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# The Geography of Multiple Scarcities: Urban Development and Water Problems in Lima, Peru

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## **The Geography of Multiple Scarcities: Urban Development and Water Problems in Lima, Peru**

*Abstract:* The paper discusses the contradictory evolution of water services and the politicised nature of water scarcity in Lima, the capital of Peru. It initially claims that water scarcity cannot be understood as an isolated phenomenon, but it is inserted in a wider multiplicity of scarcities that characterise contemporary urban development. The naturalisation of scarcity in the official policy discourse is then criticised for its tendency to overlook interconnected mechanisms of political differentiation and socioeconomic exploitation that influence the allocation and use of water. Against such reductionist readings, the analysis employs a non-essentialist interpretation of multiple scarcities related to water and emphasises the need to address the totality of the experience of scarcity. Based on qualitative fieldwork, which explored recent institutional reforms and the daily struggle for water in the periphery of Lima, three fundamental reasons were identified for the persistence of water scarcity: first, the expansion of water problems as a result of the poor quality of housing and the discriminatory practices against low-income residents; second, the modest improvements in water services provided by public investment programmes, which have primarily aimed to answer political and electoral demands of the ruling party; and third, the technocratic basis of new management approaches and the systematic exclusion of grassroots communities from the decision-making process. Genuine responses to the mounting water problems of Lima require a more critical appreciation of the production of circumstantial abundances and totalising scarcities in the city.

*Keywords:* scarcity, water supply, urban policies, political ecology, water services, multiple scarcities, Lima, Peru

### **1. Introduction: Urban water scarcity**

The water problems of Lima, the capital of Peru, have become commonplace in the global debate over urban water scarcity. The struggle to provide water for more than nine million people has attracted growing attention from academics (e.g. Chevallier et al., 2011; Fernández-Maldonado, 2008), multilateral agencies (e.g. UNDP, 2006; UNESCO, 2006) and international initiatives (e.g. projects Liwa and Switch).<sup>1</sup> A comprehensive assessment of the water services of Lima has recently highlighted the seriousness of the deficit between supply and demand, aggravated by the high rates of urban expansion and environmental change (SEDAPAL, 2005). Furthermore, there is evidence of reductions in the average flow of the three local rivers between 1992 and 2004 (19.5% of the Chillón, 13.3% of the Rímac and 33.0% of the Lurín) and of the dwindling storage of water in upstream reservoirs between

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<sup>1</sup> Liwa (<http://www.lima-water.de>); Switch (<http://www.switchurbanwater.eu/index.php>).

2000 and 2004 (Seifert, 2009). That grim situation was vividly reported in the BBC News article “Peru’s Alarming Water Truth”, which nonetheless focused mainly on the melting glaciers in the Andes and the expected reduction in water availability for the metropolitan region.<sup>2</sup> Its author argues that “Peru’s water problem lies in part in the peculiar geography of the country”, which has more than seventy per cent of the population living along the semi-arid coast where only two per cent of the nation’s water reserves are found. Mounting water scarcity is described in the article as a serious barrier to economic growth and, in the words of local political leader, “how on earth can we develop Peru in a sustainable way over the coming years [without a reliable supply of water]?”

If it is important to acknowledge the trend of water management problems in Lima, it is also significant to observe that water scarcity has been largely interpreted, as the above examples illustrate, as the result of very low rates of rainfall, river degradation, groundwater depletion and aggregate population growth. There has been limited scholarly work on the intricate synergies and spatialised connections between multiple forms of scarcity and the associated production of contained, temporary forms of abundance that underpin water problems. The scarcity of water is certainly a physical phenomenon, but it is also the result of the intersection between poverty and inequality. In this article we claim that, rather than a process that happens in isolation, the geography of water scarcity in Lima has been shaped by the politicised basis of resource allocation, use and conservation. The scarcity of natural resources, such as water, is not external to social relations, but is a collective violence perpetrated by some social groups against other members of society. Particularly in the context of disorganised urban development, a condition of water scarcity acts like a mirror reflecting back social inequalities and spatial disputes. Taking into account the compound causes and effects of water scarcity, the contribution of this paper is to demonstrate that water

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<sup>2</sup> Available on 12 Mar 2007 at: <http://news.bbc.co.uk/1/hi/world/americas/6412351.stm>

scarcity is synergistically connected with multiple other material and sociopolitical deficiencies which concurrently produce the total experience of scarcity.

This paper deals more specifically with the economic, managerial and political sources of water scarcity problems in Lima and the effectiveness of governmental responses in the two recent decades. It will be argued that the essentialisation of the causes of water scarcity has permeated most policies, official assessments and investment plans. The naturalisation of scarcity, however, has led to technocratic and apparently consensual solutions that, in the end, only perpetuate mechanisms of social differentiation and political manipulation. Those initiatives, rather than overcoming it, have further consolidated the symbolic and lived dimensions of water scarcity. The persistence of water scarcity provides an important entry point into the failures of urban policies and socioeconomic development. The intricacies of the local circumstances of Lima also serve as a compelling case study for questioning the conceptual and empirical treatment of scarcity more generally. In spite of human development being a perennial struggle against social scarcities (Sartre, 1976), there still exist a large number of disparate interpretations of the core meaning of scarcity. Even economists, for whom scarcity is the cornerstone of the profession, typically deploy a mechanical understanding of the implications of scarcity due to the supposed substitutability between resources and capitals (Perelman, 2007). Such superficial conceptualisations of scarcity have the convenient consequence of moving the debate away from political economy and “the brutal realities of actually existing capitalism” (Panayotakis, 2011: 108).

Our examination of water scarcity in Peru is based on fieldwork carried out in 2009, which included policy analysis, archival research and 54 in-depth interviews with local residents, regulators, policy-makers and parliamentarians, NGO activists, workers and managers of the water utility, and representatives of multilateral agencies. The fieldwork was appropriately conducted in a moment of apparent plenty of water because of the

announcement of new contracts and construction works. Two communities were selected for the study (Villa El Salvador and Huaycán, respectively in the south and east areas of the city) due to their historical relevance in terms of housing development and demands for improved water services, as well as because of the presence of established community networks and local NGOs. Interviews were transcribed, coded and translated by the author. Public policies and government documents, including material gathered after the actual fieldwork, were also analysed and contrasted with the discourse of the low-income population and the organised groups of protest. By combining the various sources of information it was possible to reconstruct the multidimensional, politicised relations that produce and maintain the experience of water scarcity. The empirical results reveal how the daily struggle for survival, against the odds of a large metropolitan area, requires persistent and creative coping strategies to secure household water. Furthermore, the fragile basis of the expansion of water supply in Lima contains the germ of further conflicts and new scarcities.

