

Harvesting Water for the Future: Reciprocity and Environmental Justice in the Politics of Climate Change in Peru

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Abstract

Examination of the distribution of climate vulnerability, water resources, and economic opportunities in a Peruvian watershed suggests that, rather than the concept of adaptation, a focus on political agency is important to highlight the creative and dynamic political action in local responses to climate change. Peasant farmers and herders in the Peruvian headwaters are among the most vulnerable to global warming, since they are the first to experience the changes in water supplies. Leaders in the highlands claim rights connected to a fluid ownership of water that is born in their territory and demand payments from the companies making money on this water based on the principles of reciprocity and justice. These demands are attempts at taking control of an uncertain future and as such are examples of political agency relating to climate change.

Keywords: Climate change, Water resources, Environmental justice, Political agency, Peruvian Andes

In the Colca Valley, the effects of global climate change are perceived by peasant farmers as the loss of stability—changes in the known seasonal cycle of rain, frost, heat, and drought. The greatest concern, however, is the ever-decreasing water supply due to melting glaciers, drying springs, and irregular rainfall. This article will discuss the distribution of water resources, economic opportunities, and responsibilities in the Camaná-Majes-Colca watershed in southern Peru in the wake of climate change. Along with the rest of the Global South, Peru contributes very little of the world's carbon dioxide emissions,¹ yet global warming is producing observable effects on temperature, precipitation, seasonality, glacier retreat, and water supply (Orlove, Wiegandt, and Luckman, 2008; Vuille et al., 2008; Bolin, 2009). These climate effects are unevenly distributed, both geographically and socially. Peru's national economy is one of the fastest-growing in Latin America, in great part due to the mining industry. Yet large parts of the population, especially indigenous people in the Andean highlands, are still excluded from this growth and find themselves increasingly vulnerable in terms of climate change and water scarcity.

Peru contains 70 percent of the world's tropical mountain glaciers, which are the most visible indicators of climate change worldwide because of their sensitivity to climate variations and their fast response time (Vuille et al., 2008: 80). In the Peruvian Andes, climate change has caused the world's most catastrophic glacier disasters over the past century, and scientists have been monitoring the retreat and melting of these glaciers since the 1970s (Carey, 2008; 2010). There has been a 22 percent reduction of the total glacier area in Peru in the past 35 years and a reduction of up to 80 percent of glacier surface from very small glaciers in the past 30 (Bates et al., 2008). It has been calculated that by 2025 all the glaciers below 5,500 meters above sea level will disappear, and because these glaciers provide a large part of the water used for irrigation and consumption both in rural and urban areas the consequences of rapid meltdown could be devastating (Oré et al., 2009: 56). Moreover,

climatological and hydrological measurements indicate that the near-surface air temperature in the tropical Andes has significantly increased over the past 70 years (Vuille et al., 2008: 83), and most station records in southern Peru indicate a precipitation decrease between 1950 and 1994 (Vuille et al., 2008: 84). Peruvian farmers, as well as urban citizens, politicians, and activists, increasingly perceive water as a finite resource, and water management is a concern that is growing in political importance. Throughout Peru, conflicts over water are escalating in number and intensity: in 2010, the Autoridad Nacional del Agua (National Water Authority—ANA) identified 244 social conflicts related to water resources, 22 of which were in a “critical state” (RPP, 2010).

The effects of climate change produce new uncertainties for local populations and add to existing vulnerabilities and challenges regarding adaptation to a harsh environment and economic inequalities (Crate and Nuttall, 2009). Because there are structural factors producing vulnerabilities, local environments are affected very unevenly by global climate change (Beck, 2010; Mearns and Norton, 2010). Barbara Lynch (2012: 364) argues for the Peruvian Andes that the root causes of vulnerability have more to do with social structure than with natural processes or events and that it can be produced by a water regime that favors some users and uses over others or heightens competition by encouraging new demands. Nevertheless, the responsibilities of sustainable management are being distributed among individual citizens. All over the world, governments and nongovernmental organizations (NGOs) tend to shift much of the responsibility for climate change mitigation to individuals while often allowing corporations to continue with “business as usual” (Baer, 2012: 1; Jamieson, 2009: 5). In the Peruvian Andes, individualized water management is practiced through payment for water use and through a “new water culture,” as defined by the ANA and the World Bank’s Water and Sanitation Program, which aims to teach citizens and households that they should be more efficient in their water use. Hence, responsibility is reduced from

collective solidarity to a private moral concern. This is part of an overall tendency in Latin America, where neoliberal governments since the 1990s have reduced the state's role in guaranteeing equal rights by rolling back its social responsibilities and transferring them to civil society (Dagnino, 2003; 2007).

Social scientists have for the past decade increasingly focused on the challenges of vulnerable groups facing the double exposure of climate change and economic globalization, which are discussed in terms of equity and justice (O'Brien and Leichenko, 2000; Leichenko and O'Brien, 2008; Crate and Nuttall, 2009; Liverman, 2009). However, the discussions about climate justice have mainly focused on issues at the national and global scales, while issues of equity and justice in the context of climate at smaller scales have received less attention (Thomas and Twyman, 2005). This article will discuss the distribution of responsibility and capacity for response, which embraces agency and power.² It asks in what ways the ecological crisis caused by global warming is linked to the unequal distribution of wealth and economic opportunities, on the one hand, and to the social disinvestment and shedding of public responsibility, on the other. What are the implications of the neoliberal policies since the 1970s for water legislation, climate change mitigation, social responsibility, equality of rights, and environmental justice? The article will furthermore discuss how vulnerable groups experience and respond to climate change and how they conceptualize and articulate claims about ownership, value, and reciprocity. The ethnographic material was collected in 2011 during eight months of fieldwork about water politics and water practices in the Camaná-Majes-Colca watershed. Based in Chivay, the capital of Caylloma province, Arequipa region, I visited 16 villages located at different altitudes in the watershed. The methodology included surveys, interviews, mapping, participant observation and ethnographic case studies.

