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**MSc Environment and Sustainable
Development Student Report**

Co-Learning for Action: Exploring the Relationship between Everyday Risk and Urban Development in Lima

Adriana Allen and Rita Lambert Editors



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Acknowledgements. This research is undertaken as part of the practice module of the MSc in Environment and Sustainable Development at the Development Planning Unit, University College London, co-ordinated by Adriana Allen and Rita Lambert. It has been conducted in collaboration with local partners CIDAP, CENCA and Foro Ciudades Para La Vida, based in Lima, together with Andres Alencastre Calderon, Carlos Esteban Escalante, Silvia de Los Rios, Lilliana Miranda, Rossana Poblet, Carmen Robles, and DPU staff Adriana Allen, Zeremariam Fre, Liza Griffin, Rita Lambert, Diana Salazar, Etienne Von Bertrab, Sohel Ahmed. Many people have contributed to the research findings and strategy development: local facilitators, academics, researchers, public officials, colleagues and friends in Lima and in London, and above all, women and men from the six case study sites who warmly opened up to us and patiently shared their knowledge and experience. Our local interns, Franco Evans Morales, Luisfernán Vargas Tellez, Milagros Ortiz Rosas

Rosas, Adriana Gonzales Del Carpio, Fabiola Espinoza Vergara, Nilton Delgado Rivera, Rosario More, Mariella Siña Vicente, José Cáceres Martínez, Eduardo Pelaéz Cruz del Castillo, Arturo Salazar Toledo, José Uyehara Terruya, were indispensable for helping with the research, translation, communication and logistics. Finally, the students of the MSc Environment and Sustainable Development 2014-2015 enthusiastically engaged with this action-research project, produced valuable and detailed primary information and a wide range of insightful outputs. These further the understanding of the relationship between everyday risk and urban development in Lima and contribute to the reframing of socio-environmentally just urbanization in the Global South. This compilation of reports is the final product of their work.

To all, many thanks.

Adriana Allen and Rita Lambert

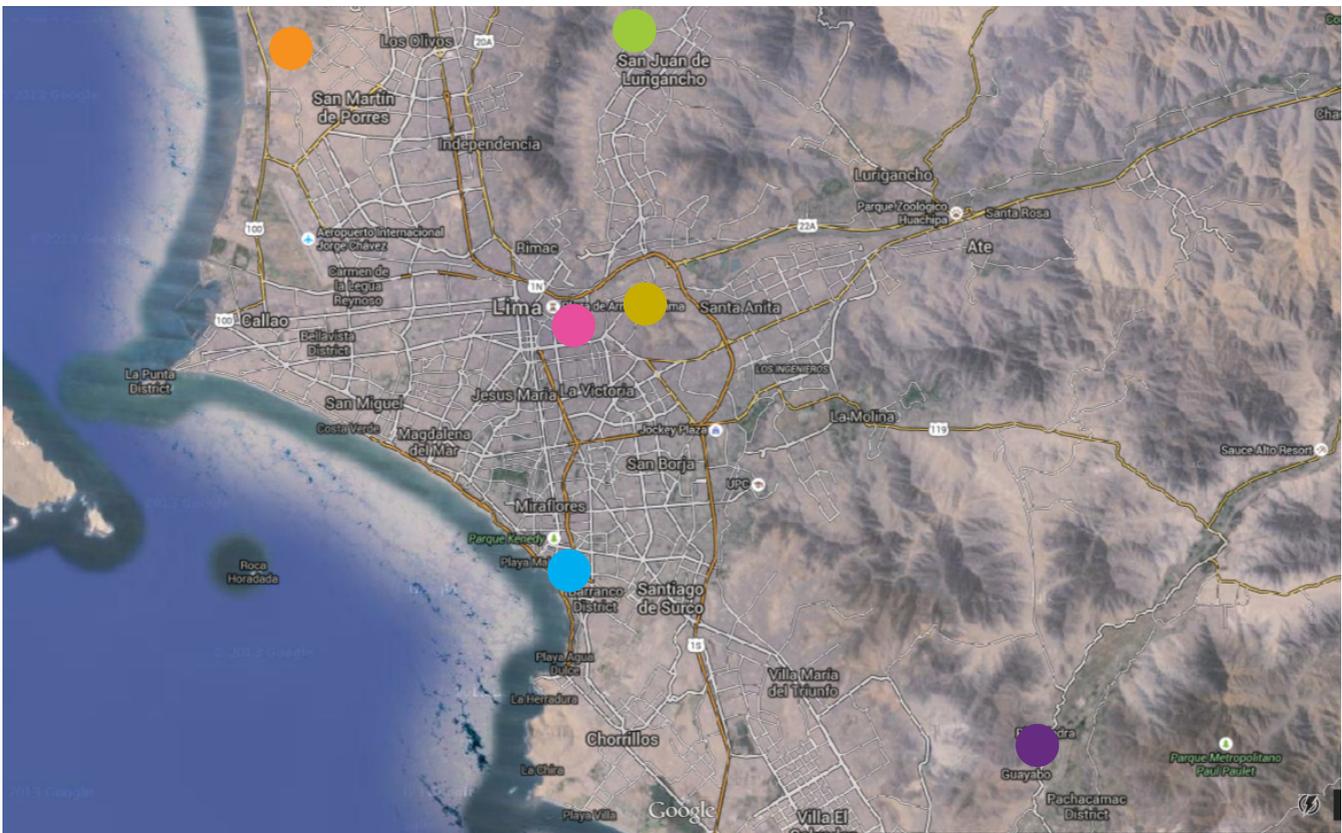
Costa Verde



Barrios Altos



El Agustino



José Carlos Mariátegui



Chuquitanta



Quebrada Verde



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Preface

These reports have been produced in the MSc Environment and Sustainable Development programme at the Development Planning Unit (DPU), University College London (UCL) in response to terms of reference for the 'Environment and Sustainable Development in Practice' module, 2014-15. The body of work presented in this report, has been conceived and executed as part of the third year of the collaborative action-learning platform Learning Lima (www.learninglima.net), established by Adriana Allen and Rita Lambert in 2012, which brings international Masters students, DPU staff together with various institutions and ordinary citizens in Lima. The aim of the platform is to understand how socio-environmental injustices are produced and how they can be addressed. Exploring scenarios and strategies embedded in the wider socio-political, economic and ecological processes at play, the investigation seeks to find avenues to disrupt unjust urban trajectories and contribute towards transformative change.

This year's assignment, is linked to CLima sin Riesgo, a DPU action-research project funded by Climate and Development Knowledge Network (CDKN) which examines urban risk traps and their impact on people's lives and investments. Contributing to this project, the research undertaken by the participants on the MSc seeks to further the understanding of the relationship between everyday risk and urban development in Metropolitan Lima and to develop an environmental action plan in collaboration with local communities and organisations for selected case studies within this jurisdiction. Six areas were selected to ground the investigation: Costa Verde, Barrios Altos, El Agustino, José Carlos Mariátegui, Chuquitanta and Pachacamac. These were chosen in consultation with our local partners within 'Foro Ciudades Para la Vida', CENCA and CIDAP, and offer unique readings of the city, enabling a better understanding of the urbanization processes, institutional, private and local communities practices, and socio-environmental trends operating in Metropolitan Lima.

The research included a four month desk-study in which the analysis and synthesis of secondary information was undertaken, as well as a three week fieldwork, in Lima, dedicated to mapping and the collection of primary information in each of the case studies. The different sections in this report, are dedicated to each of the areas.

This report as well as the videos produced as part of the project are available on the Learning Lima website: www.learninglima.net Or on the DPU website: <http://www.bartlett.ucl.ac.uk/dpu/programmes/postgraduate/msc-environmentsustainable-development/in-practice/of>



1. Costa verde. A common vision for the coast

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This research project would not have been possible without our facilitators and partners: Liza Griffin, Adriana Allen, Rita Lambert from the DPU and Liliana Miranda from Foro Ciudades para la Vida who together provided us with insightful instruction and continuous support. The assistance from the interns in Lima, Milagros Ortiz and Adriana Gonzales, also contributed towards making our field work days smoother.

We express our special gratitude to Dr. Liza Griffin for her unceasing support, encouragement, guidance, and constructive criticism, which sparked critical thinking patterns that deepened our research. We specially acknowledge the support from Diana Salazar, especially her expert contributions towards facilitation of the collaborative platform workshop held in Lima. Additionally we acknowledge and appreciate our ESD masters course 2012-2013 predecessors for the production of a concise and valuable report of their findings, which also served as a sound base to our study.

Our sincere thanks also extends to all of the people and institutions who through interviews and/or presentations patiently and enthusiastically provided us with their valuable knowledge, insights and visions. The information they provided was exceedingly essential for our research.

The enthusiasm of residents in all of the six case study areas has continuously amazed us, especially with their aspiration to protect the living environment and have a say in the development of the districts.

Throughout our project's span we came in touch with a great number of civil society members fighting for their right to the city. We would like to thank them all for inspiring us and reminding us of the importance of defending our own rights. In particular we would like to thank those who participated in our roundtable talk, in spite of the short notice. We are grateful for having this invaluable opportunity to contribute toward Lima's urban development.

Abbreviations

APCV - The Authority of Costa Verde (Autoridad del Proyecto Costa Verde)

CAPAC - Coordinating body of Activists for the Environmental and Cultural Heritage (Coordinadora de Activistas del Patrimonio Ambiental y Cultural)

DM - District Municipality

EMAPE - The Municipal Administrator of Toll of Lima (Empresa Municipal Administradora de Peaje de Lima)

RQ - Research Questions

MML - Municipality of Metropolitan Lima (Municipalidad Metropolitana de Lima)

PLAM 2035 - Metropolitan Urban Development Plan for Lima and Callao 2035 (Plan Metropolitano de Desarrollo Urbano Lima y Callao 2035)

UDEAL - Union of Students of Architecture of Lima (Unión de Estudiantes de Arquitectura de Lima)

Executive summary

This research explores the relationship between everyday risk and urban development in Lima. It particularly focuses on 'risk' due to the immense implication this has for the sustainability of the growing trend of urban developmental projects in countries of the global south, which Lima, Peru exemplifies. It does this by examining the Costa Verde development in Lima, with a particular focus on the everyday risks created and exacerbated by this development.

To understand the dynamics underpinning the production of everyday risk we focused on the districts of Barranco, Miraflores and Chorrillos, of the six districts along these development. Our findings revealed that, the development along Lima's Costa Verde is driven by economic-centered interests, perpetuating the externalization of everyday risks, such as the loss of public spaces, landslides, coastal erosion, etc. This is further exacerbated and capitalized on by several actors leading to the enforcement of existing risks and ensuing resistance. Using the lens of David Harvey's (2013) 'Right to the City' framework, we were able to critically analyze, interpret, and understand where the struggles against the existing everyday risk cycles were stemming from.

Additionally, by utilizing the political ecology lens of discourse analysis we were able to visualize that everyday risks on the Coast Verde development are fueled by the existence of discursive patterns, which highlight and reinforce a focus on interests aligned with the accruable economic value, whilst tilting attention away from others that do not accrue to immediate economic benefits. This interplay of power relations grants hegemony to certain discourses such as those on 'mobility' and 'economic viability'; leading to the suppression of other counter-hegemonic interests and discourses. This in turn, is resulting in the reinforcement of everyday risk patterns.

Furthermore, the externalization of everyday risk is aggravated by the existence of a conflicting and overlapping governance structure resulting in a paradoxical consequence of Lima's decentralized planning system on this

development. The inabilities of the Authority of Costa Verde (APCV), to sanction developers who flout planning regulations along the coast coupled with its conflicting roles with the district municipalities and other metropolitan municipality institutions has also created a loophole for risk externalization. This is being capitalized on by investors along the coastline for the disparate uses of public spaces along the coast, leading to the production of everyday risk.

In addition, we observed the existence of a 'new public', consisting of several fragments of civil society groups resisting the ensuing risks from the Costa Verde development and advocating for their right to the city. This emergent new public, however, is formed in different layers, both geographically and temporally, fragmented around specific struggles and concerns, a characteristic, which we argue, has hitherto weakened the strength and effectiveness of their struggle.

Consequently, we see that discourses, coupled with the foregoing peculiarities of this study area have framed the way everyday risk interplays along the coast and hence for our case study we have defined everyday risk as:

The continuous/daily exposure of different types of vulnerable stakeholders, comprising beach users, pedestrians, residents, informal traders etc., to social, physical and natural hazards, such as exposure to car accidents, exclusion from accessibility, loss of public spaces, landslides etc., which arise from the Costa Verde development and are aggravated by the deprivation and undermining of their capacity to face or combat such situations.

Hence, with these observations, this report proposes a 3-pronged transformative strategy that involves short, medium and long term scope. The short-term action focuses on the creation of a collaborative platform for dialogue between these fragmented civil society groups, whilst the medium-term action with the aim of influencing policy and institutional change, builds up to the long term scope which aims for the sustainable development of the Costa Verde and eventually the city of Lima.

1. INTRODUCTION

1.1 Background

Latin America and the Caribbean's today play an important role in the globalized world, owing to their rich natural resources and rapid economic growth. In this subcontinent, the coast represents one of the major factors for development, significantly increasing its international trade, promoting tourism, recreation; transport and energy infrastructure; whilst being home to valuable natural resources, ecosystems and biodiversity reserves (Urzainki, 2006).

Figure 1. Map of Peru showing Lima's location by the Coastline (Puentesperu, 2010)



Consequently, there have been huge investments in the Sea Ports of these regions being an important tool to international trade, as seen also in Lima. These investments also serve as a stimulus for economic growth through revenue generation and job creation, etc. in the areas where they are located (Rúa, 2006). It has also brought continued focus on new ways to maximize the benefits of the coast; a process, which has led to uneven distribution of benefits and burdens along the coast, resulting in uneven exposure to risks.

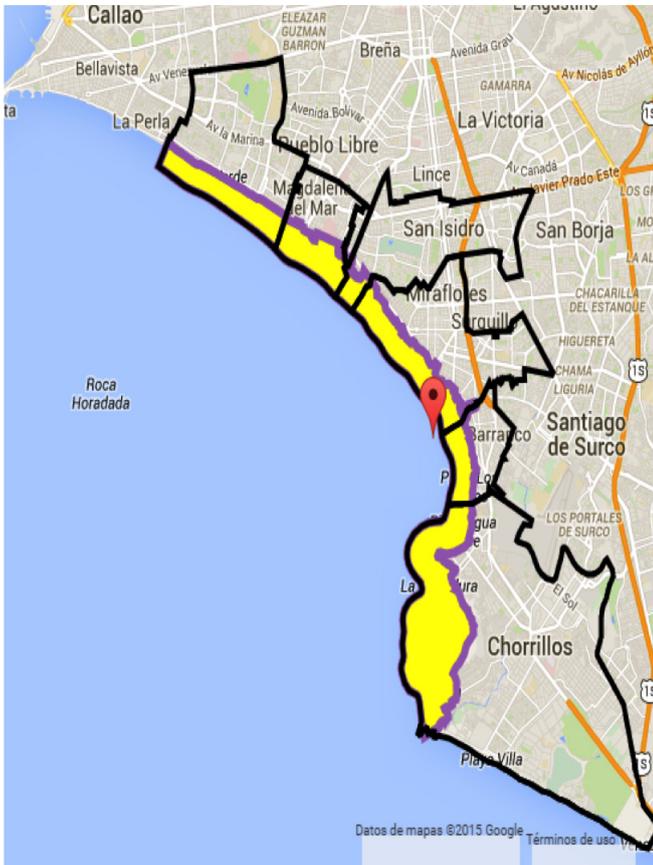
1.2 Case Study

In order to further understand the relationship between these urban development trends and the manifestations of risks in these areas, our research is focusing on Lima's Coast, precisely a coastal development, known as the Costa Verde Development.

Lima is located on the central coast of Peru, one of the world's fastest growing economies. Facing East Asia, its geopolitically strategic location as the intersection of Callao Port and the Pan American Highway has helped make the city a major economic hub (Arana, 1998).

Being one of the few coastal capitals in Latin America, the development of Costa Verde began as an attempt to connect the coast to the city of Lima. This is because historically the urbanization process in the

Figure 3. Map of Costa Verde showing the six districts (Autoridad Del Proyecto Costa Verde, 2010)



coastal zone of Lima had turned its back to the sea, despite its strong link with the Pacific Ocean through the port of Callao. Before the development of the Costa Verde, this zone was home to Lima’s waste disposal facilities and penal institutions.

Lima’s Coastal zone, today known as Costa Verde covers the districts of *San Miguel, Magdalena del Mar, San Isidro, Miraflores, Barranco* and *Chorrillos*.

This area is a man-made space reclaimed from the sea. Peru’s devastating 1940s’ earthquake collapsed significant portions of the cliff along the coast providing a platform for re-construction of the new beach. This paved the way for one of the earliest interventions along the coast - the 1960s’ construction of the “beach circuit” (APCV, 2014). This important economic highway still connects the south-western districts of Lima to the port in Callao.

This apparent success prompted further discussion in the 1980s about how the coastal zone should be developed.

This culminated in the development of a Master plan for the coast, delineating the area into the following zones: touristic zone 1 & 2, public recreation zone, service zone and landscape zone, allowing the construction of commercial buildings in the service and touristic zones, whilst the recreational zones were set out for parks and green areas (APCV, 2014).

Figure 2. Port of Callao, located in Lima: Peru’s major port for international trade. (Newsmaritime, 2015)



1.3 Case Study Background

This development of the master plan and its subsequent interpretation, created a disjunctive use of the coastal area. Following patterns that suggest they have largely been driven by the district municipalities' economic priorities and the demands of an emerging elite class with money to spend. The Costa Verde's teetering cliffs are now home to an array of luxury apartments, yacht clubs, high-end restaurants, and hotels. The first major investment made under this Master Plan was *Larcomar*, a shopping mall constructed on the cliffs of the district of *Miraflores* in 1998 (El Comercio, 2012), whose construction was allowed due to the application of new laws promoting private investment in public property.

In the following years, the Costa Verde development went through various interventions, mostly driven by the district municipalities being landowners of the coastal corridor in accordance with the law 26306 (Government of Peru, 1995). This has facilitated the trend of luxurious investments.