## **2. Scarcity and abundance: Contested droplets of truth**

### *2.1. A non-essentialist interpretation of water scarcity*

It borders on tautology to observe that water is unequally distributed and unevenly used across the surface of the planet. Quite often water supply fails to meet demand for shorter or longer periods of time, therefore producing a situation of water scarcity that can be localised or more geographically widespread. However, without denying the important climatic, geological and hydrological factors, the primary cause determining scarcity is the way water is actually managed (Rees, 1982). Water scarcity is a relational condition that arises out of socionatural interactions in time, space and scale. The scarcity of water in semi-arid Sicily, for example, does not derive from low rainfall alone, but it is mainly the outcome of disjointed, incomplete and often malfunctioning techno-natural networks (Giglioli and Swyngedouw, 2008). Likewise in Syria water scarcity has been produced and naturalised

through economic development policies and the political agenda of the ruling Ba'th party (Barnes, 2009). Nonetheless, a large number of official documents and technical assessments still tend to neglect the relational and politicised basis of resource scarcity and limit the analysis to the (utilitarian) balance between supply and demand (e.g. Baumgärtner et al., 2006; Homer-Dixon, 1994). According to the mainstream orthodoxy, the scarcity of water is the result of a combination of physical insufficiencies, environmental determinism and imperfect, costly market transactions. The unavailability of water has been interpreted by the theorists of ecological modernisation as the failure to capture its monetary value and to realise its full economic potential (Ioris, 2010). Common property institutions are also held responsible for the wasteful use of natural resources, whereas free-market responses and private property regimes are seen as the answer to the risks posed by environmental degradation and ensuing scarcity (Matthew and Gaulin, 2001).

The array of regulatory toolkits included in the new water legislation – such as water licences, user fees, payment for ecosystem services and utility privatisation – are all rationalised in relation to rising levels of scarcity (Kaika, 2003; Loftus, 2006). Because it is defined as scarce, water is reontologised by the hegemonic groups as an economic resource and becomes susceptible to the same rationality (i.e. production for the market) that was paradoxically responsible for the sources of scarcity in the first place (see Swyngedouw, 2004). Mainstream interpretations thus operate within a narrow techno-bureaucratic episteme (Ioris, 2008) in which scarcity emerges as a 'meta-narrative' that justifies simplistic solutions to conflicts and disputes (Mehta, 2007). The ordinary symbolism of scarcity ultimately represents a political rallying point around which administrative networks emerge and are perpetuated (Alatout, 2009). This reductionist focus on physical scarcity and on the purely economic responses obfuscates, rather than illuminates, the understanding of the natural resource scarcity. As pointed out by Harvey (1974: 272), the scarcity of resources

presupposes certain social ends and “it is these that define scarcity just as much as the lack of natural means to accomplish these ends”. Paraphrasing Marx (1956: 51) we can argue that scarcity and abundance are opposite poles that form a single whole, while the crucial question is the position that each one occupies in the antithesis.

We therefore submit that water scarcity should be understood from a *non-essentialist perspective*. It means that scarcity cannot be described in absolute and aprioristic terms, but it is the result of intricate relations between human groups and their socio-natural circumstances. In the Hegelian sense (Hegel, 2008), there is already a logical development of resource scarcity in unequal societies, insofar as it renders itself concrete due to the asymmetrical distribution of opportunities between social groups and classes. A non-essentialist interpretation rejects scarcity as a purely physical and economic phenomenon, but emphasises the contingency of socio-spatial relations that affect the allocation and use of resources. A non-essentialist understanding of the allocation and use of natural resources is associated with what Panayotakis (2003: 90) describes as the dialectics of scarcity, something that is inherent in the contradictory basis of capitalist societies: “the capitalist economic process that reproduces scarcity artificially also enriches human needs and creates the preconditions for overcoming scarcity”. It is relevant here to recall that classical political economists, such as Marx, already identified an intrinsic association between the structure of market institutions and environmental degradation, in the sense that scarcity derives from the way capitalism relates to nature (Perelman, 1996). Marx examined the balance of power involved in the private appropriation of the ‘forces of nature’, such as water features, that are marshalled for rent-seeking and for the overarching accumulation of surplus value. Marx further observed that those who own a waterfall are in a position to “exclude those who do not from using this natural force, because land, and particularly land endowed with water power is scarce” (quoted in Harvey, 2006: 336).



By acknowledging the non-essentialist origins of scarcity, it is possible to go beyond simplistic descriptions of resource shortage and open up the possibility of creatively addressing the causes and consequences of water scarcity. In particular, it should be noted that the persistence of scarcity in capitalist societies is in effect closely related to the expansion of a specific model of economic growth and national development according to the Western 'project' of modernity (Habermas, 1981). A condition of resource scarcity is contingent upon specific socio-natural interactions and the broader, historical relations of production and reproduction more broadly. Although it is certainly possible to identify at the centre of Western modernity the pursuit and realisation of scarcities (Xenos, 1989), we should also recognise that the goals of modernity are not a monopoly of the Western society (Robinson, 2006). For instance, in Latin America, the expansion of the modernist project has never been completed, but conflicting views of modernisation co-existed and have been even displaced by post-modernist environmental sensitivities, often imposed by donor agencies (see Laurie and Marvin, 1999).<sup>3</sup> Scarcity, as much as modernity, is a contested concept that needs to be critically reinterpreted in order to understand the failures and the prospects of allocating and using water more fairly.

## *2.2. Multiple scarcities and the urban space*

The foregoing non-essentialist conceptualisation of water scarcity is even more clearly demonstrated in the context of urban development. The city is a mosaic of places and locations where water is unevenly stored, processed, conveyed, used, wasted and recollected according to a range of socioeconomic relations and political interactions. The contemporary city is a locale that presupposes renewed forms of scarcity, which nurture novel opportunities for the circulation of capital (through investments, management and tariffs) and the endorsement of political power (through the promise and the administration of scarcity-relief

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<sup>3</sup> Many thanks to an anonymous referee for this observation.

schemes). In the words of Swyngedouw (2004: 30), “the mechanisms of exclusion from and access to water manifest the power relationships through which the geography of cities is shaped and transformed”. Furthermore, when considering the dilemmas of contemporary urban development, Lefebvre (2003: 161) observed that “urbanism provides a presentiment of new scarcities” and it raises the prospects of exploring them according to the balance of power. For Lefebvre, the city is the realm of manifold scarcities, such as scarce space, time, desire and elements (not only water, but air, earth, the sun), whose management encapsulates inequalities and is instrumental in the perpetuation of exploitation. As a result, there exist a number of concurrent forms of scarcity associated with water, which are also the outcome of sustained forms of inequality and discrimination. It is the combination of converging manifestations of scarcity that ultimately serves to reinforce policy failures and the precariousness of public water services.

Particularly in the megacities of the Global South, the cartography of water scarcity closely follows the legacy of colonial rule and the troubles of post-colonial development. Water distribution problems are often more severe in zones occupied by deprived populations and in areas where the communities are weak and unable to exert political influence. That condition calls for a conceptualisation that adequately connects the pattern of water services with the concrete suffering of marginalised sectors of urban society. Such a framework should be able to address the complexity of the city and situate water scarcity in relation to the synergistic effects of other important forms of economic, political and social deficiencies. In that regard, the concept of *multiple scarcities* provides the needed analytical device to understand the persistence of water problems in the city in a broader context of cumulative problems. Water scarcity is not a single, monothematic phenomenon but it must be decoded as the locus of various intervening scarcities, including those derived from enclosed and circumstantial forms of abundance (for example, the construction of expensive households

with high rates of water use in cities already suffering from the lack of water services in low-income areas). Consequently, the scarcity of water should be treated as a plural, compounded phenomenon, something that is also an integral factor in the formation and replication of highly asymmetric social landscapes. The multiple forms of scarcity have many repercussions for the social production of space, especially in large cities where the convergence of manifold forms of scarcity becomes the prevailing pattern of the lived space. In those situations, interpersonal and domestic forms of discrimination, as in the case of the female members of poor homes who are often put in charge of fetching water for the family (Laurie, 2011), typically add another layer to the overall association of multiple scarcities in deprived areas.