Environmental Justice and Political Agency

The global discourse on climate change has turned increasingly to adaptation as a priority for research and policy (Crate and Nuttall, 2009: 9). However, several scholars have criticized the analytical use of the terms “adaptation” and “resilience” for being inadequate to explain how people struggle for change instead of just adjusting to external harms perceived as inevitable (Tsosie, 2007; Sejersen, 2009; Lindisfarne, 2010; Cassidy, 2012). Hence, I prefer to use “response” instead of “adaptation” in order to emphasize that human beings are not merely “adapting to” changes in the environment but have agency of their own, appropriating, engaging, and interacting with nature (Strang, 2004). Generally, people tend not to embrace victimhood but act according to their own projects. This approach does not mean ignoring institutional and legal barriers, which often constrain the ability to respond to climate change for many people around the globe (Crate and Nuttall, 2009: 10). Frank Sejersen (2009: 220) argues that a focus on agency “may urge us to change the focus from *how to adapt* to *how to create change* when working with climate change adaptation strategies.” He notes that “adaptation seems to reduce the full potentials of human agency and creativity, and it downplays the fact that climate adaptation is to make societal choices informed by many other concerns and challenges than climate” (239).

Climate change can be called a chronic disaster; it is diffuse and long-term, but it alters fundamentally the foundations of people’s lives (Hastrup, 2009). Living in a chronic disaster necessitates creative responses and physical and conceptual flexibility enabling a capacity for constant reorientation in the face of new experiences (Hastrup, 2009: 267). While the idea of adaptation seems to imply passive responses to external pressures, agency should be understood as “the potential to seize, create, develop, and pursue opportunities as well as to change, create, negotiate, and develop policy” (Sejersen, 2009: 219). As Kirsten Hastrup

(2012: 79) has eloquently noted: “Action is never simply a *reaction* to what has already happened; it is also a mode of acting upon anticipation. . . . It is a profound matter of *responding*, response being made within a moral horizon and within a social context that is interpreted and projected forward as people go along.” One way of responding to an anticipated water crisis is to challenge the notion of ownership of water and the distribution of rights, entitlements, and duties that follow from this. Ownership can here be understood as a culturally and historically specific system of symbolic communication through which people act and through which they negotiate social and political relations (Busse and Strang, 2011: 4). In capitalist society, there is an ideological predominance of individual private property, in which the public and moral aspects of property relations shrink and considerations of short-term gain overwhelm long-term values (Hann, 1998: 33). At the beginning of past century, the Peruvian Marxist José Carlos Mariátegui (2001 [1928]) identified the unequal distribution of land property as the main problem in Peru, where powerful hacienda estate owners controlled all the resources, including water and the labor of indigenous people within their territories. The Peruvian anthropologist and writer José María Arguedas (1974 [1935]) vividly described in the story “Agua” how the indigenous peasants had to struggle against the violent hacienda owner to get access to irrigation water. The peasant struggles in the middle of the past century eventually led to the 1969 land reform and the nationalization of water. During the neoliberal deregulations in the 1990s, there were again social protests against attempts at privatizing water, although not of the same scale and intensity as in Bolivia’s water war in 2000 (Albro, 2005). In the past decade, most of the social and environmental conflicts have been related to the extractive industries and the toxic waste that pollutes land and water in indigenous and peasant communities, leading to claims for environmental justice.

Although the term “environmental justice” was coined in the United States in the 1980s,³ popular movements that link environmental issues to social justice and livelihood

concerns have existed for a long time in Latin America. Guha (2000) observes that in the second wave of global environmentalism starting in the 1960s, the environmental movements in South America demanded social justice from the very start. Martinez Alier (1992: 12) argues that these movements—which he calls *ecologismo popular* (popular ecologism), *ecologismo de los pobres* (ecologism of the poor), or *movimientos de justicia ambiental* (environmental justice movements)—address conflicts about unequal access to nature’s services and resources, relating economic and ecological distribution to political power. According to the Peruvian sociologist Raúl Chacón Pagán (2003; 2009), the struggle for environmental justice in Peru can be traced back to the 1930s, when highland communities opposed the pollution from mining companies and the metallurgical industry. Sixty years later, during the mining boom in the 1990s, a new popular ecologist movement rose from the communities affected by mining, with the support of national and international NGOs. Today’s social protests in the Peruvian highlands are mainly directed against multinational mining companies.⁴

When global warming causes water scarcity, however, there is no local industry that can be held directly responsible. Nevertheless, there is an unequal distribution of the effects of global warming, and the areas that are most exposed to climate change are populated by poor people. Instead of finger-pointing at the industry causing global warming, local authorities and leaders in the highlands such as district mayors and leaders of irrigation organizations direct attention to industries making profit on the water that originates in their territories and the inherent injustice in this relation. They make political demands, calling for a morally just distribution of water’s economic value. The concepts of morality and justice are in the Andes intrinsically related to principles of reciprocity: an exchange of resources in which the goal is equilibrium of relations (Stensrud, 2011). People living in the headwaters claim rights connected to a fluid ownership of water that is born in their territory and demand that the

companies making money on this water take responsibility and contribute economically to the maintenance of the headwaters environment. Although these claims are based on local principles of reciprocity, they are also justified in the legal and political narrative about the value of water and its integrated management.