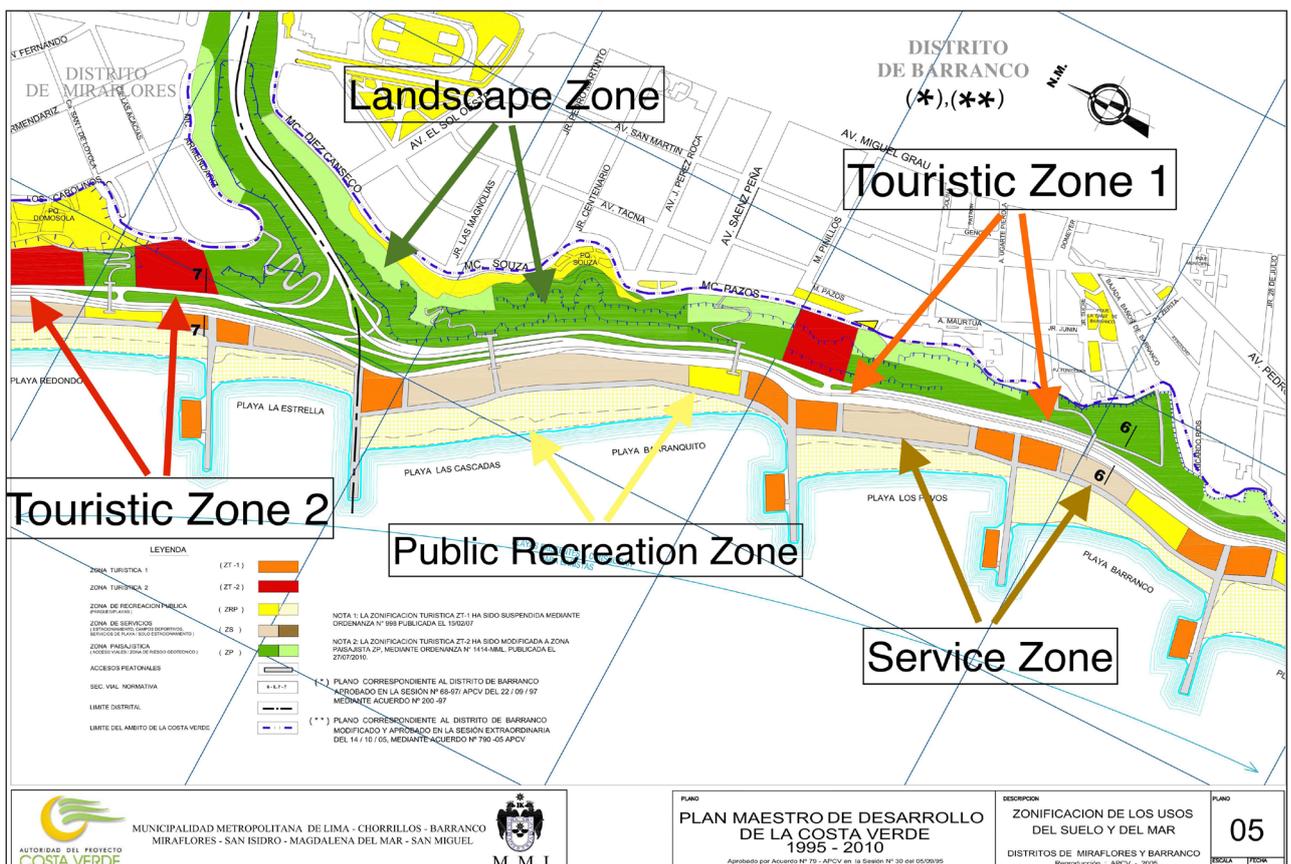
Most recently, to service the increasing use of this coastal zone and help ease Lima's escalating congestion, planners have once again turned their attention to roads; a third lane

is controversially being rolled out along the Costa Verde. These interventions have aggravated the loss of public spaces, exclusion of some groups through limited accessibility and mobility, disruption of ecological infrastructure, coastal erosion, and landslides, which constitute and reinforce patterns of everyday risk in our case study area.

Figure 4. A highway in Miraflores, one of the six districts along the Costa Verde development (Luis Padilla, 2010)



Figure 5. A portion of the Costa Verde Master plan showing the zoning of Barranco district (APCV, 2014)



Thus, while on the face of it, the Costa Verde development represents the epitome of a successful 21st century city; its development has not been without widespread controversy and significant problems for its sustainable development. The focus of this research has therefore been to catalogue and explain some of the risks associated with this development.

Figure 6. Larcomar, a shopping mall constructed on Miraflores's cliff (Olsenius, 2009)



Figure 7. Aquamarina, a luxury building constructed on Barranco's cliff (by authors)



2. 2. Methodology and limitations

2.1 Methodology

In 2013, previous research teams from the ESD masters' course explored the injustices, created and maintained by the practices and discourses shaping Lima's coastal development, with a particular focus on the districts of San Miguel, La Perla and the areas around the PTAR Taboada in Callao (DPU Report, 2013).

To take this a step further, our research explores the risks that have been created and exacerbated by the urban developments in Lima, with a focus on the Costa Verde development.

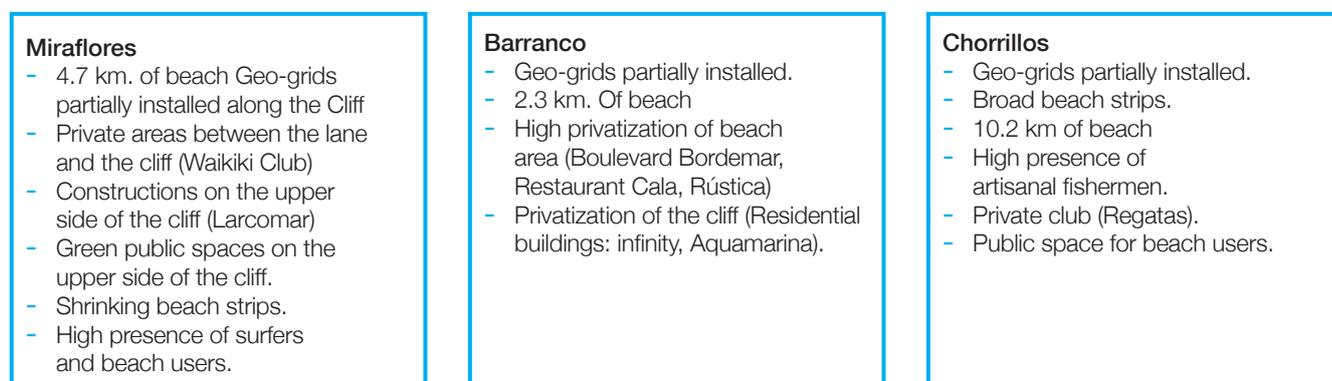
During the three phases of research, our group aimed at identifying the ways in which the everyday risk patterns are generated and aggravated by the Costa Verde development and consequently proposed a transformative strategy to intervene existing risk cycles.

Our research methodology was manifold. The pre-field work phase in London comprised a 3-month long secondary desk research that involved literature searches, policy analysis; and refinement of our primary diagnosis following several presentations of our preliminary findings, in order to get a grasp of the historical background, political context and identify the different stakeholders concerned with this case study. At this stage, we focused on the Barranco district; a middle class district with highly privatized public spaces. This stage culminated in the production of an audio-visual output of our preliminary diagnosis.

Figure 8. A residential building on Barranco's cliff (by authors)



Figure 9. Characteristics of the three districts along the Costa Verde



However, during our fieldwork, following observations made during our first transect walk on the socio-economic conditions and the differences in the priorities allocated the Costa Verde development across districts, we opted to expand our focus on to the two districts surrounding Barranco. We included Miraflores district- representing a populated wealthy and influential district and Chorrillos district- representing a poorer district with a coastline dominated by informal traders and fishermen, whose livelihood depend upon the coast to greater or lesser degrees. This enabled us get a broader perspective on how the coastal development has produced and reproduced risk. Figure 9 shows the main features of these three districts which our research focused on.

We gained a better understanding of our diagnosis through transect walks, 43 interview session, of which 30 were in-depth, participatory mapping exercises, etc. in these areas and with different stakeholders ranging from residents, businesses owners to municipal authori-

ties. We also initiated the first steps of our transformative strategy through a collaborative roundtable session with stakeholders, and made a presentations based on our findings to the stakeholders in Lima.

Post-fieldtrip work involved the analysis of our findings, a final presentation to the academics and students of the UCL's Development Planning Unit as well as the production of an audio-visual output and final written report. Table 1 shows in detail the research, activities carried out within each stage, as well as the purpose of each activity in relation to our objectives.

2.2 Limitations to our Research

Despite the thorough nature of our research and methodologies utilized, we encountered some limitations, which should be borne in mind whilst reviewing our diagnosis and findings.

Figure 10. Limitations to our research

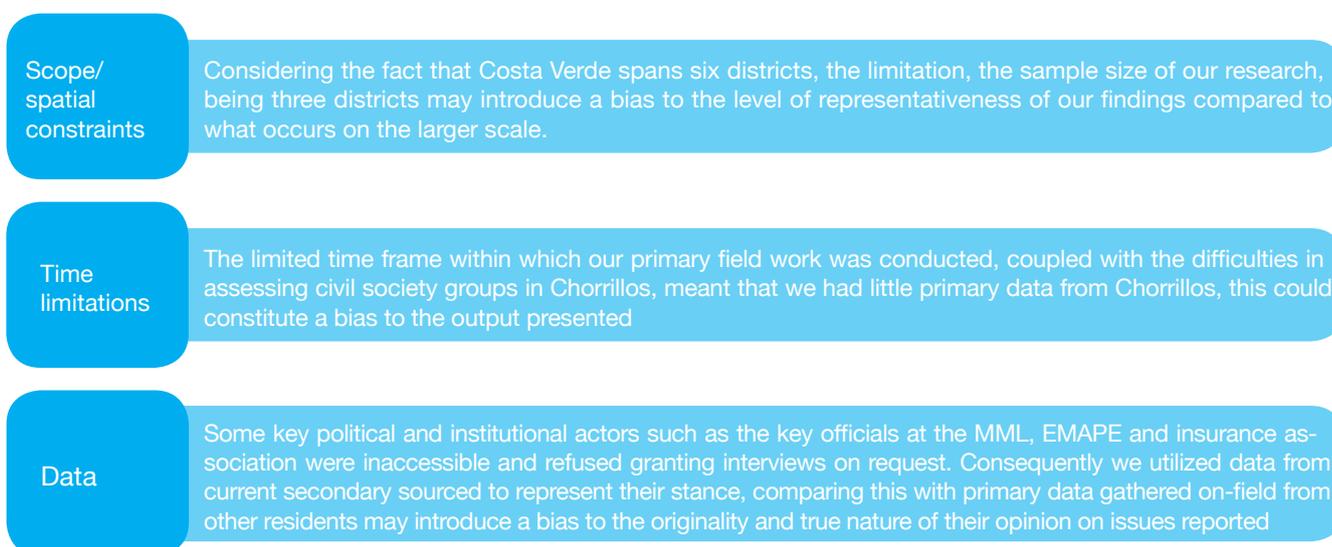


Table 1. A breakdown of our research activities (source: by authors)

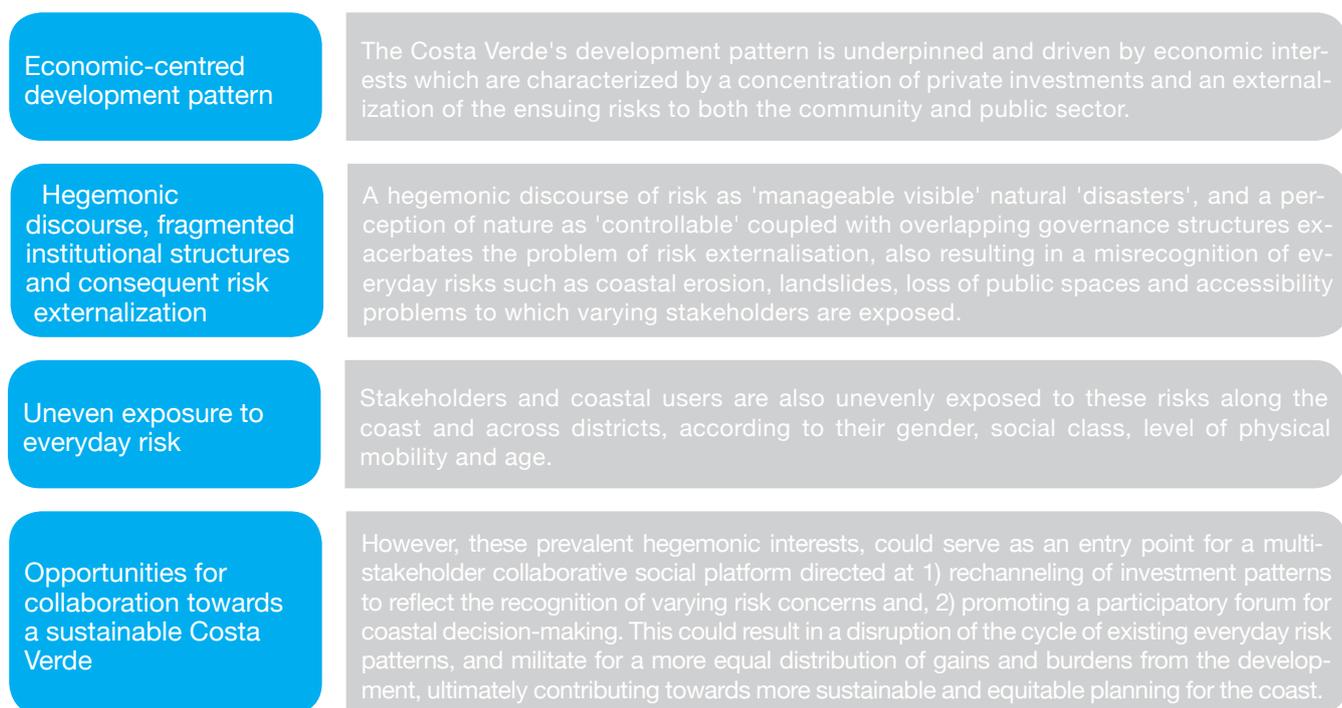
Stage	Research activities	Purposes
Pre-fieldtrip research (16th January - 18th April)	<ul style="list-style-type: none"> Collection of secondary information- literature searches, policy document review (PLAM 2035, Costa Verde Plan 1995-2010) and review of media publications (El Comercio, Perunews and La republica) Reflection on the findings of the previous ESD research in 2013 Scenario planning Conducting Skype interview with our research partner in Lima 	<ul style="list-style-type: none"> To gain a preliminary understanding of the context of the Costa Verde development To formulate an informed hypothesis of the underlying processes producing everyday risk in our case study To identify precise research questions for investigating our hypothesis To formulate a detailed fieldwork plan To plan our research scope in field
Fieldwork - Primary data collection (27th April - 13th May)	Transect walk Three transect walk ranging from <ul style="list-style-type: none"> The lower coastal strip, from Regatas club in Chorrillos to La Pampilla beach in Miraflores The upper cliff from Ehni Vallejo in Barranco to LarComar in Miraflores Interior of Barranco district and a part of Chorrillos 	<ul style="list-style-type: none"> To gain spatial understanding of the range of development projects along the Costa Verde To visualise the living conditions and how it translates to risks for residents and business practitioners along the coast To capture the different coping mechanisms and responses to conditions of risks
	Interviews 30 in-depth interviews with: <ul style="list-style-type: none"> Municipal authorities at metropolitan and district level APCV Real estate association Construction company Academics Urban planners and architects Civil society groups Residents (see appendix 5) 13 informal interviews with: <ul style="list-style-type: none"> Informal traders Residents (Disabled resident, elderly and young parents with babies) Fishermen 	<ul style="list-style-type: none"> To excavate the different discourse and perception on risks To understand institutional structure in place for risk management and monitoring along the Costa Verde development To understand the framework for the decision-making along Costa Verde To get a sense of the relationship between discourses on risks and its risk externalisation
	Policy and legal document review <ul style="list-style-type: none"> PLAM (Plan Metropolitano de Desarrollo Urbana Lima y Callao) 2035 Law 26306 (Ley N. 26306 Reconocen la propiedad del corredor ribereño denominado Costa Verde a diversas Municipalidades distritales de la provincia de Lima) Law 29664 (Ley N. 29664 Sistema Nacional de gestion del riesgo de desastres) 	<ul style="list-style-type: none"> To understand the existing governance structures as reflected in the law and planning documents To compare implementation and stipulation in planning documents and laws for the Costa Verde development To appreciate deviation from existing laws and planning documents To appreciate the language used to frame risks in planning documents
	Collaborative roundtable meetings with civil society groups	<ul style="list-style-type: none"> To establish an interaction between various fragments of civil society groups fighting against manifestation of risk from the Costa Verde development To enable stakeholders to visualise the similarity of their struggles To jointly formulate solutions to existing concerns over the Costa Verde development To identify the possibility for collaboration
	Presentation of our initial findings to stakeholders in Lima	<ul style="list-style-type: none"> To provide an update of our progress, refine hypothesis and findings for constructive feedbacks towards the final output
Post-fieldtrip (14th May - 5th June)	<ul style="list-style-type: none"> Data analysis including re-framing of our mechanisms and the development of a transformative strategy Final presentation of findings to the academics in UCL Preparation of audio-visual output and written report for our partners and stakeholders in Lima 	<ul style="list-style-type: none"> To present and communicate our findings regarding the relationship between Costa Verde development and everyday risk in concise way To present our proposal of a transformative strategy to stakeholders in Lima and academics in London

3. Hypothesis and conceptual framework

3.1 Hypothesis

Following our observations and diagnosis during the field-work, our reframed hypothesize is that:

Figure 11. Our reframed hypothesis



3.2 Research questions

To arrive at this hypothesis, we asked the following research questions:

<p>1</p>	<p>How is risk manifested and conceived in multiple discourses expounded by government, community, social groups, media, and the private sector? Moreover, what is the status of these different discourses?</p>
<p>2</p>	<p>How are the effects of risk being distributed among different stakeholders and users of Costa Verde and to what extent? And what are the responses to this risk?</p>
<p>3</p>	<p>What are the institutional structures in place for risk management along the Costa Verde development and how does this facilitate or restraint the misrecognition of everyday risk? What are the criteria and monitoring frameworks for development decisions and their authorization along the Costa Verde development?</p>
<p>4</p>	<p>How are stakeholders able to influence these governance structures and whose voices are heard or subdued? What opportunities are there for community groups to participate in planning and decision making around risk?</p>

3.3 Conceptual and theoretical Framework

The right to the city

The situation along Lima's Costa Verde exemplifies the concept of the *Right to the City*, which expands on the tendency of cities to become an area of accumulation through urban transformation, involving progressive commoditization of the quality of life.

In an attempt to reclaim the urban space for the citizens and re-enfranchise them in the democratic urban process, Harvey (2013) draws upon Lefebvre's concept of the right to the city framework, which emerges as a collective right that seeks to empower citizens towards a more democratic process of urbanization of the city.

Describing the right to the city Harvey (2013, pp.4) opines that

"...it is a right to change and reinvent the city more after our heart's desire. It is, moreover, a collective rather than an individual right since reinventing the city inevitably depends upon the exercise of a collective power over the processes of urbanization."

The process of urbanizing Lima's Coast through choice projects such as the expansion of the beach circuit highway, luxury hotels and restaurants, residential buildings on the cliff, on the Costa Verde development, has attracted varied responses. This includes reactions from groups such as civil society movements, disadvantaged social groups – those on lower incomes, the elderly, disabled and those without access to their own transport, including 'less economically powerful' stakeholders – i.e. beach users, pedestrians, residents, informal traders etc. These groups, each seeking the right to be involved in the framing of this urbanization process, one, which exemplifies a struggle for their 'right to the city'.

The neglect or recognitions of these struggles have grave implications for the sustained perpetuation of risk cycles and patterns throughout the Costa Verde development.

Emergence of a new public

Thus, these similar struggles over the everyday risk resulting from the Costa Verde development have led to the formation of a group of actively concerned citizens, which we describe as a 'new public'. This we have done, corroborating Dewey's (1927) argument (cited in Griffin, 2010), that there is no "pre formed entity called 'the public' as it only comes to exist around specific issues or moments of crisis. Our case study shows that this 'new public' comprises of spontaneous coalitions of citizens who

all have an interest in, or suffer the ill-effects of, common problems (Griffin, 2010); - in this case, the unsustainable development of Costa Verde, and also that they are specifically localised around the geographic space where the issues are taking place.

'Awareness of a common problem' and 'uniformity of interest' are common themes of this 'new public', which Dewey (1927) and Griffin (2010) posit. Themes, which play an important role in determining the effectiveness of this new public against the existing everyday risk cycles along Lima's Costa Verde.

Discourse analysis

Furthermore, in order to understand how different interests and visions are hegemonized along the Costa Verde development, discourse analysis serves as a key tool. Scholars on discourses such as Dryzek (1997; 2013) have pointed out the importance of discourses in framing our understanding and interpretation in terms of basic conceptions, meanings, and perceptions of the world around us. However, the case of Costa Verde shows us a further dimension of the effect and utilization of discourses in framing development patterns. A dimension which displays elements similar to characteristics argued by Howarth (2010, pp.313) wherein he pointed out that "every discursive formation involves the exercise of power, as well as certain forms of exclusion. This means that every discursive structure is uneven and hierarchical". Our research findings will expand further on the uneven and hierarchal nature of the existing discourses, and how this has served to exacerbate everyday risk patterns on the Costa Verde development.

The Concept of 'Risk'

In line with CABE's (2007) position, our interpretation of the concept of 'risk' is subject to 'values and beliefs', which also influence the priorities attached to these values, leading to an uneven distribution of consequences (costs/benefits) across spatial and temporal domains (Eiser et al., 2012, pp.7).