It should also be observed that previous studies dedicated to the examination of multiple scarcities have provided only a superficial discussion of the same phenomenon. For instance, Homer-Dixon (1991) presents a neo-Malthusian argument to describe the interactive and feedback effects of simultaneous shortages of resources and environmental degradation. According to this interpretation, unsustainable practices, population growth and structural failures are cumulative factors that interact in ways that create or exacerbate multiple scarcities. Similarly, Buxton et al. (2003) affirm that multiple scarcities are a problem when they prevent the advance of market-based solutions for the development of the region and the resolution of pending socioenvironmental degradation. Departing from such teleological conceptualisations of multiple scarcities, which fall short of addressing the underlying synergies between physical, social and political processes, we contend that the explanation of water scarcity requires both a non-essentialist perspective and the identification of multiple, synergistic mechanisms of inclusion and exclusion. Those two concepts – i.e. non-essentialist and multiple water scarcities – have important implications for

urban geographical investigations and indicate the importance of considering the totality of scarcity, as we see next.

### *2.3. The totality of the experience of scarcity*

By taking into account the non-essentialist interpretation of water scarcity and the intersection of multiple scarcities that helps to produce the urban space, it is possible to realise that situations of water scarcity are experienced together with the violation of socioeconomic rights and the unavailability of other important resources and services. The production of urban water scarcity arises from mechanisms of political differentiation and spatial inequality that intervene in the allocation and use of resources and opportunities. In that context, the presence of one form of scarcity (for example, limited housing rights or restricted political representation) directly and indirectly compromises the mitigation of other forms of scarcity (such as water). In other words, the scarcity of water is constantly recreated and reaffirmed by the existence of simultaneous and synergistic expressions of scarcity. The specific level of suffering depends on the status and position of individuals and communities, but the scarcity of water is always part of the *totality of the experience of scarcity*. For instance, the distress caused by the insufficiency of water is often experienced with environmental degradation and social exclusion, which together generate an integral sensuous-emotional experience in the everyday lives of urban dwellers. In the words of Lukács (1971: 10), the concrete totality is the category that actually governs reality. The category of totality helps to determine not only the object of knowledge, but also the subjects and how they are posited in the totality. The consequence is that “the destruction of a totalising point of view disrupts the unity of theory and practice” (Lukács, 1971: 39). This last statement has important practical implications for the examination and response to urban problems, such as, in our case, the sociospatial production of water scarcity.

The claims made above will inform our analysis and understanding of the scarcities associated with water in the Peruvian capital city. The recognition of the politicised basis of the totality of the experience of scarcity is central for examination of problems and potential solutions to the actual shortcomings of local water management in Lima. Historically, the relatively limited water reserves along the semi-arid coast of Peru did not prevent the indigenous people from cultivating large extensions of irrigated fields and constructing several pyramids in the area that is now the metropolitan region of Lima (Conlee et al., 2004). However, since the early days of colonisation, water management had been translated into a constant struggle to tame the local hydrology and satisfy, in highly asymmetric ways, the demands of the growing population. In more recent years, the multiplicity of urban scarcities has been managed through social and political dislocations that simultaneously bring new forms of selective abundance and generalise the experience of scarcity. That is, the totality of the experience of scarcity has not been negated by the emergence of localised, circumstantial forms of abundance in the wealthier neighbourhoods or during government investment programmes. On the contrary, the multiple scarcities of Lima have been repeatedly reinforced through institutional reforms and government initiatives carried out under the discourse of universal water services, as we begin to examine.

### **3. The geography of multiple scarcities related to water in Lima**

The empirical section of this paper applies the non-essentialist interpretation of the multiple, interrelated scarcities related to water in order to address the totality of the experience of scarcity in Lima. Based on fieldwork that explored institutional reforms, sectoral disputes and the daily struggle for water in the periphery of the city, three fundamental aspects of the reinforcement of water scarcity in the city were identified, namely: a) the evolution of water problems as a result of scarce housing supply for the poor (due to the exclusionary priorities of urban and national development); b) the misleading and

ephemeral nature of the abundances created by recent governmental programmes (primarily aimed to answer to political and electoral demands); and c) the technocratic basis of new management approaches and the systematic exclusion of grassroots communities.

### *3.1 The interrelated scarcities of water and housing*

The evolution of the water problems of Lima reveals a multiplicity of scarcities entangled in the production of the urban space. The low rates of rainfall along the semi-arid Peruvian coast (around 25 mm/year, cf. Vince, 2010) were a matter of serious concern for the colonial authorities already at the foundation of the capital in the early 16<sup>th</sup> century. Public water supply was restricted to the manor houses, convents and official buildings that controlled the production and export of precious metals (silver in particular). Water was mainly abstracted from the small River Rímac and distributed through a combination of public fountains and private water vendors, who normally employed slaves and donkeys to carry water through the streets of the city (the so-called *aguateros*, see SEDAPAL, 2003). Disputes involving the water access were resolved by the Dedicated Water Tribunal (*Juzgado Privativo de Aguas*), established in Lima in 1556 to deal with matters involving the landed nobility, the clergy and artisanal industrialists (according to our research in the Archivo General de la Nación, Lima, March 2009). The formal provision of public water services began in the 1850s, with the sudden, but circumstantial availability of state funds for investments in pipelines during the guano bonanza that lasted between 1845 and 1880 (Miller and Greenhill, 2006). Lima attracted more and more people in search of jobs and opportunities, but the low-income migrants could only find accommodation in old derelict buildings or under improvised constructions in the colonial centre with no running water (Bertram, 1991). The transfer of large numbers of people to Lima also served as an antidote against claims for agrarian reform and scarcity of agriculture land in the provinces (Collier, 1976).

Because of the limited number of affordable homes available for the working class and the poor migrants, an entire 'illegal city' was created within and around the more central areas (Calderón Cockburn, 2005). As in most of the continent, city expansion was particularly significant between the 1950s and 1970s, when the rate of demographic growth reached more than 5% per year (IMP, 1989). Industrialisation in Peru followed the traditional pattern of import substitution, only later and at a lesser scale than the larger Latin American economies (Wise, 2003). During the government of President Odría (1948-1956), a total of 3,500 houses were built, which was insufficient to accommodate the 30,000 or 50,000 new migrants that were arriving in the city every year (Driant, 1991). The growing number of squatter settlements – known locally as *barriadas* – became the main alternative to the incoming population of Lima. The *barriada* is a form of urbanisation where first a plot of land is obtained (normally by occupying a public or private area) for the construction of dwellings and where urban services, including water, arrive only much later, if ever (Barreda and Ramirez Corzo, 2004). The water treatment plant of La Atarjea was inaugurated in 1956 with the capacity to produce 5 m<sup>3</sup>/s, then considered to be one of the largest in the world (SEDAPAL, 2003), but still barely serving the metropolitan areas that contained the wealthier neighbourhoods, government buildings and industries. According to the office of national statistics, in the 1960s Lima contained 67% of the national industries, which contributed to aggravate the already serious condition of water shortage in the capital.