Water as Right, Value, and Resource

In 2009 the Peruvian government passed a water resources law justified in terms of the need to address the country's growing water problem in connection with the threat of climate change, urban population growth, and the increasing importance of the mining industry (ANA, 2010; del Castillo, 2011). Peruvian water legislation has vacillated between public and private management since the 1902 water code, which established the right to the private appropriation of water. In 1969 the reformist Velasco government introduced a new water law in which all water was acknowledged as a public good (del Castillo, 1994). In the 1990s the neoliberal Fujimori government made several attempts to privatize property rights over water, but all the 15 pre-projects for a new law failed because of strong opposition from user organizations (Oré et al., 2009: 52-53). In March 2009 the government of Alan García succeeded in passing the new water resources law, in which all forms of water are still acknowledged as state property but the way is opened for private investment in water management. The manager of the Junta de Usuarios Valle del Colca (Water Users' Organization of the Colca Valley—JUVC) used to say that the law was made “for the coast” and not for the highlands, where the population is mainly poor and indigenous, and that it was “made by the big,” the powerful politicians and companies in Lima. The JUVC was invited to Lima to give its opinion on the law proposal, but according to the JUVC manager its opinions were not taken into account: “In Lima they look at us like *cholos*. We were a few people from

the highlands with few resources.”⁵

The law is based on the principles of integrated water resource management, which during the past two decades has become the hegemonic paradigm for legitimizing and implementing water management policies (Orlove and Caton, 2010). In the law, as in other versions of integrated water resource management, water is explicitly valued as an economic good but at the same time valued as a basic human right to be equitably distributed, a principle that is not consonant with its market value (Orlove and Caton, 2010: 409). On the one hand, the law recognizes the fundamental right of human persons to consume water as well as the right of native and peasant communities to use the water that flows through their land. On the other hand, it emphasizes the economic value of water and the importance of efficient use of the resource (ANA, 2010: Preliminar Title, Article 3, Principles 1, 2, 5, and 9). As Orlove and Caton (2010: 410) point out, however, integrated water resource management hardly questions what is meant by a basic right or a commodity and does not venture into the complex political question of how its principles will be struggled over in concrete settings.

This convergence between water as right and water as commodity can be seen as intimately linked to what Evelina Dagnino (2007) has called a perverse confluence in Latin America between the participatory project linked to the emergence of social movements, equal citizens, and democratic participation and the neoliberal project of a minimal state, which requires the shrinking of its social responsibilities and the gradual abandonment of its role as guarantor of rights. One of the consequences is that issues of inequality are withdrawn from the political domain of justice and reduced to a problem that can be technically managed. Moreover, the idea of collective solidarity that underlies the classical reference to rights is now being replaced by an understanding of solidarity as a strictly private moral responsibility (Dagnino, 2003; 2005; 2007).

The water resources law confirms that the state will promote participation by creating programs for education and sensitization about the importance of water in order to generate consciousness and attitudes that foster the good use and valuation of water (ANA, 2010: Article 3, Principle 3). Giving value to water is seen as a very important step in integrated management and the ANA's idea of a "water culture" (Cárdenas, 2012), which aims to develop "an efficient culture of [water] use among the users and operators" (ANA, 2010: Preliminar Title, Article 3, Principle 9). The importance of educating water users is influenced by integrated water resource management, in which water conservation practices among ordinary citizens are constructed as a civic duty to the nation and as a gift to future generations (Orlove and Caton, 2010: 409). In Caylloma province in 2011, the JUVC and the Administración Local de Agua Colca-Siguas-Chivay (the state water administration for the region—Colca-Siguas-Chivay ALA) were promoting the new water resources law and simultaneously teaching what they considered responsible and efficient water management in irrigation and household usage. This approach tends to depict farmers as uneducated and ignorant and to disregard their traditional local knowledge of communal water management, as well as their respect for water as a living being. At the same time, both the JUVC and the ALA were also in charge of collecting payments for the right to use water and for the use of hydraulic infrastructure (ANA, 2010: Article 15.8; Article 90). Hence, in line with the valuation of water, the use rights to water come at a price, which is calculated according to the purpose and the amount of water used. The price may be experienced as high by a peasant farmer but microscopic in the budget of a mining company.

The Camaná-Majes-Colca Watershed

In the Camaná-Majes-Colca watershed, on the western slope of the Andes in southern

Peru, water is born in the headwaters basin; it comes from rain, springs, and melting glaciers and snowfields between 4,000 and 6,000 meters above sea level. It flows through the Colca Valley and Majes to the Pacific Ocean. This watershed overlaps to a great extent with Caylloma province in the highlands of the Arequipa region, where the economy is based on small-scale farming and the rearing of animals. Most of the inhabitants in the headwaters highlands are mountain pastoralists: in Caylloma there are 3,500 families who are solely dedicated to the small-scale rearing of some 400,000 alpacas and 50,000 llamas (*Correo*, July 9, 2013). In the Colca Valley there are approximately 10,000 families of peasant farmers (called “water users” by the new law) who cultivate fields of potatoes, beans, barley, and maize on a total of 12,000 hectares of land. Although there are some inequalities in land distribution (which ranges from 1/3 to 7 hectares per family), the general land tenure pattern is smallholding, with an average of 1.2 hectares per farmer.⁶ Since this is an arid environment, irrigation systems are needed, and the vertical landscapes are inscribed with centuries-old agricultural terraces and crisscrossed with networks of old and new irrigation canals of different sizes. The farmers are organized into water users’ committees that are responsible for distributing water locally and maintaining the canals through collective work. These committees are united in the JUVIC. Earlier anthropological studies in the region have focused on water distribution in terms of power and control, as well as discussing the changes and conflicts related to state intervention in water resource management (Guillet, 1992; Guillet and Mitchell, 1994; Pærregaard, 1994; Treacy, 1994; Gelles, 2000; Trawick, 2003). These issues are becoming even more critical with the increasing pressures on water resources and the effects of global warming. Uncertain future scenarios due to climate change have led to increased need for unity among water users.