The delineation of risk into the cumulative effect of : hazards, vulnerability and coping capacity (see Canon 2008; Adger 2006; Benson and Twigg, 2007; Davis et al., 2004), as expressed in the equation below, helps us "systematize and gain a better understanding of existing risk components and the strategies required to reduce each of them" (Wamsler, 2007, pp.105).

We have utilized this concept to visualize and categorize the varieties of risk occurring along the Costa Verde development, as reflected in Figure 13.

Figure 12. Risk as a factor of hazard, vulnerability and coping capacity (source: Wamsler, 2007, pp.106)

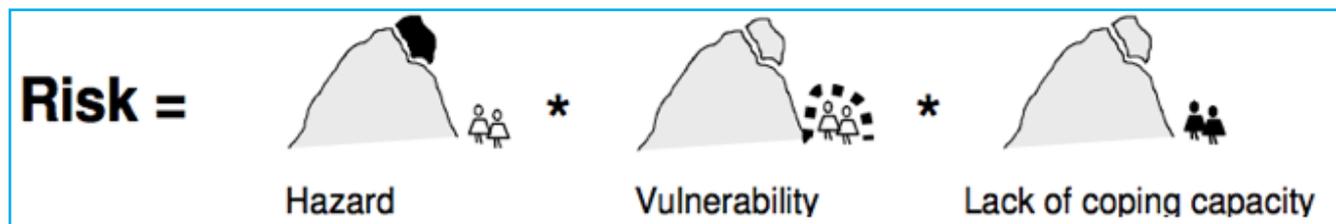
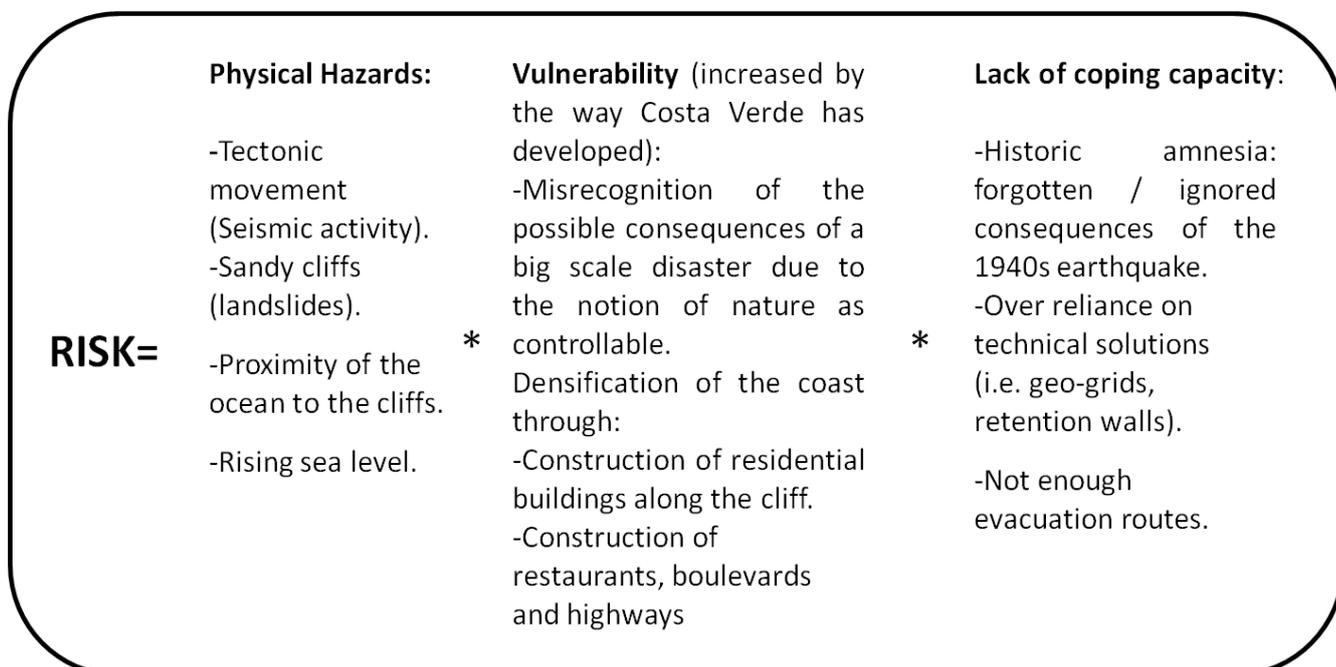


Figure 13. The varieties of risk occurring along the Costa Verde development (by authors)



Everyday Risk

Furthermore, risks in cities manifest at different scales and intensities. Bull-Kamanga et al (2003) and Dodman et al., (2013) posit that everyday risks, which is the focus of our research, occur at very high frequency but small scales, and are the main causes of premature death and serious injury. Due to the frequency of its occurrence, it is subject to diverse interpretation. Our case study reveals that there are three main types of risks which Costa Verde users are frequently exposed to thus, qualifying as everyday risk. They include *risk to the persons*, *risk to property*, and *risk to quality of life* as represented and expanded on, in Appendix 1.

Based on the various interpretations of risk, also bearing in mind the peculiar happenings on our case study, we have defined everyday risk along the Costa Verde development as:

The continuous/daily exposure of different types of vulnerable stakeholders, comprising beach users, pedestrians, residents, informal traders etc. to social, physical and natural hazards, such

as exposure to car accidents, exclusion from accessibility, loss of public spaces, landslides etc., which arise from the Costa Verde development and are aggravated by the deprivation and undermining of their capacity to face or combat such situations.

Furthermore, our findings exemplify that:

- The development of Lima’s coast has produced and re-produced these risks for its residents and for natural environment; and that
- Weak planning and poor governance such as poor collaboration between the different government institutions and the overlapping nature of some of their functions and responsibilities have exacerbated these risks. In turn,
- This fragmented, uneven and overlapping governance arrangement has allowed certain actors to exploit and bypass the planning regime of the Costa Verde in their favour.

- Often these vested interests have culminated in projects that further intensify risk, such as high-rise buildings perched on unviable cliffs or commercial concerns that flout public space conventions.

4. Research findings

4.1 Discourse - Hegemony & Its Impact on Urban Development

Our findings suggest that the coastal zoning, coupled with the divergent priorities and different socio-economic characteristics of these three districts has led to an uneven geography of risk along Lima's coast, resulting in a complex landscape of risk where the already vulnerable are further marginalized and the already influential are better able to influence development.

This uneven geography of risk is embedded in and fueled by the existence of discursive patterns, which highlight and reinforce a focus on interests aligned with the economic value of the Costa Verde development, whilst tilting attention away from others, which do not accrue to immediate economic benefits.

In the case of Costa Verde, on the one hand, the conceptions regarding major concerns, values and priorities on this project as conceived by different stakeholders corroborate the idea in Dryzek's definition of discourses i.e. the existence of varied 'perceptions' and influence of individuality and immediate concerns on discourse formation. On the other hand, when we go on to analyze what actually receives implementation focus and backing, then we visualize issues of power relations, consequent exclusion and unevenness which Howarth (2010) described as consequences of discourses.

We see a situation where these discourses on the model of development for Costa Verde are power-laden and the power and influence exuded by those propounding them, determines the level of expression they receive along the Costa Verde development (see Table 2). A visual example is the continuous focus on road expansion (to facilitate its role as an important trade route), involving a reduction in the width of pedestrian walkways, disability parking, and cycle paths.

A true understanding of the exclusionary implication of this is highlighted when we consider the fact that this road currently benefits only a meager 7.5% (Peru21news, n.d) of Lima's over 8 million residents who currently own cars. Thus, this project has undermined the accessibility of the majority of the public to the coast – especially the elderly, families with young children and the disabled - and poses a hazard for those needing to

use escape routes at times of Tsunami warnings. Additionally, public transportation is restricted in the area for the most part of the year, whilst parking spaces are the exclusionary rights of the luxury restaurant users and private club members along the coast. These embedded patterns thus forming the basis for the reinforcement of everyday risk cycles and patterns along the coast, depriving citizens of their right to a 'supposed' public space.

Figure 14. Costa Verde highway expansion project under-way, to facilitate its role as an important trade-route (Source: by authors)



The struggle for power, by those who are currently being delineated from decisions along the coast and consequently being exposed to the everyday risk of loss of public spaces, exclusions, inaccessibility etc., constitutes a fight for the right to the city, a right to be part of the land use and planning decisions along Lima's coast. This fight seeks to break existing underlying economic processes fostering these inequalities, (Mayer 2009 cited in Howarth 2010) as well as the consequent risk cycles.

The interviews conducted with Governmental organisations, private sector organisations, civil society groups and residents highlighted the varying concerns existing around the area, and the structures of power embedded in these discourses.

Different Stakeholders, Different Concerns, and Solutions

We were able to see that the concerns displayed by the stakeholders over the Costa Verde development are embedded in their different perceptions of what an ideal coastline should be. Despite these differences in perceptions, we see what seems to be similar 'themes' of concerns.

At a cursory glance, some themes seemed similar, however when we probed deeper into the meaning of some generalized terms, we were able to visualize multiple shades of interpretations of these seemingly similar terms such as - ‘mobility’, ‘accessibility’ and ‘public spaces’. A nuanced usage of these terms and the discursive implications of these different meanings on their implementation, have severe consequences on the manifestation of everyday risks along the Costa Verde development.

In addition, we were able to deduce that the privatization and concession trend in Barranco may be instigated by the perception of the Coast Verde development as a huge opportunity for economic growth and revenue generation and the conception that by using public space that way, it is being made available for the ‘public’. In Miraflores, however, we saw a sense of satisfaction with the parks on the upper level, with contrasting reactions to the narrowing of beach strip at the lower level, and a desire for a holistic development at both levels. This contrast may be due to the awareness level of the citizens, given that there are predominantly wealthier residents in this district.

Furthermore, it is clear from the discourse analysis we conducted, that everyday risks have been aggravated by a perception amongst private sector developers and municipal authorities that nature is ‘manageable’ and ‘controllable’. As they have proposed counter measures such as geo-grids, retaining walls and sand bags, which are woefully inadequate for the actual levels of landslide, flooding and heavy wave conditions. The continuous occurrence of traffic congestions and casualties from rock falling and landslide accidents

are evidences of the inadequacies of these technical measures. Also, the height, extension, and coverage of the geo-grids are being questioned, as well as their capacity to be effective during a significant earthquake.

In Table 2 below, we break down and summarize our discourse analysis from the Costa Verde development into ‘main themes of discourses’, ‘proponents’ and ‘evidence of materialization of these discourses’. Given our observation that everyday risk is exacerbated by the uneven implementation and access to benefits from the Costa Verde development, we propose that by asking ‘who is propounding these discourses’ and examining the trend of projects implemented to-date along the Costa Verde, we can gain a deeper understanding of what could be responsible for this uneven implementation.

From Table 2, we can see that compared to other themes of discourses, the themes of ‘*Economic viability*’ and ‘*mobility*’ have great expression in terms of evidence along the coast, corroborating Howarth’s (2010) argument on the unevenness and hierarchal nature of discourses. The column on ‘proponents’ however, gives an insight into what might be responsible for this. We see that proponents of ‘economic viability’ of and ‘improved mobility’, have access and closer recognition with institutional power and authority to ensure the materialization of their discursive propositions, whilst the majority of the proponents for other themes of discourses exist on a rather invisible platform (i.e. civil society groups; residents etc.). Hence, what exists is not a lack of awareness of the need for a sustainably developed coast, but the absence of a formidable platform for recognition and visibility of those calling for these suppressed rights.

Table 2. Hegemonic and Counter-hegemonic Discourses across the Costa Verde development

Main themes of discourses		Proponents	Evidence of materialization on the Costa Verde development
Mobility	Access for private vehicle users	<ul style="list-style-type: none"> • District municipalities (Barranco & Chorrillos) • Concession restaurants • Informal traders (Chorrillos) • Taxi drivers 	<ul style="list-style-type: none"> • Construction of the third lane as an ideal solution for traffic congestion • Increase in head-room and height of pedestrian bridges along the Costa Verde highway
	Access to public transport	<ul style="list-style-type: none"> • APCV • Real estate association • Construction company • Civil society groups • Residents 	<ul style="list-style-type: none"> • Sparse access to public transport during summer
Accessibility	Pedestrian roads/bridges	<ul style="list-style-type: none"> • Civil society groups • Residents 	<ul style="list-style-type: none"> • Recent redesign of pedestrian bridges
	Parking lots along the coast	<ul style="list-style-type: none"> • Civil society groups • Residents 	<ul style="list-style-type: none"> • No evidence of projects implemented to facilitate this request

<p>Ensuring economic viability (Tourist attraction centre & trading)</p>	<ul style="list-style-type: none"> • Municipality of Metropolitan Lima • District municipalities (Barranco & Chorrillos) • Concession restaurants • Real estate association 	<ul style="list-style-type: none"> • Increase in head-room and height of pedestrian bridges along the Costa Verde highway to allow passage of cargo trucks • Road expansion • Construction of shopping malls, private clubs and restaurants • Concessioneering of shoreline to restaurants
<p>Availability and access to public spaces</p>	<ul style="list-style-type: none"> • Civil society groups • Residents 	<ul style="list-style-type: none"> • Selective parks in Miraflores and Barranco • Greening of Miraflores cliff
<p>Sustaining Nature/Landscape</p>	<ul style="list-style-type: none"> • Civil society groups • Residents • Construction company 	<ul style="list-style-type: none"> • Greening of cliff for soil stability along geogrids installed in Miraflores
<p>Pollution</p>	<ul style="list-style-type: none"> • Civil society groups • Residents • District municipalities (Barranco & Chorrillos) • Municipality of Metropolitan Lima 	<ul style="list-style-type: none"> • Construction of controversial Taboada waste water plant • Imposing regulations against disposal of construction waste into the coast

This interplay of power relations is granting hegemony to certain discourses such as those on ‘Mobility’ and ‘Economic viability’; leading to the suppression of other counter-hegemonic interest/discourses. This suppression is in turn, resulting in the reinforcement of everyday risk such as the loss of public spaces, exclusion, privatization of public spaces, and exposure to landslide risk along Lima’s Costa Verde etc.

Discourses on Nature and the Reinforcement of Risk Traps

These hegemonic discourses fostering economic development of the coast are also underpinned by a vision of nature as ‘manageable’ and ‘controllable’. Some of the practices undertaken by their proponents’

on issues of risk concerns that have occurred to-date on the Costa Verde development buttress this. Table 3 gives an overview of this.

Thus, we can further deduce from the table above that these everyday risks to which citizens who use the coast and the urban infrastructure are exposed, are enfranchised in the socio-economic production of the urban landscape and nature along the coast. Furthermore, the responses to these conditions of risk helps to further perpetuate such risks, thus generating risk traps whilst also externalizing the consequences of the risks.

Figure 15 illustrates an example of this, showing the cycle of risk and the constant battle against nature, not to mention the high public funds expended to combat these.

Figure 15. Risk cycle created by the current responses to existing risks (Source: by authors)



Table 3. Table 3: The Reinforcement of Risk Traps

Issue of risk concerns to date	Response by the Municipal Authorities and Private Investors	Risk being reinforced, externalised and re-produced
Narrowing of the beach strip involving the reclaiming of land by the sea	<ul style="list-style-type: none"> Utilization of soil residues (often combined with construction waste) to wedge against the effects of this narrowing 	<ul style="list-style-type: none"> Pollution of the public space and ocean. Threat to the coastal ecosystem and biodiversity.
Landslides and rocks falling from the cliff	<ul style="list-style-type: none"> Installation of geo-grids 	<ul style="list-style-type: none"> A disregard for the requirements to counteract the effects of bigger scale episodic disasters such as earthquake or tsunami on the cliff. Consequent exposure of citizens to the effects of these episodic risks
Threat of erosions to portions of the newly constructed third lane on the Costa Verde road expansion project	<ul style="list-style-type: none"> Dumping of rock boulders and construction waste by the shore to wedge against irregular waves which could cause further erosion 	<ul style="list-style-type: none"> Encroachment on public spaces and pollution of the coastal area. Alteration of the biodiversity and ecosystem
Coastal erosion and flooding threats to concessioner restaurants along Barranco's Coast.	<ul style="list-style-type: none"> Construction of retention walls Utilisation of sand-bags on door thresholds 	<ul style="list-style-type: none"> Un-sustained maintenance of retention walls, resulting in visible deep cracks Soaked sand bags leading to flooding of some restaurants, rusted hinges and exposing customers to these risks.

Governance: The Paradoxical Impact of Decentralization

Contrary to the general notion that decentralization is highly beneficial for efficiency and democracy in the modern bureaucratic state (Kim, 1992), our research revealed a paradoxical impact of decentralization on the Costa Verde Development. The autonomy of districts, which resulted from decentralization, has translated and corroborated complex, conflicting, and overlapping responsibilities amongst institutional actors involved in decision-making process along the Costa Verde development. This is being capitalized on and exacerbates the existing risk cycles, further undermining the harmonious development of the area.

The Peruvian economy has experienced diverse processes of decentralization since the mid-eighties (for a further understanding of these processes see Kim, 1992; McNulty, 2013; Pinker, 2013). One of the outputs of the decentralization process on Lima's Costa Verde was the establishment of the Authority of Costa Verde (APCV). The APCV was established in 1995 by Law No. 26306 as a decentralized body of Metropolitan Municipality of Lima to promote, organize, and supervise the integrated and sustained development of the coast (APCV, 1998).

Decentralization and District Autonomy- A Loophole for Risk Cycle Reinforcement

Our research showed that far from being a unified coastal region, the districts of Miraflores, Barranco, and

Chorrillos are quite distinct municipalities each with diverse geographies, values, and priorities.

We realized that this diversity stemmed from the fact that due to decentralisation, each district's municipality was granted autonomy and consequent ownership of the land within the limits of their Jurisdiction on the Costa Verde. The Law 26306, which initiated Costa Verde, corroborates this by recognising that, each district has the ownership of their respective Land (Ley No. 26306, 1994) (see Box 1).

Box 1. Extract from LAW No. 26306

LAW No. 26306
 Concordances:
 Supreme Decree No. 01-95-MTC (Regulation)
 AGREEMENT No. 217-98-APCV
 Ordinance No. 750 (Municipality of Lima)

Article 1. Be recognized the ownership of the land in the Riparian Corridor, called Costa Verde, belongs to the District Municipalities of Chorrillos, Barranco, Miraflores, San Isidro, Magdalena del Mar and San Miguel within the limits of their respective jurisdictions, land owned by others being included; and merit of this Act, each of the District Municipalities listed above will proceed to register their rights in the relevant Register.

Box 1. Whilst on the field we observed that this ownership structure, gives each district the free-hand and authority to interpret, decide on projects and grant consent to intending developers on portions of the Costa Verde land within their districts. This undoubtedly has profound ramifications for the APCV because, not only are the districts' interests in the Costa Verde development distinct, the problems they suffer from are also highly diverse. Some areas being concerned with attracting investment; others more with mobility and transportation issues; others still highlight the preservation of public spaces; whilst a minority prioritise hazards, safety, and the protection of non-human nature. This also harnesses the effects of their different discourses, further allowing for the reinforcement of hegemony and its ensuing risk cycles. Consequently, planning a unified coastal zone, which addresses all concerns while taking into account the characteristics of districts will be far from easy.

Decentralization- Overlapping and Conflicting Institutional Authorities - A Loophole for Risk Externalization

A further observation from our research was the overlapping and conflicting nature of the jurisdiction of these institutional authorities, and how this has contributed to the perpetuation of everyday risk along the Costa Verde development.

The involvement of multiple institutions in decisions making regarding the coast coupled with their lack of clear distinction of their responsibilities has created a disjunctive use of the coast

The APCV's Incapability - 'weak' Institutional authority?

A clear example is seen in the fact that the APCV, though enacted by law to supervise, promote and regulate development along the Costa Verde development, has no authority to sanction those who flout their authorities.