The administration of President Prado (1956-1962) had to accept the *barriadas* as the new inescapable reality of Lima and instructed public agencies, as well as universities, to assist the settlers to build their homes even in non-regularised areas. At the same time, the liberal government of Prado supported private housing construction projects to serve the also swelling needs of the middle classes. With the obvious impossibility of attending to the increasing demand for houses, the *barriadas* then became an unavoidable feature of the urban

expansion of Lima and their tacit acceptance was a form of ‘implicit agreement’ between the state and the poor to allow peripheral informal settlements.<sup>4</sup> The formation of the *barriadas* was no longer only a spontaneous process initiated by the population in the face of scarce urban space, but was gradually transformed into a semi-official policy for dealing with the uncontrollable rates of city expansion. A new law in 1961 defined the legal status of the existing *barriadas* and provided the legal framework to integrate squatter settlements to the city (through a process called ‘physical and legal regularisation’). The crucial role played by the *barriadas* in the urbanisation of Lima was recognised by authors like Turner (1967) as a viable alternative to the growing lack of residences in the capital. Turner and others saw the dynamic and creative nature of the *barriadas* as a form of ‘self-help’, something that should be supported and legalised rather than simply condemned. Under the state capitalism policies of General Velasco (1968-1975), there was an evident reduction in the construction of regular houses and a tacit tolerance of the expansion of the *barriadas* (described by Riofrío, 1978, as ‘double-sided policy’). Between 1960 and 1968, 111 new *barriadas* were established in Lima, especially in the so-called North Cone of the capital (Calderón Cockburn, 2005). The military government also systematically tried to contain political protests and to domesticate popular organisation through the activity of SINAMOS (National Social Mobilisation System), a government-sponsored social mobilisation agency aimed to control public participation (Lloyd, 1980). The scarcity of houses was, thus, mitigated through the ascent of the *barriada* as an inevitable feature of the emerging metropolis of Lima, but at the expense of political freedom and the ability to criticise the work of public authorities.

The *barriada* was officially renamed by the military government as ‘new settlement’ (*pueblo joven*) and, in the 1970s, the expansion turned towards the South Cone. In 1976, Lima had 319 *barriadas* (188 *barriadas* were created between 1968 and 1980), which then

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<sup>4</sup> Another helpful point made by an anonymous referee.



contained a population of almost one and a half million people (Calderón Cockburn, 2005). The distinctive disparity between the water supply to central settlements and to the *barriadas* remained evident, despite some significant improvement in the 1970s due to sustained grassroots protests and concessions from the national government (Zolezzi and Calderón, 1987). Table 1 provides an overview of the expansion of services and the persistence of problems and inequalities in the period. In the 1980s, the main axis of expansion became the East Cone, as well as the borders to the other cones, with most of the new residents no longer migrating from the inland of the country, but from the older *barriadas* where houses were becoming increasingly scarce (Driant, 1991). The national and metropolitan branches of the state were increasingly powerless to deal with the constant spread of the city and the rising level of economic informality, which was defined by Matos Mar (2004) as a phenomenon of ‘popular overflow’. Furthermore, because of the ineffectiveness of the state, the *barriadas* of Lima were converted into one of the main battlefields between leftist terrorist groups and the military forces, which only served to make the expansion of water infrastructure even more difficult. Movements such as the Maoist Shining Path found in the *barriadas* a safe option to hide and plan subversive activities, although they also faced systematic and organised opposition from local groups of residents, as in the case of neighbourhood security committees that established some collaboration with the local police (Kruijt and Degregori, 2007).

**Table 1.**  
Uneven Evolution of Water Supply Between Regular Neighbourhoods and the *Barriadas* of Lima (1972-1981)

Type of neighbourhood	Percentage of water supply (per source)							
	Public water		Water fountain		Water tankers		Other sources	
	1972	1981	1972	1981	1972	1981	1972	1981
Residential districts	94.56	96.11	2.00	1.70	0.66	1.02	2.78	1.17
Mixed districts	97.29	96.73	1.12	2.57	0.09	0.11	1.50	0.59
Peripheral districts	68.92	69.97	6.96	6.64	10.29	14.58	13.83	8.81
Barriadas	24.51	67.39	2.55	3.94	68.46	19.62	4.48	9.05
Other districts	36.41	39.71	8.72	4.97	33.55	29.61	21.32	25.71
Total of Lima	72.27	79.18	5.93	5.60	16.65	9.93	5.15	5.29

For more than half century since the 1930s, the urban perimeter of Lima had undergone a rapid process of expansion but the investments in the water system remained

largely localised. The prevailing tone of the (mainly reactive and tardy) water policies was the conversion of the responses to scarcity into a scarcity of responses. To be sure, as part of the process of industrial growth and economic development, minimal volumes of freshwater needed to be provided to the urban population to secure, at least, the maintenance and reproduction of the workforce. But the provision of water services still occupied only a secondary place in the structure of public administration. It was only in 1962 that public water services were reorganised as a metropolitan utility, which received its current denomination, SEDAPAL (Drinking Water and Sewerage Service of Lima), as recently as 1981. In the early 1980s, around 20% of the population still relied on private water vendors and, among those with access to public services, 40.6% suffered from intermittent supply; 50% of treated water was lost due to leakage and illicit connections (Zolezzi and Calderón, 1987). The persistent problems with the supply of safe water deteriorated further with the macroeconomic turbulence and political instability under President García (1985-1990). The fact that water services became increasingly precarious was an integral part of the production of a generalised condition of scarcity in the city (Dietz, 1998). This context of political and economic turmoil led to the unexpected election of Fujimori (1990-2000), a political outsider who soon started to implement a package of comprehensive neoliberal policies. Despite the gradual recovery of the economy in the 1990s (which nonetheless led to higher unemployment and lower wages, see Wise, 2003), the occupation of new areas, in old and new *barriadas*, remained the main resort available to a large proportion of newcomers or second generation residents (Portes and Roberts, 2005). In the period between 1993 and 1998, 208 additional *barriadas* were established and mainly occupied steep slopes prone to erosion and landslides.