Watersheds are not necessarily entirely and unproblematically present as units in nature; they vary in scale and may contain smaller sub-watersheds and connections of

groundwater (Strang, 2004; Orlove and Caton, 2010). Parts of the watershed may also be modified by infrastructure. Since 1954 water has been transferred from the Camaná-Majes-Colca watershed to the neighboring Quilca-Chili watershed, which provides water to the large city of Arequipa, as well as a hydroelectric power plant and the powerful Cerro Verde copper mine. Moreover, water from the Condoroma dam in Callalli district is taken from the Colca River and led through the large Majes canal to the pampa of Majes, where 15,000 hectares of former desert have been made fertile and now produce agriculture products for export and grass for large-scale milk production. Since the Majes project started in the 1980s, people from the highlands have been migrating there to seek new opportunities, and during the past 30 years, a new city—Villa El Pedregal—has grown up. The office of the Colca-Siguas-Chivay ALA is located in Villa El Pedregal, a location that reflects the economic priorities of the government. However, the export economy in Majes depends totally on the water from Callalli and the surrounding highland districts, which are the most poverty-stricken areas of the province.

Unstable Seasons and Dry Water Sources

In March 2011, after a month of torrential rainfall in the highlands and unexpected frost in the valley, the political authorities in Caylloma declared a state of emergency. Seventy percent of the population had been affected by the extreme weather; 25,000 young alpacas had been killed, 400 hectares of cultivated land had been lost, several irrigation canals had been destroyed, and the losses were estimated to exceed US\$1.5 million (*Perú 21*, March 18, 2011). Despite this damage caused by irregular and excessive rain, the deepest concern is that of the ever-decreasing water supply because of melting glaciers and drying springs.

According to a survey I conducted among 80 respondents between the ages of 23 and 80 in

Chivay in 2011, there was agreement that the weather had changed during the past 20 years, and 79 respondents (99 percent) had perceived more seasonal irregularity. People generally agreed that the variations in temperature were more extreme: 73 respondents (91.3 percent) reported that the heat was increasing, while 74 respondents (92.5 percent) reported colder nights and heavier frosts. Most farmers worried about future harvests, having experienced economic loss when the premature frosts in February 2011 destroyed their crops. One of my female respondents described the extreme variations in the weather in the past few years: “The seasons of frost, rain, and heat, they were different ten years ago. You saw that it rained yesterday, and it shouldn’t do that. The climate change is strong. There are no good harvests anymore. The frosts destroy them.” Sixty-nine respondents (86.25 percent) reported that there was less water overall, and one of them said,

The water is decreasing little by little. . . . We notice. Earlier they allocated water to 15 farmers a day [in my section], but now they give it only to 8. There is not enough water. Mamaccocha [a spring] is drying up. There are no springs like there used to be; they have dried up. On my father’s land there used to be two springs that gave water, and there was a little garden there. Now they are dry.

The availability of water has always been a pressing concern for the farmers and herders in Caylloma because of the arid environment, but now the decrease of water is being perceived as stronger. These changes are experienced within local weatherworlds (Ingold, 2007), and at the same time the new senses of weather unpredictability and water insecurity are increasingly being explained by reference to global climate conditions. In Peru, many NGOs and state institutions are increasingly focusing on climate change, and they are teaching the population about the causes and effects of global warming. These new discourses include the

idea of a global climate, as well as scenarios of a waterless future and the end of life and the world as we know it. Since the melting glaciers, irregular rainfall, and drying springs are seen as effects of global warming, water is now articulated as a finite resource, and the threat of water scarcity is increasingly being perceived as irreversible. Most respondents in the survey expressed concerns about the future and said things like: “It will continue to decrease while there is global warming”; “The water will dry up, and there will be nothing to irrigate our crops”; “Fifteen years from today, the water will decrease, and we will no longer be able to supply ourselves with so little water; we will lose harvests, animals, and more.”

The changes in water sources and the anticipation of a crisis are perceived as especially significant in the headwaters basin, such as the district of Callalli. Therefore, in 2011, the alpaca pastoralists, who have started to irrigate their pastures, created their own water users’ committee in Callalli. Before being formally constituted as a committee, they made an inventory of all their water sources, including their exact locations and the water flow rate for each. This was a highly political event in which the importance of organizing and uniting forces in the headwaters to protect their water resources was emphasized. The elected leader of the committee described the recent environmental changes in terms of the degradation of the earth’s ability to absorb water:

The situation in Callalli is very difficult because 10 years ago there was a lot of snow, glaciers on the mountains. Today you don’t see that. There are no snowfields, they have practically disappeared. So what happens is that when there used to be snow, there were water mattresses where each mountain deposited water. So the springs were maintained all year. Today there are no snowfields, and thus there are no water cushions deposited under the mountains, within the Apus [the mountain lords] as I consider them to be. . . . Sometimes it rains a lot, in January, February, but it rains as if

it were raining on a mirror or on a rock or on cement or something like that. It is raining, but it runs directly to the streams and watersheds and those waters go directly to the Pacific Ocean.

This situation has pushed the poor pastoralists of the highlands to get organized in order to claim their rights, develop projects for infrastructure, and solicit support from the national and regional governments, NGOs and the water users' organizations of the richer farmers downstream.