Hence, whenever districts, for instance, flout the provisions of the master plan, there is no stipulated authority to check this. This has fostered the promotion of investment decisions and disparate uses of public spaces along the Coast to favour each districts priorities. As such, In Miraflores and Barranco, public spaces along the coast have shrunk tremendously over the last decade, depriving people of their right to enjoy nature and meet in public environments. In Barranco especially, concessions awarded by the district municipality to several restaurants along the beach strip such as *Rustica*, *CALA* and *Boulevard Bordemar*, have resulted in significant losses of the public space. In Chorrillos, however, because private investment has been minimal to date, beaches and coastal spaces are being used by informal traders and fishermen.

Figure 16. A recreational park on Miraflores upper cliff, exemplifying projects prioritized by the district (by authors)



Figure 17. Rustica, one of the concession restaurants on Barranco's shoreline (by authors)



Figure 18. Fishing boats and equipment on a portion of Chorrillos's shoreline (by authors)



This trend is thus fostering the production of uneven geographies of risk along the upper and lower parts of the cliff of the Costa Verde development.

Multiple and overlapping functions of Institutional authorities

A further dimension is the multiplicity of institutions exercising authority over the Coast Verde development, and how this often leads to conflicting jurisdictions and overall inaction.

For instance, whilst the APCV has the often-ignored authority to set standards, provide recommendations and supervise the development along the Costa Verde development, the Navy also has the responsibility to provide recommendations and approvals for projects within 50m from the coastline. Also at the municipal level, the civil defense has the authority to provide recommendations regarding risks, whilst EMAPE supervises road transport related construction in these areas. At district level, the district municipalities have the rights to approve, supervise, and implement projects within their jurisdiction, as shown in the Figure 19.

Hence, in the case of a problem, there is the tendency for each of these multiple institutions to avoid taking responsibility for its occurrence. A typical example is the case of the recent dumping of rocks in La Pampilla beach of Miraflores, discussed in detail below, which sparked protests from citizens and beach users over the safety risk this posed to them.

Being that the land on the beach in question belongs to Miraflores district authority, but the road project was a municipal level project handled through EMAPE, whilst the sea is within the Navy's jurisdiction. It was difficult to agree on who to hold responsible for such risky act. This was aggravated by the fact that the APCV was also incapacitated from acting on the situation, despite the fact that the incidence occurred along the Costa Verde development, because the APCV does not have the powers to sanction.

Thus, this overlapping and unclear jurisdiction of roles and responsibilities constitutes a loophole through which the everyday risks such as the loss of public spaces, as seen in this example is being exacerbated.

The chart below gives a diagrammatic representation of the institutions which have direct influence on the coast and also shows the APCV's current position as a 'figure head' outside the circle of direct influence.

This situation is also being capitalised on by private investors to flout the requirements of the Master plan and other regulations along the Costa Verde development, involving the utilization of the powers of the judiciary in some cases, to facilitate their stance.

For example, 'Infinity' an 11-storey luxury residential building on Barranco's cliff encompassing a basement of about 5 floors deep, was constructed despite stiff reluctance and oppositions from the district municipalities. However, a license granted by the first constitutional jury allowed the continuation of this building (El Comercio, 2012)

Figure 19. Overlapping functions of institutional authorities (Source: by authors)

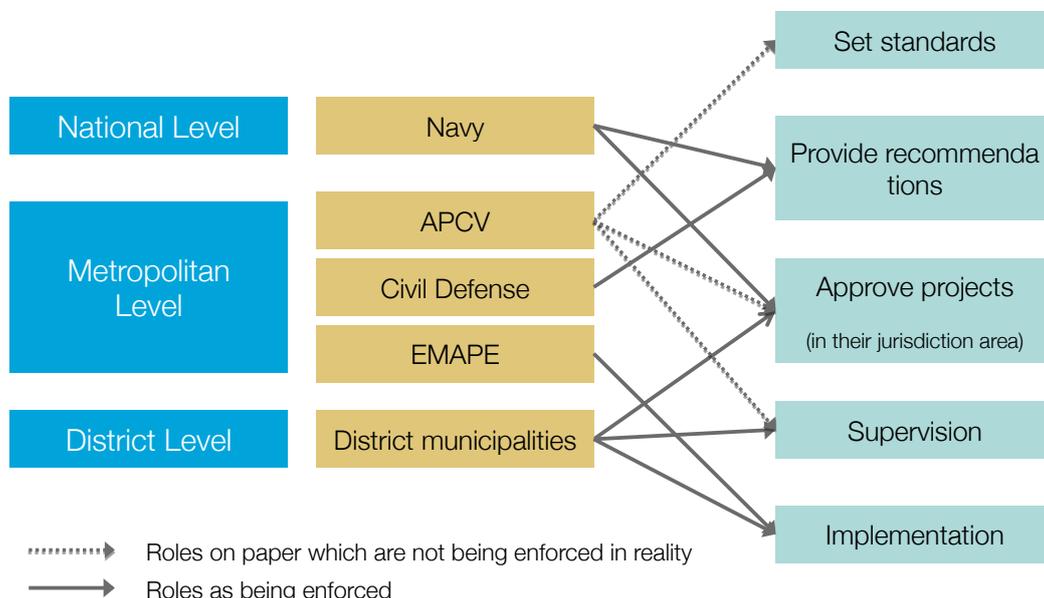


Figure 20. Unclear jurisdictions of responsibilities on the Costa Verde development (Source: by authors)



Figure 21. Infinity building on Barranco's cliff (Source: by authors)



The existence of such loopholes and allowances for the judiciary to intervene, coupled with some instances of complex authorization requirements on building standards have allowed for the production and re-production of situations of risk to users of the coast.

These risks are not only to the immediate users of such buildings, but also externalised to residents and citizens of Lima, due to the weakened cliffs and consequent possibility of cliff falls, landslides and major accidents in case of episodic risks such as Tsunami and earthquakes which they are permanently exposed to.

Box 2. Excerpts from interview with Fiorella Raquel Moran Bringas of the Real Estate Association (ASPAI)

“Civil defence on district level approves the norm and regulations in accordance that the building standards. They give approval for buildings, which are no more than 5 floors. If the building is bigger, e.g 300 m2, the approval has to be made by Civil defence on Municipality level” (Moran, 2015).

Box 3. Excerpts from interview with Raúl Flórez García of APCV

“For example, ‘Rustica’ restaurant, when they received concession for the restaurant, they were asked to build pier and a boulevard space in front of the restaurant, it should be like a space for people, for public access, but ‘Rustica’ did not construct these piers” (Florez, 2015).

4.2 Fragmented Civil Society Groups - Emergence of a ‘New Public’

Further findings from our research reveal that the capitalist driven mode of urbanization, conflicting governance structures and contradictory discourses on risk in Lima, which the Costa Verde development exemplifies, have fostered the emergence of a new public. This corroborates Dewey (1927), Warner (2002) position that publics are bounded by an event or shared physical space; a self-organized group of people around discourses, who are also independent from regulations, government, or other institutions.

In the case of our study, they are a self-organized group. First, regarding the development of Costa Verde and then, in other parts of Lima. This new public has hitherto been enacting the nascent counter-hegemonic discourses, bringing claims around their right to the city to light.

This emergent public, however, is formed in different layers, both geographically and temporally. As such, they operate in fragments, around specific struggles and concerns, as shown in Figure 22.

Some of these groups emerge, and are formed around one-off moments of crisis (see box 4), while others have been involved in long-term struggles and advocacy. Also, some of these organizations seem to advocate against similar struggles in the same areas, while others advocate for the same struggles in different areas.

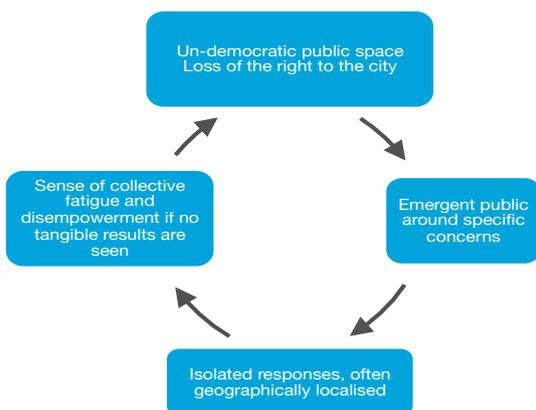
Fragmented Civil Society and the Reinforcement of Risk Traps

Based on this observations, we argue that the fragmented nature in which this ‘new public’ operates, may in fact be reinforcing the hegemonic discourses on the development of Costa Verde as well as the planning

Figure 22. Fragmented location of struggles by existing civil society groups along the Costa Verde development. (Source: by authors)



Figure 23. Risk trap resulting from fragmented civil society operation



process of the city of Lima on a larger scale. This is because, as posited by Pinker (2013), the strengths and effectiveness of any public movement is in their solidarity and union.

Hence, what exists is a situation where despite the validity and importance of their various interests and claims for the sustainable development of Lima’s coast, their voices are silenced discursively and in implementation, enabling the continued reproduction of risk traps and cycles.

Furthermore, contrary to their intentions, these fragmented responses may in fact be disempowering the innate struggles, creating a risk trap, which consequently reinforces existing risks and undermines their fights for the right to the city.

We say this because for those involved in long term struggles without visible results; (as is the case of some of the groups interviewed, who have struggled for several years on the same issue without major results), this process generates a sense of collective fatigue and disempowerment, simultaneously creating a sense of apathy which could un-democratize the urban space. Figure 23 below, illustrates this cycle.

Furthermore, we examine the case of La Pampilla beach protest, where some members of these civil society groups attempted to collaborate, and the impact this had on propagating the injustice and risk they were opposing (See Box 4).

5. Transformative strategy

Somerfield (2013) emphasized the growing literature corroborating the importance of the existence of a robust civil society as an essential precondition for a successful democracy. This consideration, also building upon the observed fragmentation of the emergent new public and their localized struggles for the right to the city, towards promoting the process of re-democratization of the urban space and strengthen the citizen’s voices, formed the base of our strategy. Our research team maximized the momentum generated by the La Pampilla beach case to begin the “on-the-ground” creation and implementation of our transformative strategy. To do this, we bore in mind the key findings of our research and necessary measures that could facilitate the production of ensuing risks. This is highlighted in Figure 24.

Thus, we propose a rounded and incremental strategy, which would build up from a short term unto a medium term unto ensuring long-term sustainable impact, in a bid to influence change in the identified practices that have led to everyday risk patterns along the coast. (See Figure 25).

Box 4. The Case of La Pampilla beach

La Pampilla is a beach located on the lower coastline portions of the Costa Verde development in the district of Miraflores. It is an important recreational area for people from the district and all over Lima. As with many other beaches all along the Costa Verde, the road expansion involving the construction of a third lane on the beach circuit –express highway- entailed an important loss of vital recreational space in the beach area.

In April 2015, facing an alert of strong waves that could affect the newly constructed third lane, EMAPE opted for an improvised protective measure against the erosion of the road by sea waves. This entailed their depositing of big sized rocks on the beach area next to the road, thus further dispossessing surfers, swimmers, and beach users of their right to this recreational space. This action was carried out without the necessary authorization of the Navy.

Citizen's response to this event was almost immediate, involving a widely publicized protest.

- **Protest along La Pampilla beach of Miraflores** -



(Source: by authors)

The protests and occupation of the beach raised awareness and drew media attention. This, resulting in an unprecedented response from the Municipality of Lima assuring the citizens that the rocks would be removed after the anomalous waves alert. However, a month after the event, this had not happened.

As a research group, this case study sparked our thoughts on the immense power of a more collaborative civil society and the possibilities this could harness towards breaking the frameworks of everyday risk, which our research has uncovered.

As an initial step, in the short term we seek to promote collaboration towards a unified and defragmented counter hegemonic force through the creation of a platform of collaboration among social movements and civil society organizations. This would promote enhancement of a unified counter-hegemonic discourse that could contest and perhaps shape the current power relations.

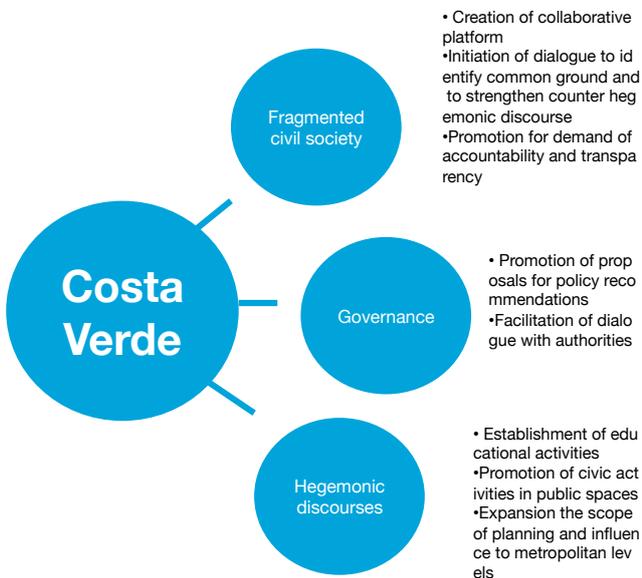
Building on that, in the medium term we seek to democratize the urban space and influence policy change by encouraging the creation of an effective action plan

whilst also finding windows of opportunities among institutions that could lead to influencing policy, decision making processes and institutions.

In the long term we seek to promote the sustained influence at community and policy level towards the reclamation of the right to the city by expanding the scope of action and planning process from the coast to the city and eventually promoting behavioural change through citizen’s activism and education practices promoted through the platform.

We expand further on the three scopes of this strategy below:

Figure 24. Key findings and the relevant strategies



5.1 Short Term Scope- Collaboration towards a Unified and Defragmented Counter-Hegemonic Force



Following our observations on the fragmented nature of the civil society movements as well as the potential this could have for initiating and breaking the existing hegemony and its associated risk, the short term scope aims to kick start this collaboration.

Collaborative Platform

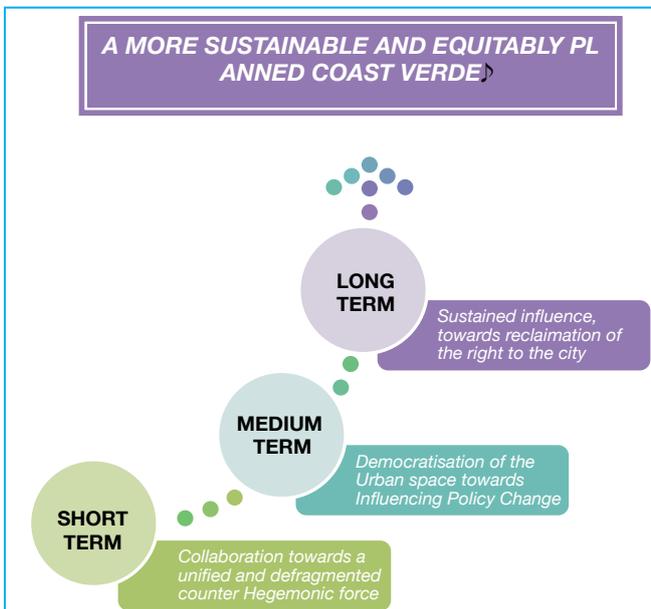
As first steps towards the short-term scope of our strategy, we created a neutral space for dialogue among some of the social movements from the three focus districts that were identified during our research. We believe there is a potential to bring these different actors and struggles together to create a unified voice and strengthen their ability to influence change given that though their causes were different, they all related to the same root problem, which is the risk of losing their ‘right to the city’ at the expense of economic interests.

In this initial space of dialogue, the different actors were able to map spatially, the problems around Costa Verde and identify potential solutions and spaces for participation and collaboration taking into accounts the different capabilities and strategies that each one of them had in their own scope of struggle.

Creating the Platform

Drawing from the findings of our case study, we define this platform as a neutral space where civil society organizations, social movements and individuals can

Figure 25. Three scopes of the transformative strategy



Box 5. Methodology of the collaborative platform

1. Introduction:

This involved individual introductions as well as the brief explanations of their vision of Costa Verde.

2. Participatory Mapping of problems:

Each participant identified three major problems in the development of Costa Verde and localized them spatially on a map of the whole coast, which we provided. Some problems affected the whole coastal area, while others were district specific.

-Mapping activity-



(Source: by authors)

- Outcome of the mapping activity -



(Source: by authors)

3. Visualizing possible solutions (group work)

The participants were separated in three working groups based on common themes of problems identified: a) Governance; b) Public Spaces and Security/Safety; c) Landscape and nature (including pollution). The objective of this activity was to think about possible solutions for the identified problems from their standpoint, as well as identify their strengths, capabilities, which they possessed towards the implementation of those strategies. This would create an awareness of room for leveraging.

Table 4. Solutions proposed by each group

Governance	Public spaces and security/safety	Landscape and nature (including pollution)
<ul style="list-style-type: none"> • Bring important issues into the discussion for the next electoral debate (i.e. Autonomy of the Metropolitan Institute of Planning - IMP). • Create a legal platform for citizens – some organizations have lawyers. • Recognize each other (among organizations) and their struggles. • Inform the population and create citizen awareness from the existing social movements: awareness campaigns in educational spaces, public spaces. • Demand for accountability: letters, ask for information on websites, public • Demand private companies for accountability and social responsibility 	<ul style="list-style-type: none"> • The municipality should have an integral plan for the city – protests • Create public awareness • Media pressure • Promote generation of studies. 	<ul style="list-style-type: none"> • Waste Management • Stop the third lane construction – media pressure. • Media pressure besides legal actions – less expensive • Articulate different citizens: pedestrians, professionals, enterprises, institutions. • Coordination: collaborate with the different resources (i.e. space, media coverage, human resources, experiences) each organization possesses, and coordinate actions in order to avoid duplication • Demand for accountability from the municipal governments. • Long term solution: A Metropolitan Plan because there are many metropolitan issues that affect the coastal area (i.e. construction waste disposal, wastewater disposal) – A plan for the city and a plan for the natural space.

meet to discuss their points of view, concerns and jointly promote their struggles. A space for awareness through educative meetings and seminars, dialogue and creation of proposals from the civil society.

Some steps required to ensure the effectiveness of this platform over this short-term period are outlined in Figure 26.

Box 6. Outputs and Results Generated

The mapping process generated a space for dialogue where it became clear that the problems on the Costa Verde development responded to, amongst other things, a lack of planning that on a larger scale was reproducing risk cycles at a citywide level. They noted that despite that, each organization was fighting a specific struggle and interests; they were fighting against a common problem.

These activities contributed to map and visualize potential entry points for collaboration and complementary actions among the different organizations and social movements, in an attempt to create a stronger and more unified voice.

The groups identified some of their strengths and capabilities, which would serve as an entry point for collaboration and support among organizations.

Despite the potentials that this stage of the strategy has, we are aware of some limitations that could militate against its effectiveness. Hence, we have made suggestions on some recommendations on Table 5 to address these limitations.

To take this step further, there would also be concerted efforts towards creating more awareness of their activities, encouraging new participants thus scaling up their activities to a city-wide movement.