During most of the 20<sup>th</sup> century, ill-planned, hasty urbanisation followed the pattern of land shortage and guaranteed the perennial continuation of multiple scarcities, including

the shortage of housing and the lack of water. If in 1956 the *barriadas* of Lima accommodated 10% of the population (119,140 residents), in 1993 they contained 34.4% of the population (1.9 million residents), according to Calderón Cockburn (2005). In 2004, the *barriadas* reached 43.4% of the metropolitan population or more than 3.5 million people (CONAM, 2004). Nowadays, the poorest neighbourhoods still concentrate the higher proportion of the population not served by public water services, although even in the wealthier areas it is possible to find pockets of houses without access and depending on alternative sources of water. As can be seen in Table 2, the legacy of urban development is still apparent in terms of unequal water supply across different levels of household income. Some economic growth achieved since the introduced of state reforms in 1990 was mainly translated into material benefits only for the small urban elite at the expense of an increasing sociospatial discrimination. The more than three million residents of the *barriadas* regularly undergo a sense of uncertainty that derives from the fast rate of urban transformation, the explosion of mass consumption values, the precarious labour market and serious levels of violence (Grampone, 1999; Joseph, 2004; Kruijt and Degregori, 2007). It is in the context of uncertainty and vulnerability that the recent initiatives of water management in Lima have been introduced, which have significantly increased the monetary and technological symbolism of water but also left the origins of the multiple scarcities virtually unchanged.

**Table 2.**

Relation between Income and Water Supply in Selected Municipalities of Lima (year 2007). Source: INEI and SEDAPAL databases; compiled by the author.

Municipality	Percentage of water supply (per source)				Total number of households
	Public water	Water fountain	Water tankers	Other <sup>a</sup>	
<i>High income municipalities</i>					
Jesús María	99	1	0	0	18,234
Miraflores	100	0	0	0	27,913
San Borja	100	0	0	0	28,269
San Isidro	100	0	0	0	17,860
<i>Medium income municipalities</i>					
Cercado de Lima	96	1	1	2	75,418
La Molina	98	1	1	0	32,945
Lince	99	1	0	0	15,701
Surquillo	98	0	1	1	23,671
<i>Low income municipalities<sup>b</sup></i>					
Ate	69	5	19	7	108,849
Carabaylo	53	10	31	6	46,933
Cieneguilla	43	2	39	16	4569
Independencia	60	4	1	5	41,239
Lurigancho	40	7	31	22	38,756
Lurin	50	5	24	21	14,562
Pachamac	11	4	73	12	17,403
Puente Piedra	40	21	22	17	51,150
San Juan de Lurigancho	78	9	9	4	189,671
San Martín de Porres	86	1	10	2	123,863
Villa El Salvador	78	3	15	4	75,883

<sup>a</sup> Others = borehole, river, neighbour, etc.

<sup>b</sup> In the more distant and smallest municipalities (Punta Hermosa and Punta Negra) still around 97% of the population had to rely on water tankers.

### 3.2 (Neoliberal) state initiatives and the persistence of problems

As discussed above, the water problems of Lima were gradually aggravated by the overall situation of scarce homes and partial integration of the incoming migrants into the economy and society of the city. The magnitude of the problems became even more evident when an outbreak of cholera erupted in 1991 in Lima, after a century without similar incidents. The epidemic was caused by an inadequate public health infrastructure and microbial contamination of water supplies (Tickner and Gouveia-Vigeant, 2005). After a long period without investments, the poor performance of the water supply and sanitation services provided the political justification for the Fujimori administration to include SEDAPAL in the list of public utilities to be privatised. SEDAPAL was then seen as a company with inadequate system maintenance, a high level of unaccounted-for water, excess staff, low metering rates and low water quality, at the same time that the national state was portrayed as unable to resolve the trend of problems and in need of the private sector (Corton, 2003). The centrality of scarcity in the reports and assessments during that phase – rather than the more politicised concepts of poverty, dispossession and unfairness – was a clear indication of the

preference for technocratic responses and private sector involvement (for instance, described by World Bank, 1994). In other words, the grim condition of the water services transformed scarcity from a problem into an outstanding opportunity for market-based solutions. More significantly, the plan to privatise the water utility of Lima was the implicit recognition of financial and technical scarcities as the emerging drivers of urban policy-making.

Among the neoliberal policies advanced by the Fujimori administration there was the intention to privatise the water utility of Lima. For the market-oriented technocrats who were managing the privatisation process, the participation of private companies in the water services of Lima was highly desirable under the justification that it would restore business confidence, remove the obstacles to modernisation, improve services and eliminate a fiscal drain (Alcázar et al., 2000). The perceived scarcity of water in Lima prompted, somehow paradoxically, a sudden abundance of money used to prepare SEDAPAL to be privatised, which came from reductions in labour costs, higher consumer tariffs and a financing package of US\$ 600 million provided by the World Bank and other agencies (Alcázar et al., 2000). Following the publication of the tender notice in appropriate newspapers, three international consortiums prequalified to bid for the concession of the water service in November 1994. However, due to various operation and political problems, the process was postponed several times and eventually cancelled in 1997. The main reason for cancelling the privatisation was that its political price was not affordable to the president (the hesitation of the government to privatise SEDPAL was mentioned in several of our interviews; one interview pointed out that “the institutional context in the early 1990s was moving towards the privatisation of SEDAPAL, new legislation and the new regulatory agency [SUNASS] were introduced, but the ultimate goals of public policies was not the sustainability of services, but the political use of water... water is votes in Lima”; Interview, 16 May 2009). Because of the confrontational nature of the neoliberal reforms introduced by Fujimori, his popularity was declining

nationally and Lima was one of the main political strongholds in his campaign for re-election, so it was very risky to press forward with the privatisation.<sup>5</sup> In 1995 Fujimori was re-elected and the management board of SEDAPAL embarked upon a second and larger programme of operational recovery independently of utility privatisation (at least in the near future).

In effect, during Fujimori's second term of office the water utility of Lima received considerable sums of public funds (it is estimated that reached US\$ 2.44 billion, equivalent to 14% of the public investment of the 1990s or 0.5% of the GDP) that were spent mainly on pipeline replacement and leakage control (SEDAPAL, 2005). Yet, water provision was still concentrated in the higher income areas, which had 40% of the population consuming 88% of the total water, while the poorer 60% only used 12% of the total (CENCA, 1998). In the more distant or hilly locations, where standard water infrastructure was too costly, a series of alternative projects were adopted with the help of NGOs and with international funding. The most notable initiative was APPJ (Water for New Settlements), which was specifically supported by the European Union (€12.3 m) and aimed to build 214 community systems comprised of a cistern, filled by water tankers, and distribution through hosepipes (Bonfiglio, 2002). Those emergency solutions, however, did not prevent the operation of private water vendors; on the contrary, 70% of the population remained affected by intermittent service disruptions and had to systematically purchase water from private sellers (ICOM, 2001). If the poor residents were expected to purchase water in the black market the rate of salary increase was negative between 1995 and 2001 (-19.13%), at the same time that the rate of inflation achieved 58% in the same period; as a result, low-income residents had to spend 48% of their earnings on food and drinking alone (data from Morales Saravia, 2005).

With the abrupt end of the Fujimori government (under corruption scandals and other criminal allegations) and the gradual return to formal democracy under President Toledo

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<sup>5</sup> Similar political support in Lima was obtained years later by Keiko Fujimori, daughter of Alberto Fujimori, in the presidential elections of 05 June 2011 (eventually won by Ollanta Humala due to the majority of votes he managed to secure in the provinces).