Water Harvests and Claims for Reciprocity

Projects of tree planting and the construction of micro-dams are called *siembra y cosecha del agua* (sowing and harvesting of water). NGOs started financing such projects in the 1980s to improve pastures in the highlands, and since these projects are ways of taking care of the environment in the headwaters, they have become extremely popular as a response to climate change. Today, all the irrigation committees, farmers, and politicians in Caylloma talk about the importance of harvesting water in order to meet future water scarcity. The micro-dams collect water when the heavy rains come in January and February and thus protect the soil against erosion and enable a more even distribution of water in irrigation canals throughout the year. The municipality of Callalli had several projects to build micro-dams in 2011, and it applied for financial support from other institutions, justifying the claim in terms of climate change. The introduction of the description of a micro-dam project for Palcapampa stated, "In recent years, as a product of climate change, a progressive reduction in precipitation has been observed that is reflected in the decrease of the water volume in streams and rivers." It further pointed out that this situation affected the *bofedales* (cushion

bogs) and the rearing of llamas and alpacas in these areas. The Palcapampa micro-dam was financed by the municipality of Callalli, the regional government, and the Majes pampa water users' organization. These farmers have committed themselves to support the people of the highlands of Callalli because they benefit from the water that comes from those highlands. The highlanders claim that the Majes farmers are morally obligated to reciprocate and to contribute to the necessary infrastructure. The transfer of money from the pampa to the highlands began in 2010, after almost 30 years of channeling water to the pampa, and it is presented as the result of a struggle and a victory for the poor highlands. The leader of the water users' committee in Callalli took much of the credit for this victory:

We have gotten this with a pure fight because *they* consume *our* resources. . . . I am a fighting man; I like to make things clear. I went to Pedregal and called a meeting where I made it clear that they should support the highlands with the construction of water harvests and that I would close the dam so that their lands would dry up. At first they wanted to attack me, but with the passage of time we have come to an agreement that they should contribute.

By threatening to stop the water, the point was made about that Majes is entirely dependent on the goodwill of the highlands. Moreover, all of the watershed, and especially Majes, would benefit from the water harvest: "Now the watershed and the cushion bogs and the rivers will continue to be alive and continue to maintain the water resources, because if there is no water in the high parts the people in the lower parts will practically die." The local benefits in the highlands include the creation of micro-climates, tree planting, the improvement of pastures by irrigation, and trout farming behind the dams. The committee leader was hoping to build 30 micro-dams in 10 years: "That is harvesting life for the future."

This struggle is driven by a desire to have a role in the making of the environments where people build their livelihoods. Water makes vertical connections between people in different villages, different environments, and different private and public institutions. These relations are intimately linked with negotiations about responsibility: Who is responsible for the maintenance of the headwaters—the local herders and farmers, the local or regional authorities, the government, the farmers in the pampa, the hydroelectric plant, or the mining companies? In a vertical landscape, where the lower parts depend on the actions in the higher parts, water management necessitates cooperation. Building micro-dams is a way of taking control over water's fluidity, containing and directing it where it is needed, according to different interests.

Another strategy is to attempt to direct the flow of money. Local political leaders in Caylloma are now demanding that the Cerro Verde copper mine and the electric company EGASA⁷ make payments (*canon hídrico*) as compensation to the province, since they use water that is born in the poor highlands. That “the water is born” in the highlands is a common saying among farmers in Colca. These farmers live in a relational world in which all human and other-than-human entities are interdependent. Water is given to the highlanders by the mountains, and therefore it belongs to the Apus (the mountain lords) and the territories and people of which the Apus are guardians (Allen, 1988; Gose, 1994; Gelles, 2000). Today, local leaders use the phrase “The water is born here” in their political rhetoric, which is embedded in the local worldview and directed toward regional and global issues of water justice.

Payments for water are analogous to the compensation paid by mining companies to local communities. Elmer Cáceres, who was the mayor of Caylloma in 2011, often said that water is the wealth of Caylloma and that the community cannot sit and watch others getting rich using this water and not giving them anything back: “We transform the topic of water

resources and water scarcity into an opportunity for us, because now people begin to give value to the water. . . . So when the world gives value to the water, we can say that our water costs [money].” He and other highlands political leaders who support him base their claim on the principle of valuation of water as formulated in the water resources law and the integrated water resource management paradigm. In most noncapitalist societies, land and labor have traditionally not been commodities, and water as a source of life is even harder for most people to accept as a commodity. The acceptance of ideas of ownership of water thus seems to be one more step down the road of neoliberal capitalism. Nevertheless, in this case local communities are appropriating the principle of water as value and turning it to their advantage. When the mayor explained the proposal of water payments, he justified it in terms of the principle of reciprocity that is practiced in the Andes:

Those on the coast take the water for free. . . . And we send water and send water, and the coast does not even worry whether the water is drying up in these parts, whether there are no trees or whether there are filtrations, or whether a mining company comes in. . . . The poorest areas of the Peruvian Andes are those that provide water to the coast. . . . Now we are having conversations about presenting an initiative to the Congress in order to make the law of the water payment so that the people living on the coast [can be a] part of the reciprocity that we as Andeans manage: I give you water, so you should give me something back. . . . They should pay us, and we will make schools and restore agricultural terraces and build dams. But the idea is that we sow water with a large percentage of that money. We will sow, for example, native plants around the water sources. In other words, this is all work to preserve and harvest the water.