Figure 26. Characteristics and steps for implementing the collaborative platform

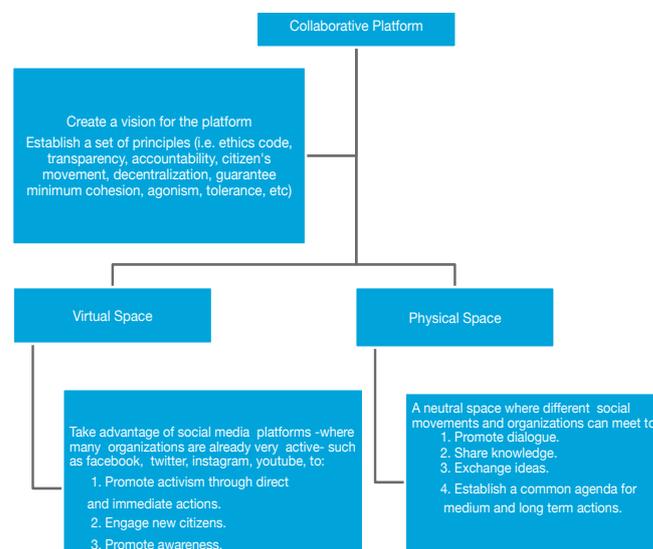


Table 5. Possible Limitations and Recommended Measures for Short Term Scope

Limitations	Recommendations
Risk of politicization	Establish a clear set of rules as part of the vision and principles
Conflicting visions and personal interests among different organizations and movements may impede progressive actions.	Encourage decentralized operation by ensuring the absence of what Brafman & Beckstrom (2006) describe as “a traditional hierarchical system” This can be achieved by ensuring it: <ul style="list-style-type: none"> • Works as an open system where power is fluid and distributed among all the spheres, welcoming new movements, organizations and interests; • Is adaptable and easy to mutate and respond to different circumstances. This may be triggered by the immediate struggles that arise along Costa Verde and in the city. • Proposing a rotational “leadership” style where no particular individual or organization remains in positions of leadership for longer than 6-12months
Establishment of hierarchies and overarching interests undermining weaker voices, leading to some organizations and social movements being left out or misrepresented.	<ul style="list-style-type: none"> • Recognize the platform as a space of agonistic pluralism (Mouffe, 1999): a space where conflict and adversaries are recognized embraced and coexist as part of the democratic process. • Proposing a rotational “leadership” style where no particular individual or organization remains in positions of leadership for longer than 6-12months • Creating a quota system for deciding on election results thus ensuring majority opinions count in the choice of leaders per time.
Lack of resources may limit scope of action	<ul style="list-style-type: none"> • Take advantage and build upon the different capabilities and skills that each movement, organization, and/or individual may poses (i.e. lawyers from social movements may be able to provide legal advice), ensuring where possible payments could be by leveraging and utilizing existing capabilities

5.2 Medium term scope - Democratization of the urban space towards Influencing Policy Change

The following activities and guiding principles could help strengthen this step.

MEDIUM TERM Democratization of the urban space towards Influencing Policy Change

In order to enhance this process of change, in addition to bringing voices together to make stronger claims, which the short term aims to achieve, we propose a medium term plan, which is aimed at democratizing the urban space, and consequently causing an influence at policy levels. This would involve:

Step 1: Formulation of an Action Plan for these Collaborative Civil Society Groups

This would involve ensuring the collaborative platform has a workable strategy, takes specific actions and influences precise change along the Costa Verde development. Also enabling them communicate proposals and alternatives to the authorities towards a long-term influence.

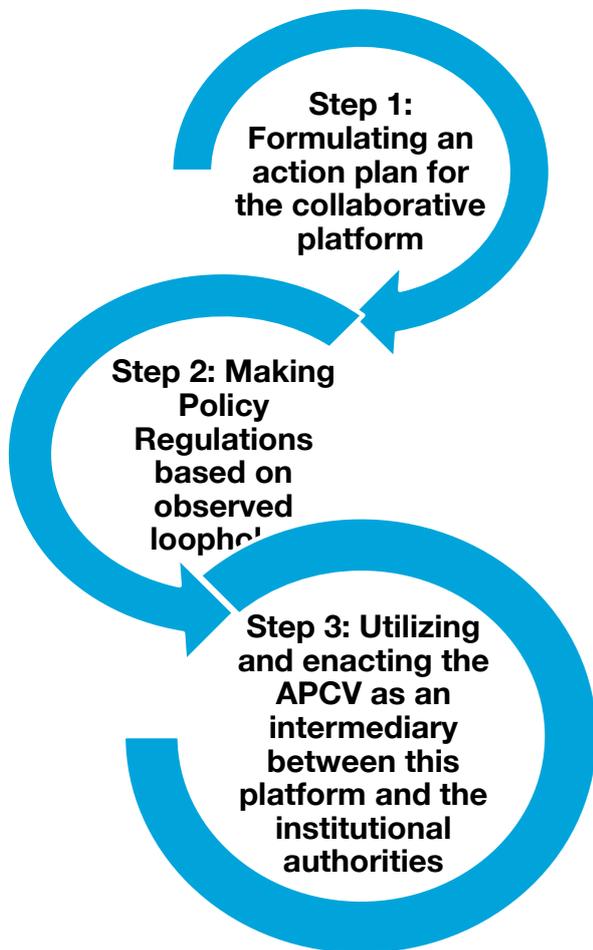
Box 7. Activities to strengthen Step 1

- Promote Citizens awareness through scheduled awareness campaigns with the media, schools, road shows etc.
- Initiate Primary and secondary school campaigns
- Initiate Contact with the APCV, as an entry point into involvement in existing APCV organized Council meetings and subsequently gaining the interest of the government

Box 8. Guiding principles for Step1

- Respect for the Principles of the Platform
- Creation of a Long and Medium term vision
- Inclusion of Precise Communication Strategy, detailing how interactions with institutional authorities are carried out.

Figure 27. Three steps towards Influencing Policy Change



Step 2: Policy Recommendations

Following our observations on the way the Coast has developed, coupled with our findings on policy documents, we proposed that some sets of guiding principles on Coastal planning would facilitate a coherent and sustainably planned Costa Verde development. Consequently, drawing on Pawlukiewicz, Gupta & Koelbel's (2007) ten principles for coastal development we propose the changes desired on the Costa Verde development could be further perpetuated by influencing policy formulation stages, thereby ensure ap-

propriate policies are formed contributing towards breaking the cycle of destructive planning decisions and laws which are currently leading to the degradation of Lima's coast line.

These policies should reflect the shared values of the Costa Verde stakeholders - nature, community, residents, stakeholders, governmental institutions, private sector, some of which include:

1. Harmony with nature, which also means minimum interruption to the natural systems hence lowering the associated risks;
2. Access to public space (i.e. the beach area), meaning that the coastal region should be truly a place where the public can enjoy without any barrier; and
3. The preservation of the coast as recreational areas.

We have thus attempted to exemplify the implications of these principles to the Costa Verde development. Using seven (7) of the ten (10) principles identified which are most relevant to the Costa Verde development. These seven principles could act as the basis for future policy-making.

Step 3: Utilizing and Enacting the APCV as an Intermediary between this Platform and other Institutional Authorities

To counter the loopholes and overlapping spaces, which proponents of the economic interests have capitalized on, to perpetuate investment patterns fostering exposures to everyday risk, we propose that the APCV could serve as an entry point for the civil society groups to start a dialogue with institutional actors and influence change at a policy level (See Box 9).

Box 9. The APCV – An Intermediary tool

In spite of being the entity that should regulate the development of Costa Verde, the APCV's lack of sanctioning power has undermined its scope of action and planning processes and attempts.

This institution however is open for dialogue and holds regular fora with district representatives, also with civil society and interest groups who will to attend. However the attendance rate and commitment of some districts have been low and infrequent.

Nevertheless, we propose that the APCV could represent an entry point to start a dialogue with government institutions to influence policy and accountability. And this could simultaneously help strengthen the importance/role of the APCV to other stakeholders.

Table 6. Seven Principles for Coastal Development (adapted from Pawlukiewicz, Gupta & Koelbel's (2007)

S/No	Planning policy principles	The implications and applicability to the Costa Verde development
1.	Planning to enhance value by protecting and conserving natural systems	<ul style="list-style-type: none"> •The need to protect the Costa Verde shoreline for the benefits it brings are shared among the local residents, surfers, citizens in Lima and tourists •The need for the protection of natural tidal waves for diverse recreational activities •Prioritize in the constructing of standard highways without compromising nature's jurisdiction, the using of natural vegetation with minimum irrigation and the using of recycled materials in constructions
2.	Planning by being sensitive to natural hazards and ensuring the reduction of vulnerability	<ul style="list-style-type: none"> •Reduce risk or vulnerability through open space and cliff protection •Be aware of coastal erosions as erosive forces can destroy homes, businesses, roads and other infrastructures, as such ensure terms of concessions are first installed before construction of the individual buildings •Sensitivity to and regular assessment wave intensity as floating debris may affect surfing activities; also beware of the debris which got washed onto the shore due to strong waves •The potential of tsunamis resulting from earthquake or landslides. •Conduct initial site assessment prior to any type of development to identify specific vulnerabilities which should be taken into account in the final design of the development •The need to enhance resilience, for example through evacuation scenario stimulation and emergency management •In terms of economic resilience, ensuring a coastal business mix (ex. easy pick up and leave for tourism purposes, NGOs which can also help in the aftermath of natural disaster) is necessary •The need to establish accountability in which the approval of projects should not ignore the potential hazards. The true cost of development should be clearly reflected which also includes long term protection needs
3.	Ensuring comprehensive and intermittent assessments to the region and site	<ul style="list-style-type: none"> •Emphasis on the mandatory need for environmental impact study for any development project •Regular utilization of technical tools such as GIS to evaluate the natural boundaries of the coast, understand existing relationships and how this has changed in regular intervals to allow for necessary policy and planning adjustments •Enforce a land use planning system which takes into account the ecological status of Lima's coast
4.	Lower risk by exceeding standards for citing and construction	<ul style="list-style-type: none"> •Enforce compliance with concession requirements by private investors on the coast. (Restaurants, Luxury apartments, Yacht clubs along Costa Verde) •Confer sanctioning powers unto the APCV •Beyond the creation of a zoning code; make provisions for assessing compliance regularly and assign worthy penalties to offenders. The APCV should be empowered for this purpose
5	Use market-based incentives to encourage appropriate development	<ul style="list-style-type: none"> •Provide incentives to encourage the private investments in agreed development purposes on well assessed and tested sites; the incentives may include public investment in capital and/or services and public-private partnerships for land assembly and financing •However make mandatory safety and city-wide protection measures as pre-requisites for their investments such as installation of agreed standards grids; protection of cliff vegetation etc •Investment in alternative transportation systems such as railway system by utilizing the private sector for financing whilst ensuring appropriate regulatory and standards enforcements. This would reduce the current pressure on the highways, creating less tendency to invade coastal space through road projects, whilst also ensuring economic revenue for the municipality

6.	Balance the public's right of access and use with private property rights	<ul style="list-style-type: none"> • Create a space for dialogue between the private investors and public citizens, probably through the APCV fora's (see medium term strategy)
7.	Commit to stewardship that will sustain coastal areas	<ul style="list-style-type: none"> • Actively engage civil society groups in the development course of Costa Verde and to ensure that the voices from civil society are heard • The community must have a shared vision of the future; in which the vision involves strategy for implementation (funding mechanisms, potential partners, agenda/time frame should be included in this strategy) • The goal is for the establishment of inclusive and transparent partnership with participation from the identified stakeholders. • The design and initiation of educational programme towards ensuring awareness of planning best-practices by adolescents and children from early life stages

Action points for Step 3:

- Maximization of existing fora and council meetings with district representatives and civil society groups which has hitherto recorded low attendance levels
- Arrange for formal introductory meetings with the APCV
- Through these council meetings propose attendance by members of the national and municipal Urban planning departments; NAVY , Civil defense at least once in 6 months, towards gaining recognition and influence at other levels of government

In the course of our research we have seen examples of such issues affecting the coast such as the disposal of wastewater and construction waste on the beach and coastal areas which have lingering consequences on pollution and consequently water and hydrological that area a consequence to the whole city.

Hence, the long-term part of our strategy seeks to ensure a scaled-up and sustained influence at community and policy level, towards reclamation of the right to the city and a sustainably developed Costa Verde in the long term this would be done by:

Step 1: Enhancing a city-wide scope through propagating an understanding of the urban metabolism:

5.3 Long term scope - Sustained influence at community and policy level towards reclamation of the right to the city

LONG TERM

Sustained influence at community and policy level towards reclamation of the right to the city

This may involve the adoption of a city-wide scale in the preparation of policy plans, enactment of a specific department for holistic and regular evaluation of implemented plans along the coast and adapting it at regular intervals to the way the coast has developed. Also, encouraging annual assessment /sustainability reports by an independent body, which would be made publicly available on a city-wide scale as well as local district scale.

As highlighted by our findings so far, Lima's coast is an important and dynamic part of the city, one which could consequently serve as an entry point to democratize the urban space. However, it is also important to understand and consider the interactions of human and ecological systems, which constitutes its 'urban metabolism' (Rapport 2011, Heynes et. al. 2006, Kaika & Swyngedouw 2000, Gandy 2004), bearing in mind that the issues that materialize on the coastline are effects of problems initiated at a smaller scale or larger scale. These in turn, have implications on the local district scale as well as the city-wide metropolitan and National scale.

Step 2: Educational awareness of the right to the city and well as on issues of sustainably planned development:

We understand the necessity of starting from the cradle of knowledge, hence this long-term scope would involve:

- Incorporating compulsory modules on awareness of sustainable planning methodologies, in the educational curriculum of secondary and University schools

- Organizing regular awareness campaigns and creative activities for children within neighborhoods, to create an initial awareness of the importance of planning.

5.4 An Integrated Process of Transformation

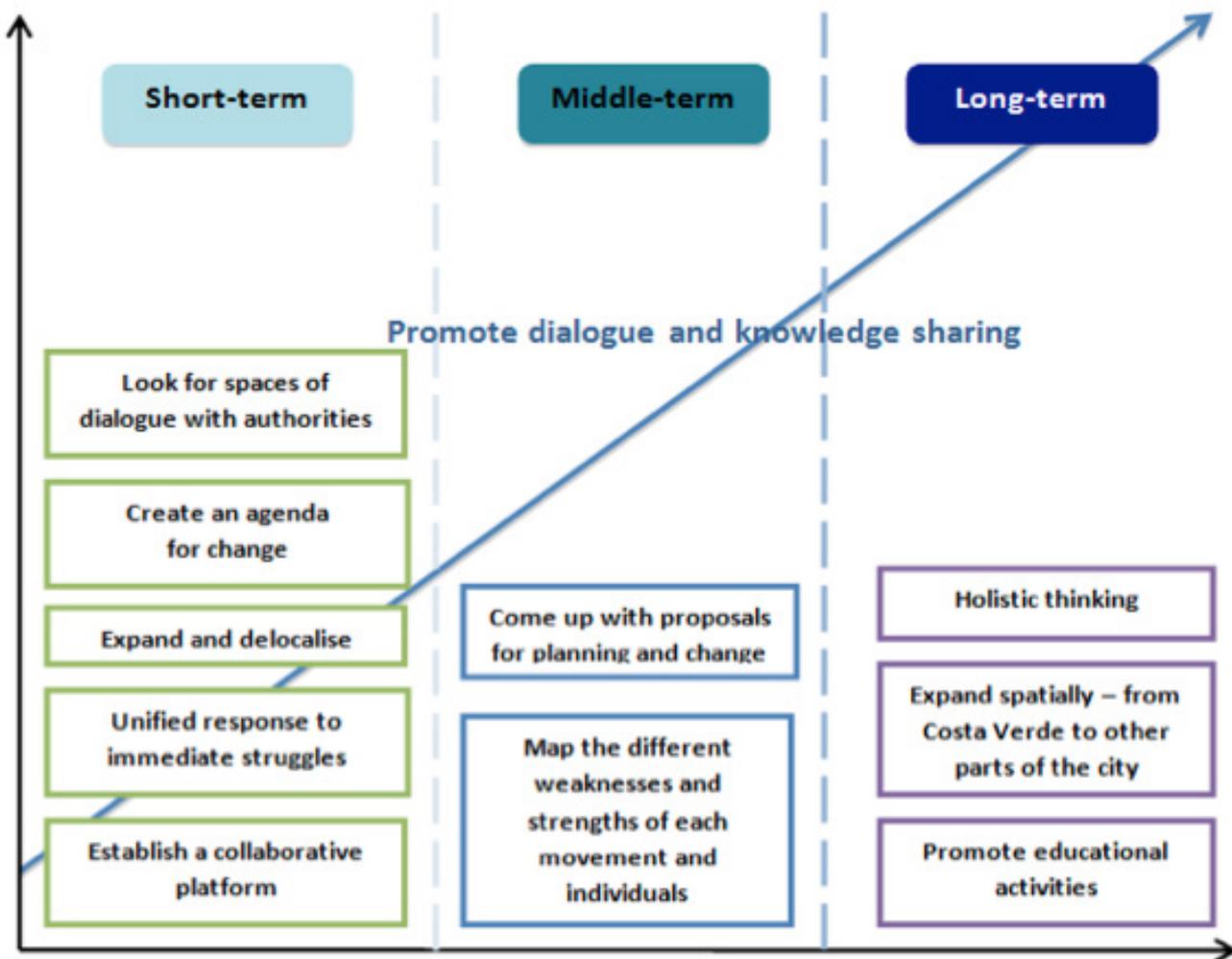
We would like to stress, however, that for the purpose of this report we have separated the implementation of the strategy into short, medium and long-term strategies based on the problem they respond to from our findings. However, this does not imply that they take place in distinct successions, as on a whole they constitute an interactive and integrated process initiated within different time frames as shown in the chart below:

6. Conclusion

The development of Costa Verde is inextricably representative of the development dynamics of the city of Lima and of Peru in the context of globalization. The notion of a manageable and controllable nature has been in existence since the initial stage of the Costa Verde development and has been perpetuated through time. This pattern has created risk patterns that have been reinforced through the Costa Verde development practices, creating risk cycles/risk traps.

The proposed transformative strategy seeks to break those risk traps by tackling some of the issues that have generated them, challenging dominant discourses that have sustained these patterns of development along

Figure 28. An integrated process of transformation



Costa Verde, proposing new alternatives of development through policies and practices and ultimately promoting a change in the vision of how the coast and the city should be developed under the framework of the right to the city.

By challenging the dominant discourse, we foster an enabling environment for the citizens to contest the current power relations that have perpetuated the hegemonization of economic centred discourses and the vision of nature as controllable on which existing risk cycles and traps are underpinned. This would pave way for a new configuration of power relations that prioritizes the vision

of the city as a space of diversity; social encounter and construction of democracy; re-scale the importance of public spaces for the urban imaginary.

However, whilst this strategy holds prospects for changing the current situation, it is important to bear in mind that the new configurations of power may also amount to a re-shaping of existing power relations which could also lead to the exclusion of a new or different set of actors, undermine other discourses and generate other practices.