(2001-2006), SEDAPAL faced a deteriorating financial situation (which reflected the macroeconomic problems in the country). Tariffs started to increase again and become a main dispute between SEDAPAL and the regulatory agency SUNASS (Bonifaz and Malásquez, 2008). The average tariff rose from US\$ 0.39/m<sup>3</sup> in 2001 to US\$ 0.77/m<sup>3</sup> in 2008, an increase of 97.4% (Interview, SUNASS manager [National Sanitation Service Superintendence], 06 May 2009). After initial instability, the economy resumed growth under Toledo, although the level of social poverty persisted significantly high at around 35% of the population of Lima (Morales Saravia, 2005). For those without access to mains water, the alternative continued to be the purchase from private water tankers.<sup>6</sup> On average, poor families in the periphery could only afford 30 litres per capita per day in the private water market (by comparison, the average consumption in San Isidro, the wealthiest neighbourhood, was 405 l/day and supplied by the public water company; see more statistics in Grupo GEA, 2005).

The long-lasting scarcity of water in Lima was perceived as a main electoral expedient in the 2006 presidential campaign and formed an important part of the promises made by the main candidates. In that process, and to the surprise of many analysts, Alan García, the previous nationalistic president, who had adopted a histrionic confrontation with the banking sector in the 1980s, won a second election and returned to office as a converted neoliberal. During the campaign, García had sensed the political significance of water scarcity in Lima and pledged to bring abundant water to the most distant corners of the capital (the candidate even used the eye-catching expression “without water there is no democracy”). Already in the second year of the government of Alan García, in 2007, the programme ‘Water for All’ (*Agua para Todos* or APT) was launched with a portfolio of projects for the metropolitan area of Lima that totalled more than US\$ 2.3 billion (cf. SEDAPAL, 2007). See an outdoor advertisement of the programme in Figure 1.

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<sup>6</sup> 303 water tankers were registered by the Ministry of Health in 1997 (CENCA, 1998). Ten years later, in 2007, there were still 800 tankers in operation (Fernández-Maldonado, 2008).



Figure 1. Advertisement of the Water for All Programme in Lima (picture taken outside the headquarters of SEDAPAL).

Despite its rhetoric of social inclusion and democratisation of services, APT offers an emblematic example of the barriers and difficulties to deal with the scarcity of water in Lima (without changes in current management practices). On the one hand, the initiative was evidently welcomed by construction companies and private operators, who were eager to praise the ‘leadership’ of the Peruvian government (for example, on 03 Dec 2011, there were 427 articles related to SEDAPAL on the website Business News America).<sup>7</sup> Such level of interest is not surprising given that most of APT works are to be carried out through concessions to and partnerships with private companies. On the other hand, the circumstantial abundance of investments made available by President García failed to conceal the uncertainties about the future of the water sector of Lima. The billionaire budget of the APT

<sup>7</sup> Website address: <http://www.bnamericas.com>



programme was in effect a combination of public sector surplus, foreign loans and private sector investments (the latter will have to be repaid, obviously, at a profit). The recovery of those investments was guaranteed by increased in water tariffs: 10.73% increase to pay for Marca II, Huachipa and North and South mains system and 12.31% to pay for Taboada and the Submarine Discharge Line (SUNASS, 2007). Even before the conclusion of those works, the utility's income rose by 16% in 2008, compared with the previous year, due to more water being sold and additional micro-metering (SEDAPAL, 2008). SEDAPAL also registered 10% of the utility's shares in the stock market of Lima as a supplementary assurance to the international banking system, foreign investors and private operators (SEDAPAL Communiqué on 10 Nov. 2009).

Crucially, this combination of loans, investment contracts, tariff increases and stock market shares was only possible in a context of favourable global market conditions. There is no guarantee, however, that all the initiatives included in the APT will be effectively funded. At the same time, the overall approach to water management remains centred on supply augmentation according to the top-down priorities of the ruling government. Considering these two factors together, there is little room to believe that the momentary containment of water scarcity promoted by APT is going to respond to the long-term water problems of Lima. In the words of a former SUNASS officer:

“We are in a situation of bonanza, lots of investments in water and some in sanitation. Or at least that is the image that the current government [García's] is trying to convey. In a situation of plenty, alternatives and criticism diminish. But, in my opinion, we are ignoring the big problems that will mean new constraints in the water services, especially environmental degradation and climate change impacting the [Andean] glaciers. More important, the city remains without planning and management, keeps expanding and climbing the sandy hills” (Interview, 12 May 2009).

The implementation of APT seems to operate within the same rationality of the ephemeral and demagogic initiatives that have historically maintained an overall condition of multiple scarcities related to water. A benchmarking study shows that public services are still

lagging behind the needs of the population: water supply serves 84.3% and sanitation 80.1% of the residents, while only 20.7% of sewage receives treatment (SUNASS, 2010). Despite the various investment programmes, the president of SEDAPAL had to concede, in May 2011, that at least 157,000 families still did not have access to water and sanitation (Isasi Cayo, 2011). Most of those without public services are in the periphery of the city, but even in the consolidated neighbourhoods, approximately half of the houses receive treated water for only a few hours every day (SEDAPAL, 2005). Although the total number of water users continues to increase, there are limited efforts to save and recycle water. In addition, the rate of leakage and unaccounted for water also remains high (i.e. 38%) and there is limited opportunity to increase the abstraction of water from the River Rímac, as 82% of the annual water flow is already diverted to serve Lima (i.e. demand of 20.70 m<sup>3</sup>/s, between 1990 and 2010, and average flow of 25.22 m<sup>3</sup>/s), as explained in an interview with a SEDAPAL manager (on 10 Apr 2009). That is particularly problematic given that the total production of treated water has been fairly constant since 1995 (Figure 2), which means a reduction in the average amount of water supply (due to population growth). Based on the official statistics (published by INEI and SEDAPAL), we calculated that the annual availability of treated water oscillated from 8.51 m<sup>3</sup>/inhabitant/year in 1986 to 6.97 m<sup>3</sup> in 1990, 7.45m<sup>3</sup> in 2000 and only 6.74 m<sup>3</sup> in 2007. In the next section we will examine the contrast between the predominance of a technocratic rationale and the reaction of those more directly affected by water scarcity.