This claim echoes the “ecologism of the poor” movement, since it denounces the unequal distribution of ecological burdens and economic opportunities. However, the claim is explicitly based on the traditional Andean practice of reciprocal exchange of labor and services (called *ayni*), which is generally not talked about in terms of justice but aims toward the equilibrium of relations. The obligation to reciprocate is seen as essential to restore balance in the web of relations that hold local communities and the universe together (Allen, 1988; Stensrud, 2011). However, the ANA engineers reject the possibility of a water payment to the highland provinces: water cannot be owned because it is part of the hydrological cycle and not stable in the ground like a mineral. As Veronica Strang (2011) has pointed out, in contrast to land and artifacts, water—along with energy and ideas—is not readily “located”: it is intrinsically fluid. Water may spring up in a particular place or flow through a particular space but it does not stay there. Unlike a mineral, water permeates wider systems in highly dynamic ways, making it difficult to separate out (Strang, 2011: 178). The claim for the water payment is thus a claim for a fluid form of ownership that implicates a different way of understanding the relations between water, landscape, and people.

These responses to new climate challenges address not only the physical environment but also the social composition of power in the watershed. Property is a relation not to an object or substance but to other persons (Hann, 1998: 4–5), and ownership can be fruitfully seen as a set of processes through which people assert and contest rights rather than a static bundle or structure of rights (Busse and Strang, 2011:4). In making claims of ownership of the value of water in a territory, the leaders of Caylloma province make claims of moral rights, duties, and common responsibilities toward the other users of the water that originates in their territory. Water cannot be possessed as an object, but the flow can be stopped and directed, and access to and rights to the use of water can be controlled. Such control can often be more important than mere possession (Hann, 1998), and by attempting to change

hegemonic relations of control and appropriate payments of water to a small highland province these communities and their leaders engage in water politics as part of their response to climate change. The claim for the water payment is based on notions of reciprocity and justice and challenges the unequal distribution of resources in the region. The entities that benefit from the water as a resource to make a profit should contribute accordingly to the sowing and harvesting of water in order to achieve a healthy environment in the headwaters, a goal that would in turn benefit all the water users along the watershed.

Conclusion: Fluid Rights and Collective Responsibilities

To understand the implications of global warming, it is of the utmost importance to look at what happens locally: human-environment relations, social conflicts, political dynamics, and creative agency. This article has particularly argued for the necessity of changing the focus from adaptation to political agency to fully understand different responses to climate change. Furthermore, scrutinizing how value, ownership and rights are conceptualized in localized responses and political demands is crucial for grasping what is going on in particular events and disputes.

In Peru, the neoliberal water policies have reduced the meaning of participation to technical management, and concerns with efficiency have come to replace the political debate on inequality and social justice. When the state's role is reduced to mere symbolism, the environmental responsibility is left to private interests and companies as well as individuals and local groups who struggle for the right to live in the headwaters environment. The danger of individualized responsibility is that it allows some to profit from investments and to shed responsibility while the majority of those already suffering the consequences of climate

change will be dependent on private initiatives and the goodwill of NGOs for survival. As a consequence, environmental and social inequalities will increase.

Climate change in the Andes is a chronic disaster that creates winners and losers, and the peasant farmers and herders in the headwaters are among the most vulnerable, since they are the first to experience changes in weather, soil and water supplies. The changes affect their crops, pastures and animals, with long-term consequences for their ability to earn a livelihood in the highlands. Hence the need to unite, organize, and make inventories of water sources in order to make political demands based on claims of fluid ownership. The difference from earlier protests against social injustice in Peru is that there is no specific local entity—no powerful hacendado or mining company—that can be held responsible for climate change. The cause is global and abstract, but the problems are concrete and the daily struggle is local. Thus the people in the highlands direct their political claims toward the unequal distribution of resources in the watershed and attempt to take control and direct the flow of water and money. Using the water resources law to their advantage, they point to the fact that if water has economic value, this value is unevenly distributed. Although the rich farmers in Majes and the Cerro Verde copper mine are not directly accountable for water scarcity in the highlands, they are included in the logic of reciprocity and solidary cooperation in the watershed. By invoking the obligation to reciprocate for the water, the highlanders request monetary payments. These claims are the result of past experiences of economic inequality and injustice on the one hand and the anticipation of a water crisis and continuing injustice in the future on the other hand. Experiences of living in a vulnerable environment and at the same time seeing that others make money on the water born in their territory lead to feelings of structural injustice. Moreover, the idea that the water belongs to the mountains and the territories of which they are guardians and therefore to the people living in these territories gives legitimacy to the claims of fluid ownership. The goal is to achieve equilibrium in the

flow of value and resources in the watershed. The highlanders' demand for reciprocal payments is a strong attempt at taking control of an uncertain future. It also implies defiance of hegemonic water policies and could therefore become part of the wider movement for environmental justice.

Notes

1. In a 2008 world ranking Peru was ranked as number 143 out of 215 with 0.38 metric tons of carbon per capita (Boden, Harland, and Andres, 2008).
2. The impacts of climate change can also be seen as unevenly distributed between men and women due to a gendered division of labor and political decision making. The "formal" rights to irrigation water tend to be predominately vested in men, and although women often feel the changes in water supplies most acutely in their work, they seldom hold positions of authority in rural communities and seldom participate fully in political meetings (cf. Li, 2008; Vera and Zwartveen, 2007). In 2011, there were some alderwomen in the local municipalities in Caylloma, but very few women were found in leading positions in the water users' organizations.
3. In the 1980s a multiracial environmental justice movement was born in the United States as a result of campaigns against toxic waste affecting poor Afro-American communities (Ikeme, 2003: 197; Stephens, 2003).
4. A few examples are Newmont's Conga gold mine project in Cajamarca, the Xstrata copper mine in Cusco, and the Southern Copper Tia Maria mine project in Arequipa.
5. *Cholos* is a term for urban Indians or highlanders, often used derogatorily by people on the coast. Peru's colonial and republican history is marked by deep economic and ethnic differences between the poor indigenous highlands and the coast, where the industrial power and the political elite are located.