6.1 Areas for further research

Figure 29. Areas for further research



References

- Adger, W. N. (2006) 'Vulnerability,' *Global Environmental Change*, Vol. 16(3), pp. 268-281.
- America latina ante el paradigma y los desafíos de la globalización / Asuncion Urzainki. (2015). *America latina ante el paradigma y los desafíos de la globalización / Asuncion Urzainki*. [online] Available at: <http://www.ingeba.org/lurralde/lurranet/lur29/29urzain/29urzain.htm>. [Accessed 05 June 2015].
- Arana V.A. (1998) *Institutional Building for the Land Use Management in Peru: The case of Lima*. [Online]. Available at https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCEQFjAA&url=http%3A%2F%2Fwww.ruaf.org%2Fsites%2Fdefault%2Ffiles%2Fecofnf2_backgroundpaper_vladimir.doc&ei=hr9wVZmhBsb8Ut6WgWg&usg=AFQjCNFQcCTiyEUrjQ6G2jYxcJvMabGVXg&sig2=L6J61bTVZJfk9xVHD13SQg&bvm=bv.95039771,d.d24 [Accessed at: 6th February 2015]
- Beckstrom, A. and Brafman O. (2006) *The Starfish and the Spider: The Unstoppable Power of Leaderless Organizations*. New York: Portfolio.
- Bull-Kamanga, L. et al. (2003) 'From everyday hazards to disasters: the accumulation of risk in urban areas,' *Environment & Urbanization*, Vol. 15(1), pp.193-203.
- CABE (The Commission for Architecture and the Built Environment) (2007) *Living with risk: Promoting better public space design* [Online] Reports. Available at: <http://web.archive.nationalarchives.gov.uk/20110118095356/http://www.cabe.org.uk/publications/living-with-risk> [Accessed at: 1st June 2015].
- Canon, T. (2008) 'Reducing people's vulnerability to natural hazards: Community and Resilience,' *UNU-WIDER Research Paper*, No. 2008/34. [Online] Available at: http://www.wider.unu.edu/publications/working-papers/research-papers/2008/en_GB/rp2008-34/ [Accessed at: 3rd June 2015].
- Dodman, D. et al. (2013) 'Understanding the nature and scale of urban risk in low- and middle-income countries and its implications for humanitarian preparedness, planning and response,' *IIED Human Settlements Discussion Paper Series*, [Online] Available at: <http://pubs.iied.org/pdfs/10624IIED.pdf> [Accessed at: 3rd June 2015].
- Development Planning Unit-DPU (2013), *MSc Environment and Sustainable Development Student Report. Transformative planning for environmental justice in metropolitan Lima. Water, risk and urban development: Present outlooks, possible futures*. London: The Bartlett, Development Planning Unit.
- Dewey, J. (1927)., *The Public and its Problems*. New York: Henry Holt & Co.
- Dryzek, J. S. (1997)., *The politics of the earth: environmental discourses*. Oxford: Oxford University Press.
- Dryzek, J. S. (2013) 'Making sense of earth's politics: a discourse approach,' from Dryzek, J. S. *The politics of the Earth: environmental discourses*. Oxford University Press, pp.3-25.
- Eiser, J. R. et al. (2012) 'Risk interpretation and action: A conceptual framework for responses to natural hazards,' *International Journal of Disaster Risk Reduction*, Vol. 1, pp.5-16.
- Florez R. (2015) 'Concession for construction'. Interview with Raul Florez Garcia. Interviewed by Morah Nonye for research for Development Planning Unit, 5th of May.
- Gandy, M. (2004) 'Rethinking urban metabolism: water, space and the modern city', *City*, Vol. 8(3), pp.363-379.
- Griffin, L. (2010) 'Fishing for the Public Interest: Making and Representing Publics in North Sea Fisheries Governance Reforms,' in "Fishing for the public interest" in (ed.) Newman, J., Barnett, C. and Mahony, N., *Rethinking the Public: innovations in research, theory & policy*. Bristol, UK: Policy Press.
- Harvey, D. (2013) 'The Right to the City,' in Harvey D. Rebel Cities. *From the right to the city to urban revolution*. London: Verso, pp. 3-27.
- Howarth, D. (2010) 'Power, discourse, and policy: articulation a hegemony approach to critical policy studies,' *Critical Policy Studies*, Vol. 3(3-4), pp.309-335. [Online] Available at: <http://www.tandfonline.com/doi/pdf/10.1080/19460171003619725> [Accessed at: 29th May 2015].
- INICIO. (2015). *INICIO*. [ONLINE] Available at: <http://www.apcvperu.gob.pe>. [Accessed 05 June 2015].
- Lemay, M (1998), *Manejo de los recursos costeros y marinos en América Latina y el Caribe*, Washington, D.C. Diciembre 1998 - No ENV-128, [Online] Available at: . [Accessed 05 June 2015].
- Lizarzaburu J. M. (2015) 'Awareness of citizens'. Interview with Javier Lizarzaburu Montani. Interviewed by Aigul Magazova for research for Development Planning Unit, 5th of May.
- Kaika, M., Swyngedouw, E. (2000) 'Fetishizing the modern city: the phantasmagoria of urban technological networks,' *International Journal of Urban and Regional Research*, Vol. 24(1), pp.120-138.
- Kaika, M. (2014) *Maria Kaika explains political ecology* (Video), Available at <https://www.youtube.com/watch?v=Z5PRfxNUBao> [Accessed at: 3rd June 2015].

Kim, S. H. (1992). *The political process of decentralization in peru*. Public Administration and Development, 12(3), 249-265. doi:10.1002/pad.4230120304

Marco Trade News (2015). *La importancia de la industria del transporte marítimo en el comercio internacional*. [Online] Available at: <http://www.marcotradenews.com/noticias/la-importancia-de-la-industria-del-transporte-maritimo-en-el-comercio-internacional-19866>. [Accessed 05 June 2015].

McNulty, S. (2013) 'Participatory democracy? exploring peru's efforts to engage civil society in local governance,' *Latin American Politics and Society*, Vo. 55(3), pp. 69-92.

Mouffe, C. (1999) 'Deliberative Democracy or Agonistic Pluralism?' *The New School*, Vol. 66(3), pp. 745-758. [Online] Available at: <http://www.jstor.org/stable/40971349> [Accessed at: 3rd June 2015].

Pawlukiewicz, M., Gupta, P. K., and Koelbel, C. (2007) *Ten Principles for Coastal Development*. Washington D.C.: ULI(the Urban Land Institute). [Online] Available at: <http://uli.org/wp-content/uploads/ULI-Documents/Ten-Principles-for-Coastal-Development.pdf> [Accessed at: 4th June 2015].

Peru 21(n.d) *Lima Cómo Vamos: El 80% de limeños usa el transporte público | Actualidad | Peru21*. 2015. *Lima Cómo Vamos: El 80% de limeños usa el transporte público | Actualidad | Peru21*. [Online] Available at: <http://peru21.pe/actualidad/transporte-publico-ong-lima-como-vamos-corredor-azul-metro-lima-parque-automotor-mtc-2200043>. [Accessed 05 June 2015].

Raquel F. M. B. (2015) 'Approval process' Interview with Fiorella Raquel Moran Bringas. Interviewed by Natalia Aillatan for research for Development Planning Unit, 5th of May.

Rua, C. (2006), *Los puertos en el transporte marítimo*, Universidad Politecnica de Cataluna, [Online] Available at: <https://upcommons.upc.edu/e-prints/bitstream/2117/289/1/8.%20Rua.pdf>. [Accessed 05 June 2015].

Wamsler, C. (2007) *Managing urban disaster risk: Analysis and Adaptation Frameworks for Integrated Settlement Development*

t Programming for the Urban Poor. Lund: Lund University. [Online] Available at: <http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=1036522&fileId=1036619> [Accessed at: 3rd June 2015].

Warner, M. (2002). *Publics and Counterpublics*. New York. Zone Book.

Laws

Government of Peru (1995) *Reconocen la propiedad del Corredor Ribereño denominado Costa Verde a diversas Municipalidades distritales de la provincia de Lima*. Ley No. 26306.

Government of Peru (2002) *Ley de reforma constitucional del capitulo XIV, del titulo IV, sobre descentralizacion*. Ley No. 27680.

Municipalidad Metropolitana de Lima (MML) (2011) *Sistema Nacional de Gestion del Riesgo de Desastres*. Ley No. 29664.

Municipalidad Metropolitana de Lima (MML) (2010) *Declaran la intangibilidad de los acantilados que conforman el Corredor Ribereño de la Costa Verde, en la provincia de Lima*. Ordenanza No. 1414.

Website

Larcomar: <http://www.larcomar.com>

Photos

Figure 1: Puentesperu (2010) *Map of Peru* [Online]. Available at: <http://www.puentesperu.org/peru.html> [Accessed at: 4th June 15].

Figure 2: Newsmaritime (2015) *Port in Callao* [Online]. Available at: <http://www.newsmaritime.com/2015/dockworkers-at-port-of-callao-in-peru-on-strike/> [Accessed at: 4th June 15].

Figure 3: Autoridad Del Proyecto Costa Verde (n.d.) *Map of Costa-Verde* [Online]. Available at: <http://www.apcvperu.gob.pe/index.php/costa-verde/ambito-territorial> [Accessed at: 30th March 15].

Figure 4: Luis Padilla (2010) *Highway in Miraflores* [Online]. Available at: http://es.wikipedia.org/wiki/Circuito_de_playas_de_la_Costa_Verde#/media/File:Circuito_Costa_Verde.jpg [Accessed at: 4th June 15].

Figure 5: APCV- Autoridad Del Proyecto Costa Verde (2014) *Planos zonificación* [Online] Available at: <http://www.apcvperu.gob.pe/index.php/planos-zonificacion> [Accessed at: 4th June 15].

Figure 6: Olsenius, R. (2009) *Lima, Peru Photos, National Geographic Traveler* [Online]. Available at: http://travel.nationalgeographic.com/travel/city-guides/lima-peru-photos-traveler/#/lima-larcomar-pacific_22998_600x450.jpg [Accessed at: 4th June 15].

References

Appendices

Table A1. Diverse Interpretations of Risks

Types	Impacts	Who is vulnerable	Quotes
Risks to the person	Car Accidents	Pedestrians, cyclists, drivers	"Expansion of the highway produces more chances for car accidents." - Jasmin (Civil society member, N.A.)
	Crime	Tourists, residents	"In Magdalena del Mar, the beaches are dangerous for the residents." - One of the problems identified during the roundtable.
	Cliff falling	Pedestrians, cyclists, drivers	"A child went into a coma after hit by a falling rock." - Lilliana (Professor, Miraflores)
Risks to property	Vandalism	Restaurants owners, public sector	"Due to the lack of security, people in Chorrillos dug up the water pipe from public toilets and used the water." - Patricia (Professor, Barranco)
	Flooding		"When the waves are strong, we have to use these sandbags to prevent water from coming into our restaurant." - N.A (Restaurant staff, N.A.)
	Coastal erosion		"The waves are so strong and it is possible that the wave will destroy the third lane." - Ricardo (Lawyer, N.A.)
	Cliff falling	Drivers, public sector	"District municipality has to come clean things up whenever big landslides happened." - Paola (Restaurant owner, Chorrillos)
Risk to quality of life	Loss of community cohesion	Tourists, residents, surfers	"Last year the students came here to enjoy a picnic. Then the owner just put a barrier around this place. The municipality didn't remove the barrier." - Jose (Civil society member, Barranco)
	Social exclusion		"There's poor accessibility for the disabled people, even though there is a law stating there should be ramps." - N.A (Wheelchair user, Surco)
	Loss of areas for recreation/sport		"Government put huge efforts on mobility but they always forget about the recreational and tourism area along Costa Verde." - Ana (former municipality official, Barranco)
	Pollution		"Waste disposal in Magdalena del Mar created numerous environmental problems" - Ursula (Civil society member, N.A.)
	Economic loss	Restaurant owners, fishermen, vendors	"Closure of the road is affecting our sales." - N.A. (Fisherman, Chorrillos)
	Traffic congestion	Drivers	"Our major concern now is the traffic problem." - Lorena (Municipality official, Barranco)



2. Barrios Altos.

Breaking the risk-cycle for an inclusive urban revival

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Quinta Baselli, Quinta Carmen, Quinta El Carmelo, Quinta Jr. Paruro, Quinta n.n. (only woman, Huanuco), Psje Muña, Quinta 641, Quinta 1274, Quinta 1388, Quinta 1290, San José, San José 234, Santa Clara, Santa Rosa (Miro Quesada), Santa Rosa (Sebastián), Señora de los Milagros, Virgen de Fátima

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Abbreviations

CIDAP - Centro de Investigación, documentación y asesoría poblacional / Center of Research, Documentation and Population Advice

ELIS - Eficiencia Legal para la Inclusión Social / Legal Efficiency for Social Inclusion

EMLIMA - Empresa Municipal Inmobiliaria de Lima / Real Estate Company of MML

INDECI - Instituto Nacional de la Defensa Civil / National Institute of Civil Defense

MML - Municipalidad Metropolitana de Lima / Metropolitan Municipality of Lima

PROLIMA - Programa Municipal para la Recuperación del Centro Histórico / Municipal Program for the Recovery of the Historic Center of Lima

PUCP - Pontificia Universidad Católica del Perú / Pontifical Catholic University of Peru

PROSODE - Proyección Social de Derecho / Social Protection of Law

SEDAPAL - Servicio de Agua Potable y Alcantarillado de Lima / Water and Sewage Utility of Lima

UNESCO - United Nations Educational, Scientific and Cultural Organization

Glossary

Adobe: A natural building material made from sand, clay, water and some kind of fibrous or organic material

Barrioaltinos: Residents of Barrios Altos

Beneficencia: Charity body of the MML

Coping mechanisms: The activities planned or undertaken by actors to reduce everyday risk

Everyday risk: The probability of loss, including mortality, morbidity, livelihood, assets, culture and heritage, on a daily occurrence.

Hazard: Physical and social phenomena that may cause loss, harm or damage.

Juan Pérez Medical Centre: A public medical center in Barrios Altos

Quinta: Building accommodating various families in individual units around or along a central common space

Law 29415: Aimed to improve the physical structure and legal status of *tugurios* located in the center of Lima

Mejorando Mi Quinta: Former national program created by Resolution N° 185-2007 of Housing, Construction and Sanitation Ministry (Ministerio de Vivienda, Construcción y Saneamiento) that aimed to improve infrastructure and basic services in quintas owned by a public entity, like Beneficencia.

Polladas: Peruvian post-disaster fund-raising party amongst residents

Posesionario: Informal occupant of a building with a known or unknown careless or negligent owner.

Programa de Mejoramiento Integral de Barrios: The Integral Improvement of Neighbourhoods Program

Stakeholders: Various actors are involved in and influence the processes occurring in a city.

River Rímac: A 160 km long river that runs across Lima is the main water source of the city

Tugurio(s): Decaying and overcrowded housing

Vía Parque Rímac: Development project along the River Rimac aimed to improve the mobility across 11 districts of Lima.

Vulnerability: the susceptibility to be harmed. It is a dynamic concept influenced by factors including health, poverty, gender, age, formality, social status, etc.

Executive summary

Barrios Altos is a UNESCO heritage site in Lima's historic city centre highly valued for its historical significance. Despite this, the environmental and living conditions are worsening, as many of the buildings are falling into a state of dilapidation and eviction is threatening many of the residents. Furthermore, residents are excluded from participating in the urbanisation process of their area, as stakeholders that are more powerful propose their own plans, which take advantage of the complexities and ambiguities within Barrios Altos.

This research focuses on the physical and social everyday risks in Barrios Altos and the efforts undertaken by key stakeholders to reduce them. The objective of this research is to disrupt everyday risk cycles through proposing strategies that lead to transformative change. The main everyday risks the residents face include building collapse, fires, flooding, health issues, eviction and crime. The key findings of this investigation show that everyday risk is far more diverse than normally portrayed, as factors influencing vulnerability interact to produce everyday risks and influence the exposure of different groups of residents to individual risks. Furthermore, the interaction of vulnerability factors leads to the formation of persistent risk cycles, reinforcing the reproduction of risk despite efforts towards its reduction. Moreover, coping mechanisms to reduce everyday risk frequently result in the externalisation of everyday risk onto surrounding neighbours and public spaces.

We argue that in Barrios Altos, everyday risk is intertwined in urban development, as, despite the fact that development plans have focussed mainly on buildings and neglected the residents, little action has been taken against this. This has led to the increasing risks in Barrios Altos and the formation of socio-physical risk cycles. To disrupt everyday risk cycles, an urban development pattern that recognises the diversity of everyday risk in Barrios Altos is required, under the theme of an inclusive urban revival; utilizing opportunities to promote social organization and mobilization. A web of strategies to achieve this vision of transformative change has been proposed and grouped into three themes: *Unity and Collaboration; Knowledge and Perception; Institutional and Legal Mechanisms for Urban Renovation*. Under a vision of inclusive urban revival, urban development will preserve both the life and memory of Barrios Altos and reclaim the residents' right to the city.

1. Introduction

Located in Lima's historic centre, Barrios Altos is an important part of not only Lima's, but also Peru's identity. In recognition of its historical significance and colonial architecture, part of Barrios Altos was declared a UNESCO world heritage site in 1988, with further extensions made in 1991. Originally inhabited by the elite, rural to urban migration during the first half of the 20th century led to low-income groups occupying Barrios Altos. Over time, a lack of attentive ownership and public and private investment has led to the deterioration of the buildings. Today, 70% of *barrioaltinos* live in *tugurios*, a form of decayed and overcrowded housing.

In addition to these housing issues, many residents lack basic services such as water and sanitation and also experience water injustices. This lack of service and the deliberate lack of provision is being used proactively as a tool for eviction, as highlighted by the ESD report of 2013 (DPU, 2013).

Despite these housing and socio-environmental issues, land prices are on the rise in Barrios Altos owing to its strategic location in terms of centrality, existence of multiple hospitals, large markets, and excellent transport links (Figure 1). In addition, private investment and public projects, such as Via Parque Rimac - a transport construction project north of Barrios Altos along the river Rimac, are located near Barrios Altos. Such projects attract increased attention from the MML, PROLIMA and private sector towards Barrios Altos, under the premise of preserving the historical value whilst improving environmental and living conditions. However, the many visions and plans proposed by the

Figure 1. Strategic Location (Created by the Authors, Google Maps)

The strategic location of Barrios Altos

- Key**
-  Hospital
 -  Metro
 -  Bus station
 -  Ministerial Offices
 -  Central Market
 -  Main roads

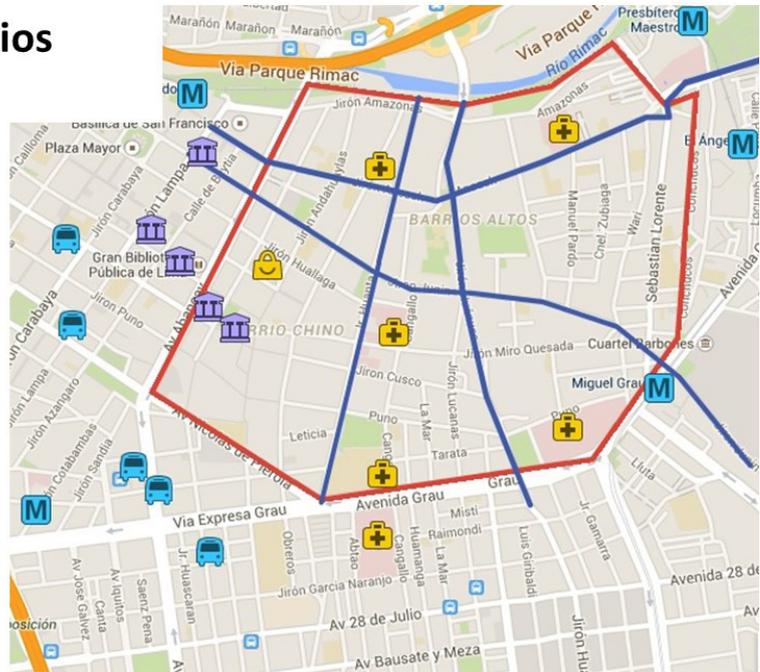
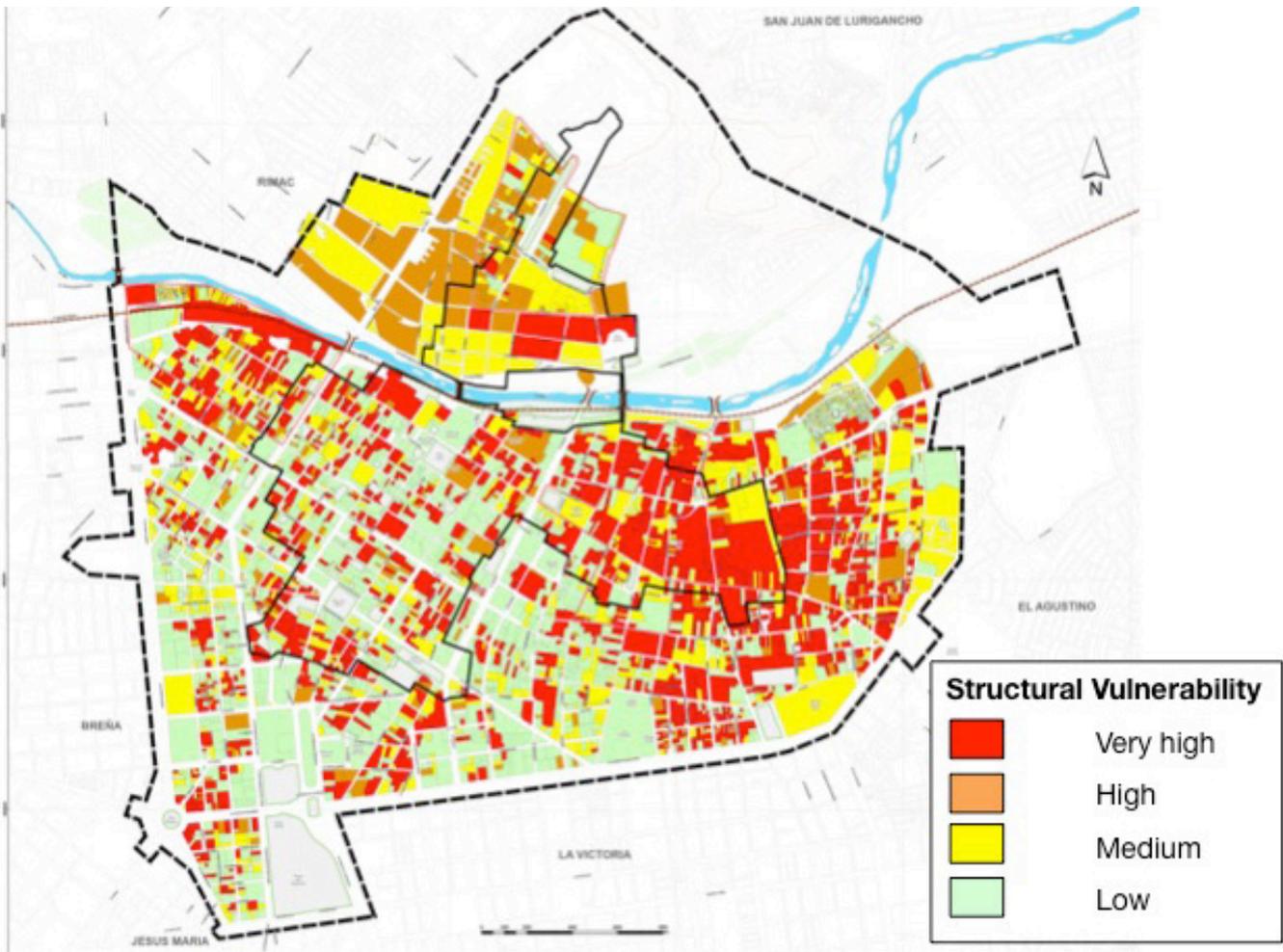


Figure 2. Vulnerability map of Barrios Altos (PROLIMA, 2014).



public and private sectors neglect the needs of the current residents and their right to remain in their homes, as they are often viewed as contributors to the dilapidation. These current residents of Barrios Altos are not included in the future visions for the area, leading to spatial segregation and increased evictions, as highlighted in the 2014 ESD research findings on the area (DPU, 2014). In a bid to preserve the historical significance of the area, the rapid increase in construction of storage units, which serve as a façade, falsely preserving the UNESCO protected exterior facades of the area, whilst the interior elements are removed, further exacerbates the segregation and exclusion of *barrioaltinos*.