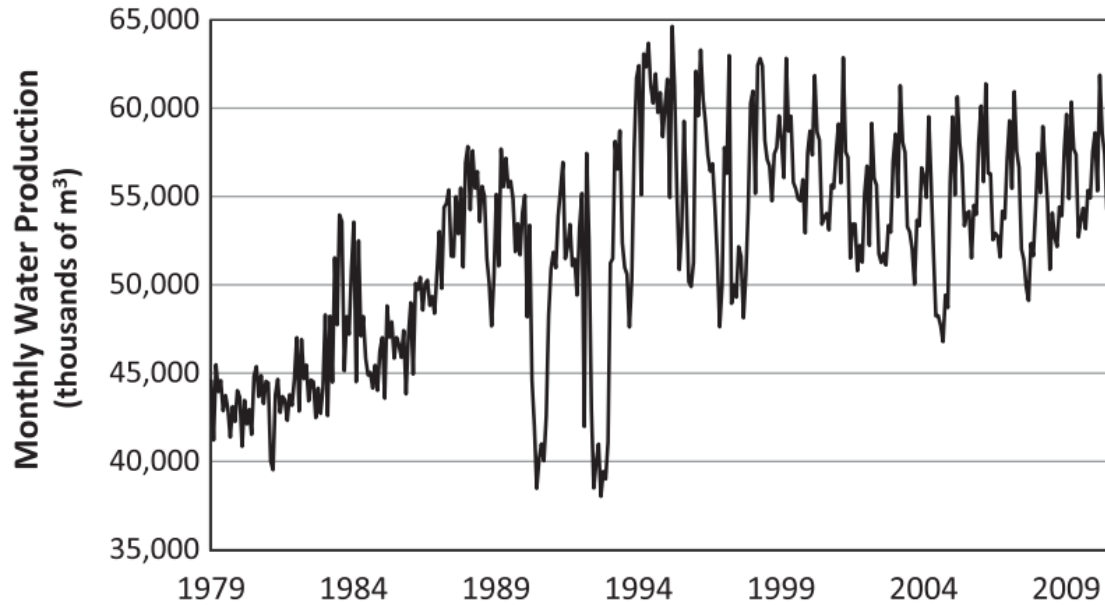


Figure 2. Monthly Production of Treated Water in Lima (data from INEI and SEDAPAL annual reports).

### *3.3. The distance between technocratic interpretations and the lived experience of water scarcity*

The persistent condition of water scarcity is evidently not unknown to policy-makers and public authorities, as it was demonstrated in the interviews carried out during our research. Moreover, the focus of governmental policies and official speeches has frequently overlooked the multiple sources of the scarcity of water in Lima and has tended to concentrate on the need to build large-scale works with greater political visibility (e.g. SEDAPAL, 2005). In an attempt to improve those responses to the water problems of Lima, the multilateral agencies responsible for managing loans and cooperation programmes in Peru have insisted on a more efficient management of water utilities and on higher user charges and safeguards for private companies involved in public services (see, for example, the argument of the World Bank in PAS, 2001).<sup>8</sup> A local representative of those agencies stated that the market-friendly adjustments of the Peruvian water sector seem to be going in the

<sup>8</sup> This opinion closely follows the argument of the industry federation's spokesperson, who strongly emphasised that, while the quantity of the water available in Lima seems satisfactory, the main problem is the populist manipulation of the water sector by politicians (Interview, 08 Apr 2009).

right direction, but also claimed that the way forward depends on regulatory improvements and institutional protection to attract more private companies to Peru (Author's interview with a World Bank officer in Lima, 18 Mar 2009). In the words of a member of the German cooperation agency:

“The water industry in Peru is relatively new, less than ten years, as an organised sector with dedicated institutional coordination, a proper ministry and legislation. (...) The main challenge is to reduce the political influence in the municipal level, train the technical staff, increase the market and the number of those that pay for water” (Interview, 22 Mar 2009).

Both the responses formulated by national and international policy-makers maintain this technocratic and economic emphasis, which is often translated into large construction contracts and business management strategies that fail to engage with the everyday reality of the population most affected by water scarcity. Successive governmental interventions have systematically reinstated water scarcity as a physical problem that should be resolved basically through additional investments in infrastructure, higher tariffs and public-private partnerships. Following such a rationale, the multiple forms of scarcity associated with water are continually ignored and the consequence is a significant mistrust between SEDAPAL and the low-income population. The turbulent dialogue between the water utility and communities in the periphery of the city inevitably affects the search for alternative, water supply and sanitation technologies, which in theory could help to alleviate the deficit of services. For instance, since 2005 SEDAPAL tried to introduce the condominial system, a low cost, decentralised sanitation technology imported from Brazil that attains a cost reduction of up to 40%, which was systematically rejected by the local residents.<sup>9</sup> Despite efforts by the engineers and other SEDAPAL officers to promote the condominial alternative, the residents refused to accept a technology that was perceived to be designed only for those that live in the *barriadas* and in similar marginalised areas. As stated in one interview, it

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<sup>9</sup> Condominial systems involve a connection by ‘blocks’ (rather than the traditional individualised connection).

“does not matter the technological argument, we saw it as a second-class solution that was being offered to second-class citizens” (Interview, local resident, 24 Apr 2009). Because of the tortuous dealings with the population, alternatives such as the condominial technology were virtually abandoned (in 2009, there were only 11 condominial systems in Lima). In spite of potential money savings, those contacted in our interviews had mixed feelings about the new technology. To be sure, some interviewees expressed their satisfaction with the condominial option, but most took a more critical approach and perceived it as ‘the alternative for the poor’, something that is intrinsically discriminatory as it was only adopted in the periphery of Lima.

The difficulty in maintaining a good relation between SEDAPAL and the more needy communities is not helped by the negative image people have of the water utility, particularly because of several cases of corruption reported in the newspapers in recent years. The failure of additional investments and ingenious technologies demonstrates that scarcity is an outcome of deeply politicised processes of inclusion and exclusion, which is again appropriated as a powerful force in preserving established hierarchies and privileges. Infrastructure construction programmes, such as those introduced by Fujimori and the more recent APT under García, have mainly changed the aggregate statistics of water supply and, to a lesser extent, sanitation. In the meantime, serious problems continue to afflict low-income households and marginalised communities, such as the unreliability of services, rising water tariffs and, ultimately, the persistent experience of multiple scarcities. Interestingly, the physical structure of the new headquarters of SEDAPAL is probably the most emblematic representation of the interplay between scarcity and abundance in the capital city. The central office of the water utility has an impressive glass and steel façade and is surrounded by an oasis of artificial waterfalls, swan ponds and irrigated greens. The estate extends for many kilometres along the two margins of the River Rímac and strict security prevents the access to

the watercourse (not allowed during our several visits to SEDAPAL in 2009, despite the request to visit the water treatment plants and other infrastructure works). All that dramatically contrasts with the dry and dusty neighbourhood of El Agustino, the crowded corner of Lima where the utility headquarter is located (see Figure 3).



Figure 3. Contrast between the Headquarters of SEDAPAL and its Surroundings

The water saga in different parts of the city suggests that scarcity remains directly associated with the limitation of political spaces and the discrimination of the low-income residents. The various expressions of water scarcity continue to be a major concern in Lima, but localised and circumstantial problems can only be properly understood when considering the totality of the experience of scarcity (including its physical, socioeconomic and political dimensions). That has certainly been the case in Huaycán, a self-administered community established in the East Cone in the 1980s in a steep slope area – between 500 and 900 metres above sea level – 20 km to the east of central Lima. Lack of water and sanitation has represented one of

the most significant failures of the experience of self-management in Huaycán (Interview, community leader, 29 Apr 2009). Precarious water services have been a central problem in Huaycán since its foundation and are often reinforced by the constant expansion of the settlement and unemployment affecting the majority of the population (Zambrano, 1997). Some rudimentary water infrastructure was achieved in the early days of community coordination, but gradually the settlement suffered from serious corruption, violence and the demobilisation influence of opportunistic politicians (Soto et al., 2005). At the time of our fieldwork, a significant proportion of the population still had to buy water from vendors and store it in plastic cylinders.