6. The Colca Valley was never dominated by the large haciendas so ubiquitous elsewhere in Peru (Guillet, 1992).

7. Sociedad Minera Cerro Verde is owned by the U.S.-based company Freeport McMoran Copper & Gold. The Empresa de Generación Eléctrica de Arequipa S.A. (EGASA) is a state-owned company and the main electric generating company in southern Peru.

Biography

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References

Albro, Robert

2005 “The water is ours, carajo!: deep citizenship in Bolivia’s water war,” pp. 249–271 in June Nash (ed.), *Social Movements: An Anthropological Reader*. New York: Blackwell.

Allen, Catherine J.

- 1988 *The Hold Life Has: Coca and Cultural Identity in an Andean Community*.
Washington, DC: Smithsonian Institution Press.
- ANA (Autoridad Nacional del Agua)
- 2010 *Ley de recursos hídricos y su reglamento*. Ley No 29338. LIMA: Ministerio de Agricultura.
- Arguedas, José María
- 1974 (1935) *Agua y otros cuentos indígenas*. Lima: Editorial Milla Batres.
- Baer, Hans
- 2012 “Academic and political responsibility in confronting climate change: a personal trajectory.” *Practicing Anthropology* 34 (4): 39–43
- Bates, B. C., Z. W. Kundzewicz, S. Wu. and J. P. Palutikof (eds.)
- 2008 *Climate Change and Water*. Geneva: IPCC Secretariat.
- Beck, Ulrich
- 2010 “Climate for change, or How to create a green modernity.” *Theory, Culture and Society* 27: 254–266.
- Boden, Tom, Gregg Marland, and Bob Andres
- 2008 “Ranking of the world's countries by 2008 per capita fossil-fuel CO2 emission Rates.” Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory: <http://cdiac.ornl.gov/trends/emis/top2008.cap> (accessed December 16, 2012).
- Bolin, Inge
- 2009 “The glaciers of the Andes are melting: indigenous and anthropological knowledge merge in restoring water resources,” pp. 228–239 in Susan A. Crate and Mark Nuttall (eds.), *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek, CA: Left Coast Press.
- Busse, Mark and Veronica Strang

2011 “Introduction,” pp. 1–19 in V. Strang and M. Busse eds., *Ownership and Appropriation*. Oxford: Berg.

Cárdenas, Luis Luján

2012 “ANA busca una gestión integral del agua.” *El Peruano*, July 23.

<http://www.elperuano.pe/edicion/noticia-ana-busca-una-gestion-integral-del-agua-46169.aspx> (accessed December 16, 2012).

Carey, Mark

2008 “The politics of place: inhabiting and defending glacier hazard zones in Peru’s Cordillera Blanca,” pp. 229–240 in Ben Orlove, Ellen Wiegandt, and Brian H. Luckman (eds.), *Darkening Peaks: Glacier Retreat, Science, and Society*. Berkeley: University of California Press

2010 *In the Shadow of Melting Glaciers: Climate Change and Andean Society*. New York: Oxford University Press.

Cassidy, Rebecca

2012 “Lives with others: Climate change and human-animal relations.” *Annual Review of Anthropology* 41: 21–36.

Chacón Pagán, Raúl

2003 “El nacimiento del ecologismo popular en el Perú, o La lucha sin fin de las comunidades de Vicco y San Mateo.” *Ecología Política*, no. 24, 113–127.

2009 “El dilema de las relaciones comunitarias en minería y el desarrollo en la comunidad campesina de Rancas.” *Sociológica: Revista del Colegio de Sociólogos del Perú* 1 (1): 129-149.

Crate, Susan A. and Mark Nuttall (eds.)

2009 *Anthropology and Climate Change: From Encounters to Actions*. Walnut Creek,

CA: Left Coast Press

Dagnino, Evelina

2003 "Citizenship in Latin America: an introduction." *Latin American Perspectives* 30 (2): 3–17.

2005 *Meanings of Citizenship in Latin America*. IDS Working Paper 258.

Brighton, UK: Institute of Development Studies.

2007 "Citizenship: a perverse confluence." *Development in Practice* 17 (4-5): 549-556

del Castillo, Laureano

1994 "Lo bueno, lo malo y lo feo de la legislación de aguas." *Debate Agrario*, no. 18: 1–20.

2011 "Ley de Recursos Hídricos: Necesaria pero no suficiente." *Debate Agrario*, no. 45: 91–118.

Gelles, Paul H.

2000 *Water and Power in Highland Peru: The Cultural Politics of Irrigation and Development*. New Brunswick, NJ: Rutgers University Press

Gose, Peter

1994 *Deathly Waters and Hungry Mountains: Agrarian Ritual and Class Formation in an Andean Town*. Toronto: University of Toronto Press.

Guha, Ramachandra

2000 *Environmentalism: A Global History*. New York: Longman.

Guillet, David

1992 *Covering Ground: Communal Water Management and the State in the Peruvian Andes*. Ann Arbor: University of Michigan Press.

Guillet, David and William P. Mitchell (eds.)

1994 *Irrigation at High Altitudes: The Social Organization of Water Control Systems in the Andes*. Society for Latin American Anthropology Publication 12.

Hann, Chris

1998 "Introduction: the embeddedness of property," pp. 1–47 in C. M. Hann (ed.), *Property Relations; Renewing the Anthropological Tradition*. Cambridge: Cambridge University Press.