With the deteriorating conditions and increasing external interests in claiming Barrios Altos, its heritage and residents face multiple physical and social everyday risks. These risks include building collapse, fires, flooding, health issues, crime and eviction. Despite these different risks, the concept of risk is often generalised by the public and private sector who portray the heritage of Barrios Altos and its residents as being at 'high risk' (Figure 2). Also important is that, everyday risks are linked to the historical and current mode of urban development in Barrios Altos and Lima, which saw the right to adequate housing being abandoned by law in 1993 (De los Rios, 2011). Additionally, the combined historical classification of Barrios Altos, multitude of plans and interests, and legal complexities, serves to reproduce everyday risks, as urban development is complicated for residents. The result of this is the formation of persistent risk cycles, involving the reproduction and reinforcement of risk through the constant exposure to it as well as by the efforts made to reduce it.

2. Research Objective

The environmental and living conditions as well as the everyday risks within Barrios Altos are closely linked. Everyday risk is a major issue across Lima, however this study focuses on Barrios Altos and in doing so aims to provide an understanding that can be related to other areas of Lima's centre.

The main objective of this research is to understand how everyday risk is produced and experienced, in order to develop strategies to disrupt its reproduction. This research has three sub-objectives:

1. To reveal the processes producing and reproducing everyday risk within Barrios Altos.
2. To understand the risk coping mechanisms adopted by stakeholders, including the residents, state agencies and private actors.

3. Using the key findings, to develop transformative strategies that serve to disrupt risk cycles in Barrios Altos and lead to transformative change.

3. Analytical Framework

3.1 Conceptual Framework

Disaster risks are largely known to accumulate through inappropriate development (Hardoy et al., 2011). In general, more focus has been given to longer-term and large-scale events, in comparison to everyday risks and disasters, which account for greater losses globally. Also, disasters manifest themselves at the local level, impacting livelihoods, homes, health and more (Hardoy et al., 2011; Bull-Kamanga et al., 2003). For these reasons, this study focuses on physical and societal everyday risks, defined as:

Everyday Risk:

The probability of loss, including mortality, morbidity, livelihood, assets, culture and heritage, on a daily occurrence.

Everyday risk is dynamic due to the interaction of physical and societal hazards, vulnerability factors and individual and collective coping mechanisms. Increases or decreases in each field lead to changes in the level of everyday risk as expressed in the following equation (Adger, 2006; Pelling, 2011; Hardoy et al., 2011):

$$\text{Everyday Risk} = \text{Hazard} \times \left(\frac{\text{Vulnerability}}{\text{Coping mechanisms}} \right)$$

Vulnerability and the coping measures available to residents are influenced by underlying factors such as informality (defined as the lack of legal tenure), poverty, governmental actions and policies (Romero-Lankao et al., 2014). Importantly, actions termed as 'coping mechanisms' can often be misleading as they involve the conversion of individual or collective assets, which do not significantly reduce risk but greatly diminish those asset bases, therefore reducing future possibilities for coping. Furthermore, once core social and economic assets are lost, the breakdown of households become inevitable, even when macro-economic conditions improve (Pelling, 2011). Due to interactions between risk producing factors, everyday risks are geographically and temporally specific for different groups in Barrios Altos. The groups considered most vulnerable to everyday risks are the very young, elderly, women, people with health

impairments and those considered informal, all of which are present in Barrios Altos (Hardoy et al., 2011; Romero-Lankao et al., 2014).

Everyday risk in Barrios Altos is also linked to a lack of attentive ownership, minimal public and private sector investment, and the current citywide market-led development pattern. In order for everyday risk reduction measures to be successful, efforts should be continuous, address the local scale and involve local actors (Hardoy et al., 2011; Gaillard & Mercer, 2012). However, municipal and private sector plans frequently neglect residents' needs, their right to remain in their homes, as well as their rights to participate in urban development, therefore excluding them from their collective right to participate in improving their environmental and living conditions. This brings in the concept of *the right to the city*, first developed by Lefebvre (1968, 1991), which refers to the collective right of citizens to participate in altering their urban landscape and advance the urbanization process (Harvey, 2008). However, the collective nature of *the right to the city* can lead to conflicts due to heterogeneous interests of groups, with more powerful groups claiming the right for themselves (Harvey, 2008; Attoh, 2011). This is the case in Barrios Altos as the continued misrecognition and exclusion of residents from participating deactivates their right, whilst the MML, institutions and private sector who constitute more powerful actors, claim it for themselves. This leads to the residents becoming isolated from the city and their conditions misrecognised. The result of this is the reproduction of everyday risks and the deterioration of historical value.

Figure 3. Barrios Altos (Taken by T. Belkow, 2015)



3.2 Research Framework

In order to address the three main objectives of our research, we formulated the following hypothesis:

HYPOTHESIS

Market-led development and the external stigma and perception of Barrios Altos leads to the misrecognition of the residents and a lack of concern over urban living and environmental conditions by the authorities and private actors; producing everyday risks for the residents. However, the interaction of various factors at the local scale, including tenancy type and economic assets results in residents experiencing risk differently, resulting in heterogeneous coping mechanisms and urban renovation with a lack of common vision.

Furthermore, the current urban renovation policies exclude the residents, and existing legal mechanisms to empower residents contribute additional burdens to their everyday lives, reproducing everyday risk. Ultimately, this exclusion of the residents permits the continued environmental degradation and loss of cultural heritage, allowing the continuous reclamation of this strategic location by non-resident actors.

Despite the internal and external complexity, multiple entry points exist to achieve inclusive urban development that disrupts everyday risk cycles and leads to transformative change.

To investigate this hypothesis, four research questions were utilized:

- What are the factors that influence vulnerability and generate everyday risk for the residents?
- How do the residents, state and private sector differ in their perceptions and investments to cope with these risks? Moreover, how do these relate to each other?
- How do the legal mechanisms affect the everyday risk of Barrios Altos' residents and the future urban development of the area?
- What are the barriers to adaptive capacity and how can they be overcome to achieve transformative change?

4. Methodology & Limitations

4.1 Methodology

This research was carried out in three stages, outlined in Table 1. In the pre-fieldwork stage, we gained a preliminary understanding of the everyday risks and the risk cycles operating in Barrios Altos from secondary and grey sources during desk-based research. During the fieldwork stage, we further contextualized and developed our understanding of everyday risk through qualitative and quantitative data collection using various methods, before final analysis and consolidation of results during the post-fieldwork stage.

(A detailed outline of our methodology is included in the Appendix).

Limitations

Despite our efforts at ensuring a thorough research, several limitations existed which constrained our representation of the complex and diverse situation of everyday risk in Barrios Altos. First, time, resource and safety constraints limited the focus of our research to a small area of Barrios Altos. However, in choosing this study area, we made sure to avoid duplicating the areas investigated by previous UCL ESD research groups, therefore contributing new knowledge and database for the whole of Barrios Altos.

To consider as many voices as possible our study was open to all residents during focus groups and feedback meetings, however biases may exist due to the narrow sample of residents that attended. Similarly, the lim-

Table 1. A breakdown of our research activities (source: by authors)

Research Stage	Activities	Aim
Pre-fieldwork stage (January - April, London)	Desk-based research and analysis of secondary data sourced from MML, NGOs, private sector, and media publications, as well as previous MSc ESD group reports.	To gain a broad yet detailed understanding of everyday risk, housing conditions, legal mechanisms, urban renovation programs, perceptions, etc., to develop our working hypothesis and research questions.
	Presentation of findings and understandings to DPU staff and MSc colleagues.	To gain feedback in order to test and refine our understanding.
	Skype interview with CIDAP.	To gain feedback in order to test and refine our understanding.
Fieldwork (April 25 th - May 12 th , Lima)	Four Transect Walks	To meet residents of Barrios Altos and collect data.
	Manzana Mapping using Quinta Surveys	To systematically collect qualitative and quantitative data as well as promote mapping exercises amongst residents.
	Two Focus Group sessions	Tandem focus groups to collect information from residents and to i) explain mapping techniques and our findings so far ii) produce a historical timeline of change in Barrios Altos..
	Interviews (CIDAP, PROLIMA, INDECI, MML's Urban development division, hospitals)	To gather information from non-resident actors regarding risks, issues and plans.
Post-fieldwork stage (May 13 th - June 5 th , London)	Consolidation of key findings and refinement of strategies.	To ensure that information is correctly presented and that strategies are contextual and achievable.

ited number of Spanish speakers within our research team sometimes hindered the collective understanding of the group, meaning that key information may have been missed.

Furthermore, we acknowledge the possible existence of political and personal bias amongst the views of some stakeholders interviewed, also that some infor-

mation gathered were based the respondents' personal opinion. In addition, our research data may also have been impacted on by our own preconceived biases and perceptions.

5. Key Findings

5.1 Introduction & Preliminary Thoughts

Figure 5. Transect walk interview with residents of a quinta on Jr. Huánuco (Taken by L. Fischer, 2015)



Our preliminary research revealed several everyday risks in Barrios Altos including building collapse, fires, flooding, health issues, crime and eviction. Our preliminary analysis also identified five types of building owners in Barrios Altos (Figure 6), including the Municipality, Beneficiencia, Church, University, and private owners (DPU, 2013)

Initially, we hypothesized that different ownership types influenced everyday risk levels. However, our fieldwork revealed that all ownership types had *tugurios* and that all residents were at risk regardless of ownership type. Furthermore, some owners had dissolved their owner-tenant agreements in order to remove their responsibility of the building's condition, contributing to the residents' risk.

Figure 4. Drone map of Barrios Altos illustrating 17 quintas visited (Remap Lima, 2014)



Figure 6. Ownership type (created by DPU, 2013 using data from MML, 2011)

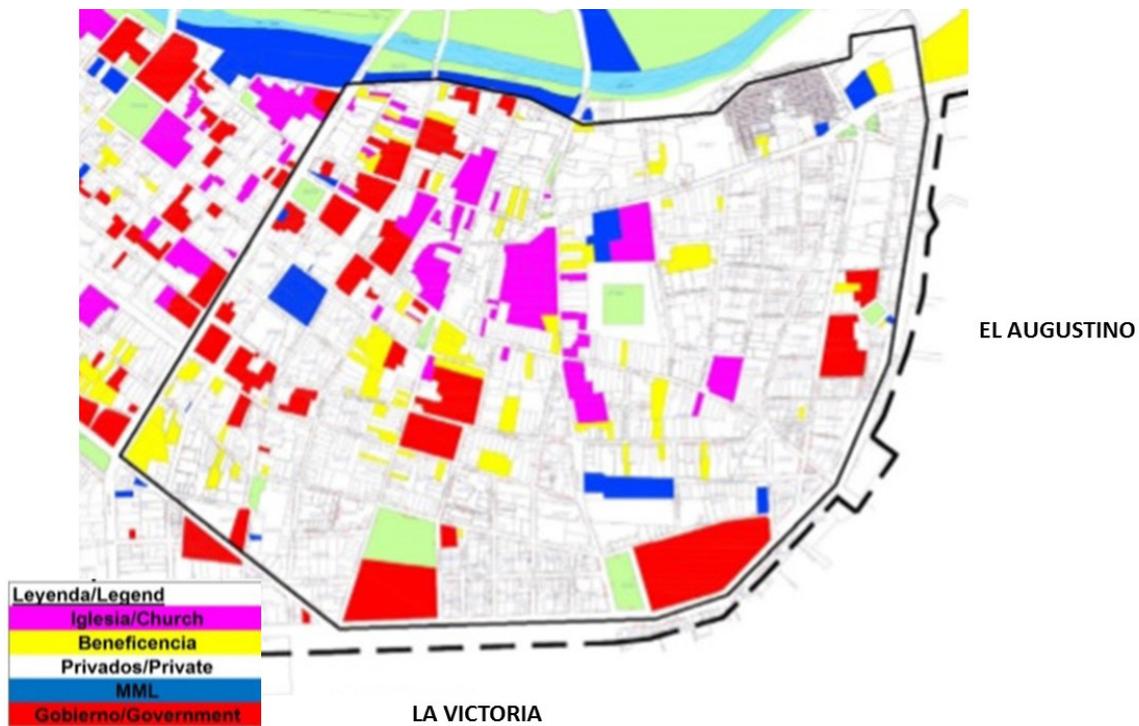
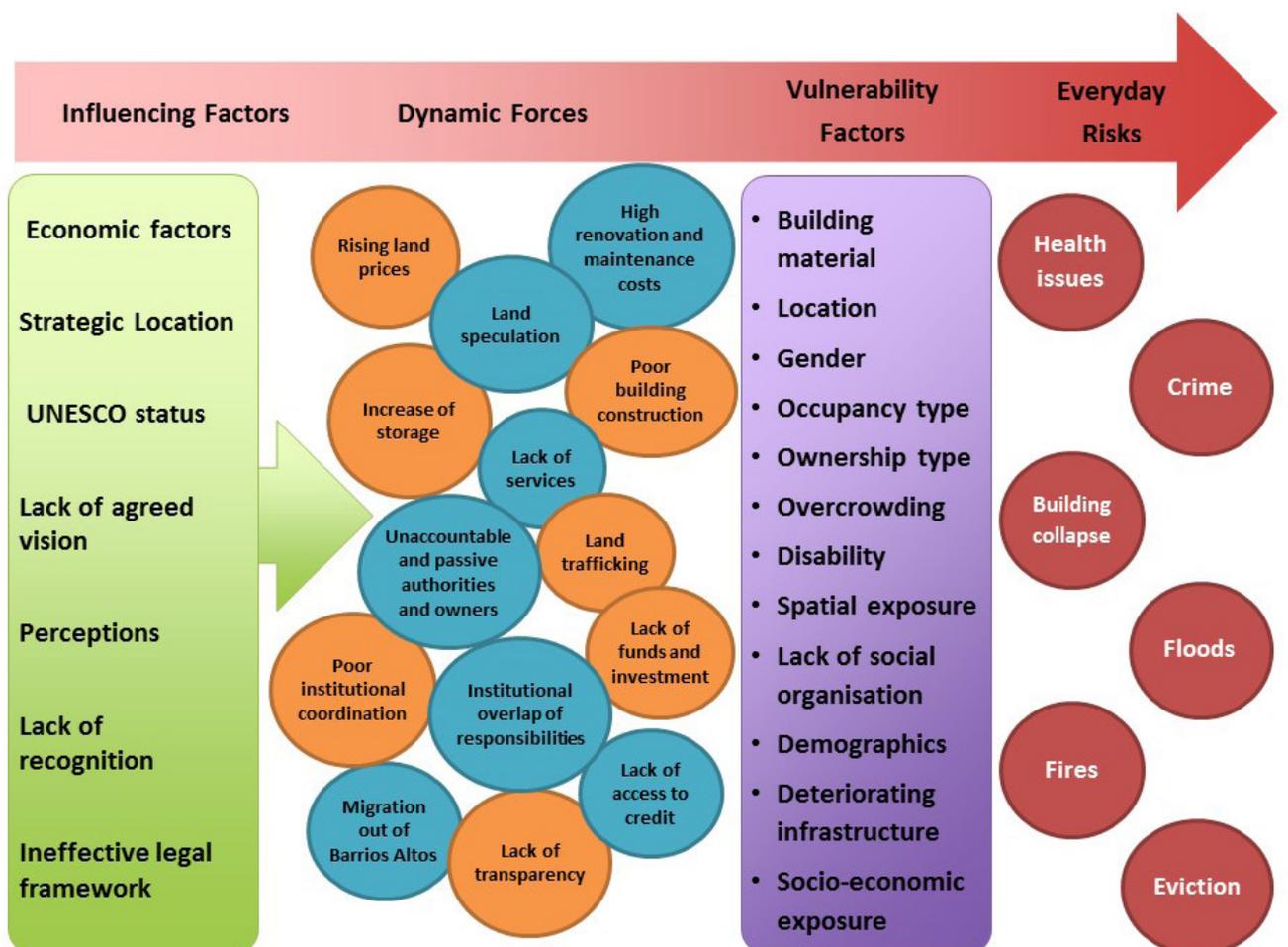


Figure 7. Adapted Pressure and Release Model for Barrios Altos (Blaikie et al., 2004)



During fieldwork, it was found that the cumulative interactions of various other factors determine the levels of vulnerability to certain everyday risks, how risks are reproduced, and how risks are coped with. These vulnerability factors include occupancy type of residents, building material, building height, the land use surrounding a Quinta, infrastructure quality, individual and collective economic capacity, gender, age, and social organization. To demonstrate how these vulnerability factors interact, a modified version of Blaikie et al's (2004) Pressure and Release Model has been used (Figure 7). Within this model, neighbourhood or citywide influencing factors were identified that contribute towards risk production by either making Barrios Altos historically or economically significant or by increasing the complexity surrounding urban development. These factors are followed by a set of dynamic forces, which are specific to Barrios Altos, further streamlining the range of everyday risks experienced in the neighbourhood. Finally, specific factors that amplify vulnerability of Barrios Altos residents to certain everyday risks were identified. This model therefore shows the flow of risk production and how factors influence the level of vulnerability to certain risks.

Perception

Interviews with respondents, revealed that the MML perceives the residents as the cause of dilapidation and deterioration in Barrios Altos, and that residents are too reliant on state support. This top-down stigmatizing attitude is argued to be self-reinforcing as the MML's perception of the cause leads to their unwillingness to improve conditions, allowing environmental conditions to deteriorate further. Overall, these worsening conditions are used to justify the recent MML plan, which is to demolish almost all of Barrios Altos in order to reduce risk (Lizarzaburu, 2015).

Residents of Barrios Altos also perceive the government negatively, and claim that the MML lacks interest in fulfilling their responsibilities and supporting socially-inclusive urban

Box 1: Casona El Buque – “The Ship”

Built in 1753, this historic courtyard mansion has been a national monument in Barrios Altos since 1988 and was residence to leading political figures during the 18th and 19th centuries. Previously housing up to 17 families, it collapsed on November 4th 2012 following structural damage from an overnight fire (Heritage on the Wire, 2012).