The concrete and lived experience of water scarcity in the periphery represents, therefore, a robust challenge to the rhetoric associated with ongoing investment schemes such as APT. The profound consequences of water scarcity at the household level are vividly illustrated by the following statement of a resident in an area without water mains:

“You know... I feel really embarrassed to say that my two daughters and my wife still have to defecate in such a precarious toilet [with no piped water]. (...) These people from APT came here and promised to bring water to our house, but so far I have seen nothing. I don't think that it is going to happen. I am sceptical, I am 44 years old, from Lima – my wife is from Amazonas – and in my whole life I have never lived in a house with running water. It seems that we don't deserve it, that we are not really entitled to have good, clean water” (Interview, 06 May 2009).

Similar demonstrations of the difficult and enduring experience of water scarcity were found in Villa El Salvador (VES), in the South Cone of Lima, a ‘self-administered community’ (*comunidad autogestionaria*) (Zeballos, 1991). The history of VES started in 1971 with the massive occupation of a plot of land and the immediate construction of homes, as is normal in rainless Lima, with mats of reeds (*esteras*). The population was then relocated and organised the community according ancient Peruvian traditions of common ownership of land and community work (*faenas*). Four decades after its establishment, VES still has some symbolic elements of the original mobilisation, but public participation became increasingly

fragmented, which inevitably affects the ability of the residents to complain about the quality of public services, such as water (Interview, former mayor of VES, 05 May 2009). The main consequence is that poverty is widespread in VES and a third of the households are still in a condition that is below inhabitability (García-Calderón et al., 2005). Even after the installation of pipelines, many dwellers have to wait for years to use the mains system due to lack of money to pay for the connection (Interview with residents, 2009). Figure 4 was taken during our fieldwork and shows a resident demonstrating how he stores and uses water previously purchased from a water tanker. This contrast between the physical availability of resources in the neighbourhood and the persistence of domestic shortage of water highlights the importance of addressing the totality of the experience of scarcity, which goes beyond aggregate statistics and the claims of policy-makers in order to encompass the perverse synergies between multiple manifestations of scarcity.

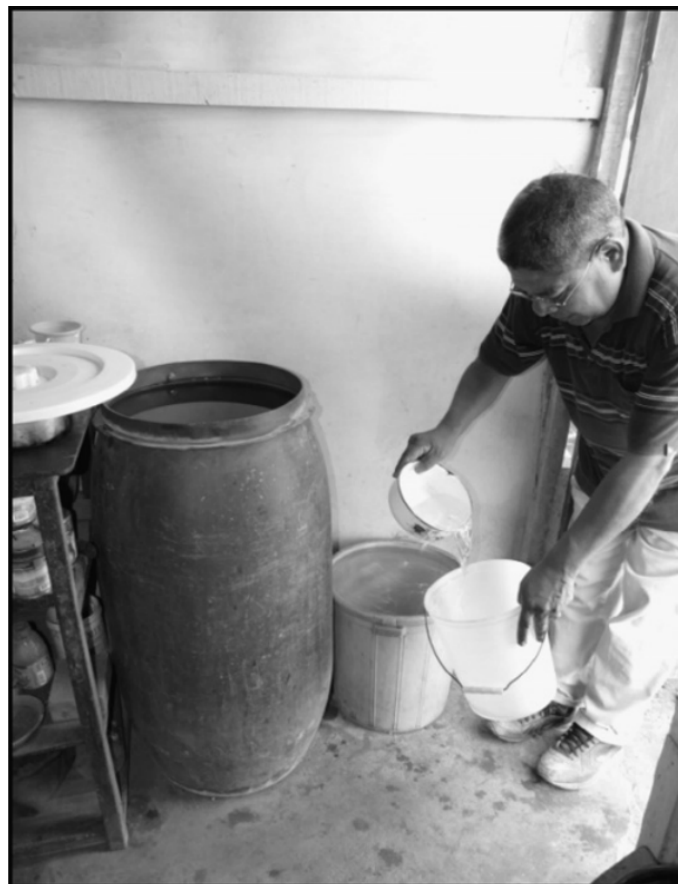


Figure 4. Resident without Public Water Supply.



#### 4. Conclusions: The Prospect of Persistent and Renewed Scarcities

The persistent and multifaceted problems of water scarcity in Lima demonstrate the interconnections between various mechanisms of social exclusion that have composed the recent history of water management in the city. In order to understand the asymmetry of social and spatial opportunities behind the management of water, a non-essentialist conceptualisation of water scarcity was applied, which considered the relational and highly politicised basis of resource shortage and abundance. Rather than privileging physical and administrative factors, the analytical approach provided an examination inside the multidimensional nature of water scarcity and an excavation into the intricate barriers that prevent its resolution. Water scarcity cannot be understood as an isolated phenomenon, but as a process constantly reinserted in the totality of multiple urban scarcities of Lima. Instead of a purely material phenomenon, the condition of water scarcity reflects the long-term development of the capital city in relation to the rest of the country and the internal inequalities within the metropolitan area. While the old *barriadas* (as the slums of Lima are often called) remain areas of partial integration in the life of the city, the new *barriadas* propagate the same hierarchical organisation of space that presupposes renewed forms of scarcity. Likewise, despite the higher sums of capital that now circulate in the city due to the adoption of neoliberal policies of the last two decades, city expansion and economic growth have in effect accelerated the social presupposition of scarcity, as it is made evident by the spread of unemployment and job informality, the foundation of new neighbourhoods at significant distances from the city centre and the unresponsiveness to grassroots demands for water and public services.

In the end, the geography of water scarcity in Lima offers a representative example of the complex interlinkages that constitute the contemporary megacity. The constant reinforcement of multiple scarcities – due to a combination of top-down strategies and the

manipulation of investments and infrastructure – has become the most basic experience in the daily struggle for survival in the periphery of such vast urban areas. In the case of the Peruvian capital, both city regeneration and water management have operated within the hegemonic asymmetries that dominate the political scene and, crucially, have reinforced disparities inherited from the previous historical periods. Even when low-income areas manage to secure concessions from public authorities, infrastructure and services are typically second-class. More significantly, the dialectical interplay between scarcity and abundance has been systematically used as a political device to handle expectations in the deprived areas of the capital. The deficiencies of the public water services are less the result of state failure than the convergence of powerful private interests in the organisation of urban water systems. Scarcity is instrumental for the circumstantial emergence of a circumstantial ‘abundances’, at the price of maintaining long-established, multiple scarcities. As in the past, the recent responses to water problems are centred on the appropriation of scarcity as a productive force that serves dominant interests and political agendas. The ultimate conclusion is that, in order to search for genuine responses to the mounting water problems that trouble the low-income population, these multiple scarcities need to be considered in their totality, by acknowledging the uneven advantages accrued from the production of fluid scarcities and abundances in the city.

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