Hastrup, Kirsten

2009 "Arctic hunters: climate variability and social flexibility," pp. 245–270 in K. Hastrup (ed.), *The Question of Resilience: Social Responses to Climate Change*. Copenhagen: Royal Danish Academy of Sciences and Letters.

2012 "Anticipating nature: the productive uncertainty of climate models," pp. 1–29 in K. Hastrup and M. Skrydstrup (eds.), *The Social Life of Climate Change Models: Anticipating Nature*. London: Routledge.

Ikeme, Jekwu

2003 "Equity, environmental justice, and sustainability: incomplete approaches in climate change politics." *Global Environmental Change* 13: 195–206.

Ingold, Tim

2007 "Earth, sky, wind, and weather." *Journal of the Royal Anthropological Institute* 13: 19–38.

Jamieson, Dale

2009 "Climate change, responsibility, and justice." *Science, Engineering, and Ethics*.

<http://environment.as.nyu.edu/docs/IO/1192/ClimateChangeResponsibilityJustice.pdf>
(accessed July 20, 2013).

Leichenko, Robin M. and Karen L. O'Brien

2008 *Environmental Change and Globalization: Double Exposures*. Oxford: Oxford University Press.

Li, Fabiana

2008 "Negotiating livelihoods: women, mining, and water resources in Peru." *Canadian Woman Studies* 27 (1): 97–102.

Lindisfarne, Nancy

2010 "Cochabamba and climate anthropology." *Anthropology Today* 26 (4):1–3.

Liverman, Diana M.

2009 "Conventions of climate change: constructions of danger and the dispossession of the atmosphere." *Journal of Historical Geography* 35: 279–296.

Lynch, Barbara D.

2012 "Vulnerabilities, competition, and rights in a context of climate change toward equitable water governance in Peru's Rio Santa Valley." *Global Environmental Change* 22: 364–373.

Mariátegui, José Carlos

2001 (1928) *Siete ensayos de interpretación de la realidad peruana*. Lima: Empresa Editora Amauta.

Martínez Alier, Joan

1992 *De la economía ecológica al ecologismo popular*. Barcelona: Icaria

Mearns, Robin and Andrew Norton

2010 "Equity and vulnerability in a warming world: introduction and overview," pp. 1–44 in Robin Mearns and Andrew Norton (eds.), *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*. Washington, DC: World Bank.

O'Brien, Karen L. and Robin M. Leichenko

2000 “Double exposure: assessing the impacts of climate change within the context of economic globalization.” *Global Environmental Change* 10: 221–232.

Oré, María Teresa, Laureano del Castillo, Saskia Van Orsel, and Jeroen Vos

2009 *El agua, ante nuevos desafíos: Actores e iniciativas en Ecuador, Perú y Bolivia, Agua y Sociedad*. Lima: Instituto de Estudios Peruanos

Orlove, Ben and Steven C. Caton

2010 "Water sustainability: anthropological approaches and prospects." *Annual Review of Anthropology* 39 (1): 401–415.

Orlove, Ben, Ellen Wiegandt, and Brian H. Luckman (eds.)

2008 *Darkening Peaks: Glacier Retreat, Science, and Society*. Berkeley, Los Angeles, and London: University of California Press.

Pærregaard, Karsten

1994 “Why fight over water? Power, conflict, and irrigation in an Andean village,” pp. 189–202 in D. Guillet and W. Mitchell (eds.), *Irrigation at High Altitudes. The Social Organization of Water Control Systems in the Andes*. Society for Latin American Anthropology Publication 12.

RPP, Grupo Agua

2010 “ANA identifica 244 conflictos por agua”

<http://radio.rpp.com.pe/cuidaelagua/ana-identifica-244-conflictos-por-agua> (accessed July 20, 2013).

Sejersen, Frank

2009 “Resilience, human agency, and climate change adaptation strategies in the Arctic,” pp. 218–244 in K. Hastrup (ed.), *The Question of Resilience: Social Responses to Climate Change*. Copenhagen: Royal Danish Academy of Sciences and Letters.

Stensrud, Astrid B.

2011 “‘Todo en la vida se paga’: negotiating life in Cusco, Peru.” Ph.D. diss.,
University of Oslo.

Stephens, Tom

2003 “An overview of environmental justice.” *Cooley Law Review* 20: 229–247.

Strang, Veronica

2004 *The Meaning of Water*. Oxford: Berg

2011 “Fluid forms: owning water in Australia,” pp. 171–195 in V. Strang and M.
Busse (eds.), *Ownership and Appropriation*. Oxford: Berg.

Thomas, David S. G. and Chaska Twyman

2005 “Equity and justice in climate change adaptation amongst natural-resource-
dependent societies.” *Global Environmental Change* 15: 115–124.

Trawick, Paul B.

2003 *The Struggle for Water in Peru: Comedy and Tragedy in the Andean Commons*.
Stanford, CA: Stanford University Press.

Treacy, John M.

1994 *Las chacras de Coporaque: Andenería y riego en el Valle del Colca*.
Lima: Instituto de Estudios Peruanos.

Tsosie, Rebecca

2007 “Indigenous people and environmental justice: the impact of climate change.”
University of Colorado Law Review 78: 1625–1677.

Vera, Juana and Margreet Zwarteveen

2007 “The public and private domain of the everyday politics of water: the
constructions of gender and water power in the Andes of Perú.” *International Feminist
Journal of Politics* 9: 503–511.

Vuille, Mathias, Bernard Francou, Patrick Wagon, Irmgard Juen, Georg Kaser, Bryan G. Mark, and Raymond S. Bradley

2008 “Climate change and tropical Andean glaciers: Past, present, and future.” *Earth Science Reviews* 89: 79–96.