The building was subdivided into small housing units and suffered from severe wall erosion and soil subsidence due to outdated leaking pipes. Continued lack of maintenance led to further wall collapses and construction using concrete frames weakened the abode walls, leaving El Buque in a state of decay (De los Rios, 2007).

In 2010, El Buque's demolition was disputed between Peru's National Institute of Civil Defence, who declared the building unsafe and the National Institute of Culture, who highlighted its historical significance (Heritage on the Wire, 2012).

Since its collapse, El Buque has been neglected by authorities, symbolising the deterioration of Barrios Altos, lack of state support and high risk of building collapse in the area.

renewal. Lack of state support also fuels the private sector's perception that Barrios Altos can be claimed, further increasing the residents' vulnerability. These differences in mind-set reinforce the reproduction of everyday risk whilst also deactivating residents *the right to the city*, and consequently constituting a key barrier to transformative change.

Figure 8. El Buque before and after (Photos: Heritage on the Wire, 2012 and V. Tuomala, 2015)



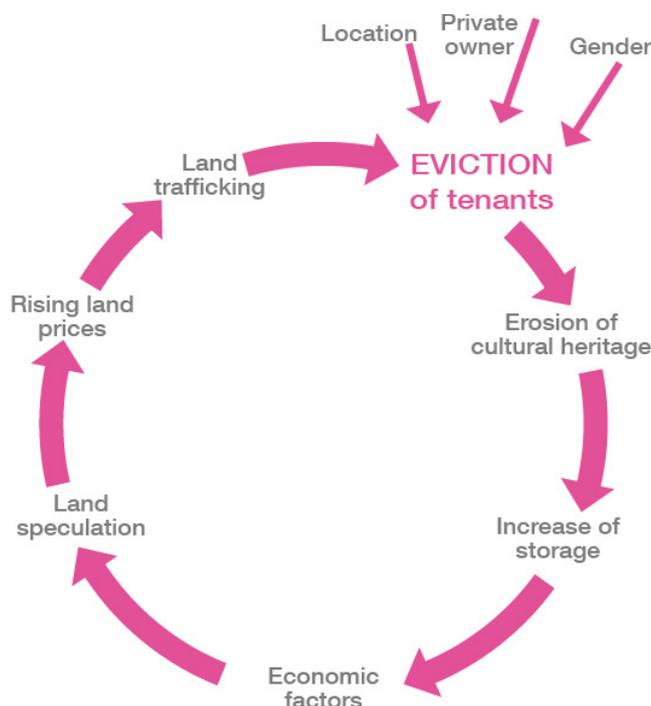
5.2 Eviction

Our research also identified eviction as a major everyday risk facing residents. This is largely due to the strategic location and rising land prices in Barrios Altos combined with market-led development leading to increased land speculation and trafficking. The current MML plan to demolish up to 40% of the historic centre ensures that most *barrioaltinos* experience the risk of eviction. However three factors were identified that increase certain residents' vulnerability to eviction. Figure 9 illustrates this.

Firstly, spatial relations and location of a Quinta affect its vulnerability. Residents living at the periphery of Barrios Altos close to important transport links and economic areas e.g. Quinta Santa Rosa, are more vulnerable compared to interior areas (Figure 10). This is due to higher land values and greater accessibility increasing interest from traffickers. Furthermore, Quintas that border uninhabited land or storage units on more than one side are more vulnerable, owing to lack of social security from neighbours and their consequent increased exposure. (Figure 11).

Secondly, residents within privately owned Quintas experience a greater risk of eviction for two reasons. Rising market values serve as an incentive for the owners to sell their property. In addition, some often allow housing conditions to deteriorate in order to justify eviction. This, in turn, producing other everyday risks e.g. building collapse. Also, confusions surrounding owner-identity often expose residents to illegal trafficking and eviction, as this

Figure 9. Eviction risk cycle



ambiguity provides an opportunity for false ownership claims to be made.

Lastly, Quintas with higher proportions of more vulnerable groups including women, children and the elderly experience a greater risk of eviction.

5.3 Storage

Another factor driving the risk of eviction is the rapid growth of illegal storage units. Currently, this growth is uncontrolled due to minimal municipal monitoring and the high demand for land. As this continues, the risk of eviction increases, as new space is required for storage units (Figure 12). Overall, the growth of storage contributes to the neighbourhood-wide change in land-use, from resi-

Figure 10. Eviction threat close to Metro (Created by the Authors, Google Maps)



Figure 11. Eviction threat when exposed (Created by the Authors, Google Maps)



dential to commercial, with the latter estimated by INDECI in 2011 to account for 77% of the land-use in Barrios Altos (INDECI in DPU, 2013).

Storage areas require limited to no water services, and often times are used for storing flammable items, usually with irregular supervision, consequently exposing neighbouring Quintas and households to the risk of fire out-

breaks. In addition, these buildings are often poorly constructed, exceeding building height regulations. This exposed residents of the surrounding areas to the risk of uncontrolled building collapse, as illustrated across the manzana we mapped (Figure 13).

5.4 Services and Sanitation

A lack of water provision was observed during fieldwork, although some residents had access at individual household level. This corroborates findings on water injustices from the ESD research of 2013 (DPU, 2013). Manzana mapping showed that in some Quintas, only one water pump was available to all the residents. Furthermore, some residents within a Quinta had no water access (Figure 14). Lacking or minimal water access increased the risk of health issues for the residents. The most vulnerable were residents who did not have the legal right to live in their homes.

The lack of regular upgrading of Barrios Altos' water infrastructure; last upgraded in the 1970s, also produces flood risks for residents. Although flooding is often small-scale (e.g. due to burst pipes), its consequences are great for the residents, given to the high costs of repairing the resultant damages. Furthermore, flooding and associated humidity can cause structural damage to buildings, especially those made of adobe (Figure 15). Therefore vulnerability factors, in this case infrastructure quality and building material, interact to reproduce risks.

Figure 12. Storage risk cycle

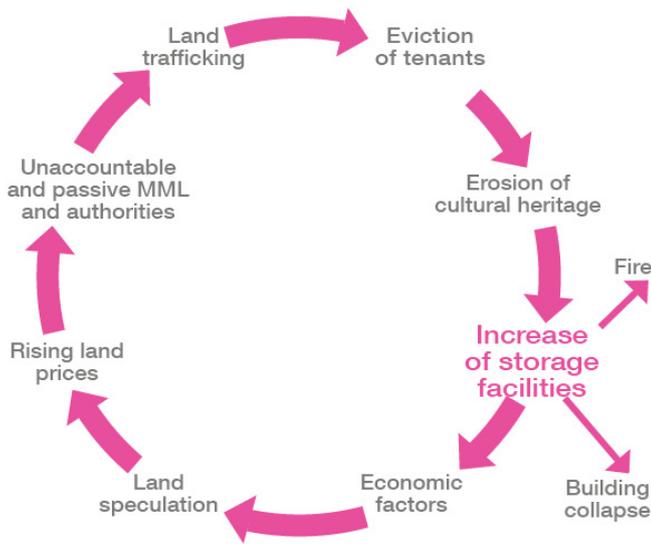
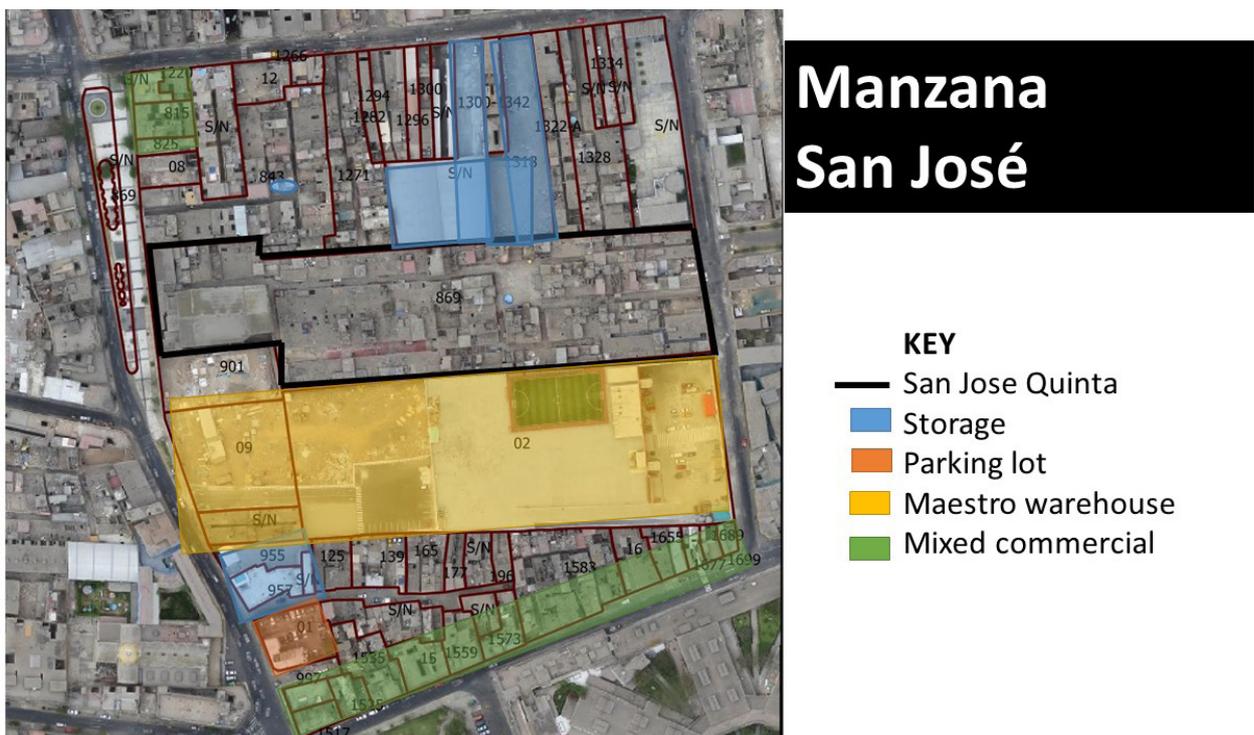


Figure 13. Land use in Manzana San José (Created from survey results using Google Maps)



Moreover, flood risk is reproduced due to urban renovation projects undertaken by municipal authorities often overlooking the deteriorating pipes and only improving the aesthetic qualities of buildings and roads. As such,

many of the aging pipes lay beneath weak roads, which cannot support the heavy weight of vehicles, trucks etc without damaging the pipes beneath them, as is the case in calle Muña.

Figure 14. Lack of water access (Created from survey results using Remap Lima drone map 2014)



5.5 Building Collapse & Health Issues

An important vulnerability factor also influencing building collapse and health issues is the type of building material utilised for construction in the area. Adobe is commonly used in Barrios Altos, which as previously stated is susceptible to humidity, causing structural damage and increasing the risk of building collapse (Figure 15)

When these structural weaknesses manifest, residents often use concrete for patch and repair works, being that it is cheap and accessible. However, by mixing building materials additional structural weaknesses are impelled, reproducing the risk of building collapse. Furthermore, residents often construct illegal additional storeys onto their homes to reduce overcrowding (Figure 16). This coping mechanism however leads to vertical overcrowding, reproducing the risk of building collapse.

Residents of adobe-built homes living in overcrowded conditions also experience greater risks of health issues. This is especially the case for Tuberculosis (Figures 17,18,19), with 99 cases confirmed in 2014 by Juan Perez Medical Centre, and other health issues such as

Figure 15. Adobe walls damaged by humidity (taken by A. Ng and V. Tuomala, 2015)



Box 2.

Maestro Eviction
The growth of storage in Barrios Altos

Sitting on an 18,000m² plot, the Maestro warehouse located between Sotomayor and Huanuco in Manzana San José, was originally home to 18 families living in two Quintas with a community football pitch.

The eviction process began in 2009 through trafficking leading to violence and coercion and the unfair compensation of residents, resulting in the complete demolition of the site, illustrated below.

Previously owned by a Catholic University, it was purchased at \$1.5 million USD and sold in 2011 for a significant profit at \$9 million. However, the purchasing process prior to Maestro is unclear.

Due to complaints from locals about losing their football pitch, Maestro, supported by EMILIMA, built a rooftop football pitch known as "Plazuela Buenos Aires" which is open to residents for a small fee (Maestro, 2014).

Source: Interview with CPRU and CIDAP.

Aug 2003
Manzana San José 12 years ago

Jan 2010
Site before demolition: two Quintas (A and B) and a football pitch (C).

Mar 2010
Demolition begins with Quinta B and the football pitch (C), cleared first.

2011
"The land was originally purchased at \$18 USD per m², then sold at \$500 USD per m²"

Dec 2013
The construction of Maestro is complete and officially opened in January 2014.

May 2012
Within two years, the site is cleared.

Images from Google Earth

skin diseases (MINSA, 2015). Currently, Barrios Altos has the highest rate of Tuberculosis occurrence in Peru, which is expected to increase by 100 cases per year (PERU21, 2014). Furthermore, interviews with medical staff and residents revealed that residents lacked awareness on how to prevent illnesses from spreading, as well as the economic capacity to do so. This reproduces risk for the residents and inhibits their ability to develop adequate coping mechanisms.

A number of medical personnel' also corroborated that the low socio-economic levels and poor water and sanitation services in Barrios Altos produced health risks for residents e.g. diarrhoea. Additional common health issues include anaemia, nutrition deficiency, sexually transmitted diseases, drug addiction and obesity.

5.6 Occupancy Type

Tenancy type also constitutes a vulnerability factor greatly influencing everyday risk, especially building collapse and eviction in Barrios Altos. Three types of tenancy were identified in the area: owner-occupier, renter and 'pose-sionario', with the latter being the dominant category (see Appendix).

Four out of the five self-owned quintas surveyed (Quintas El Carmelo, Senora de los Milagros, 1290 and Carmen) do not perceive eviction to be an imminent risk – Quinta table (Appendix)

As owner-occupiers own their homes, they are incentivised and legally able to upgrade, reducing their risk of building collapse. Tenure security also reduces eviction risks and improves access to services, therefore

Figure 17. Health statistics from Juan Perez Carranza health centre (Table 1, see appendix)

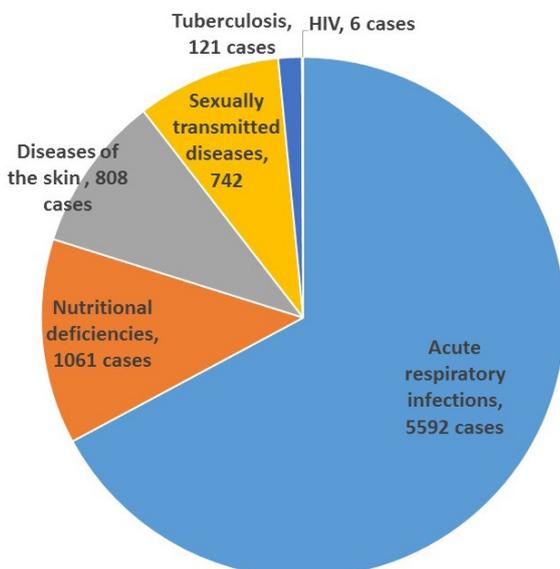


Figure 16. Vertical overcrowding as a coping mechanism (taken by A. Ng, 2015)

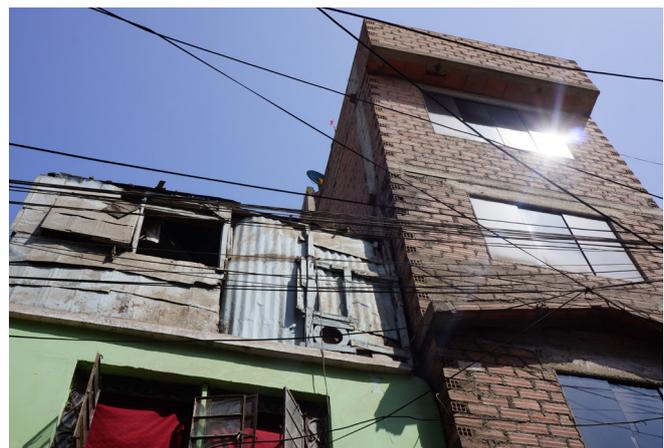


Figure 18. Tuberculosis incidence related to building material in Barrios Altos (created by the authors using Juan Perez Carranza information and PROLIMA data).

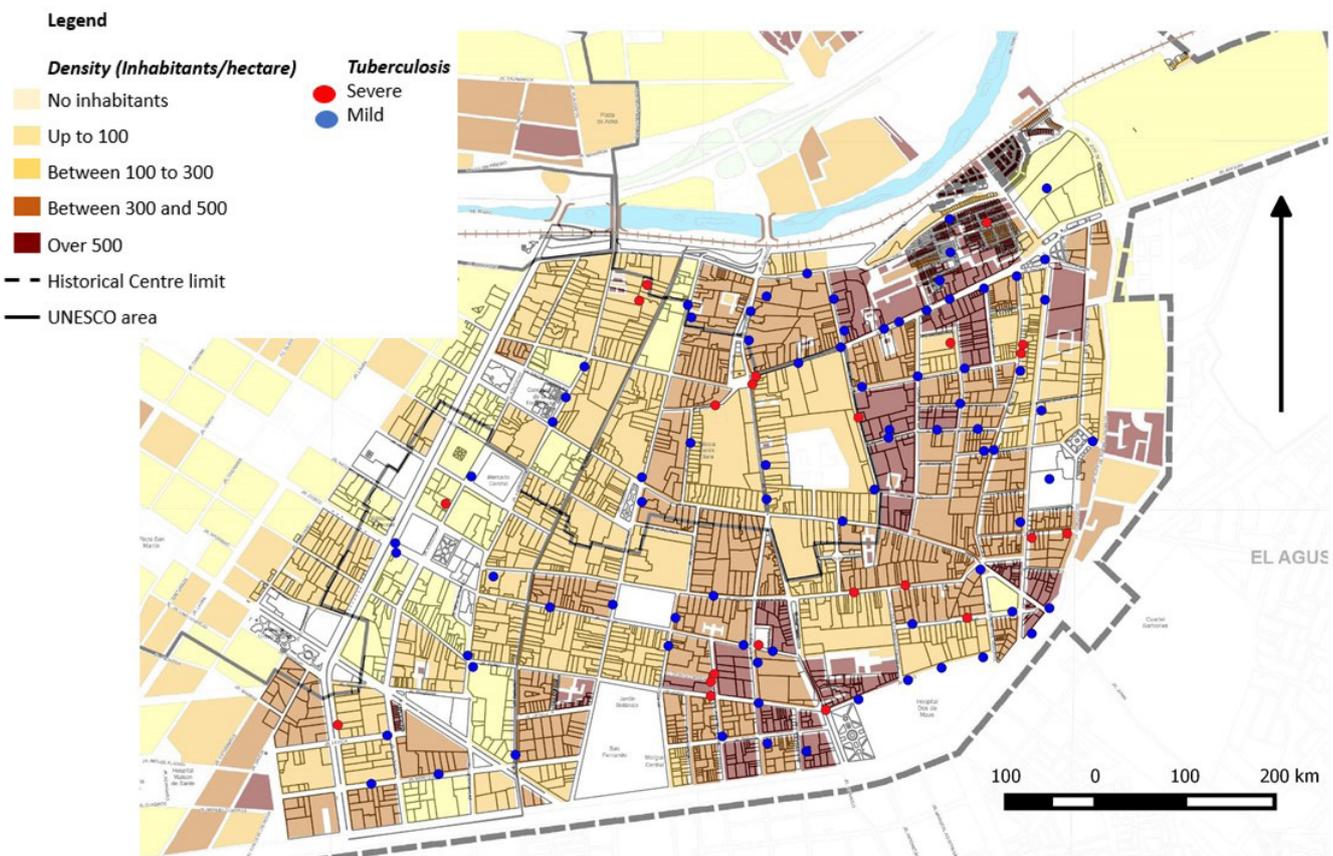
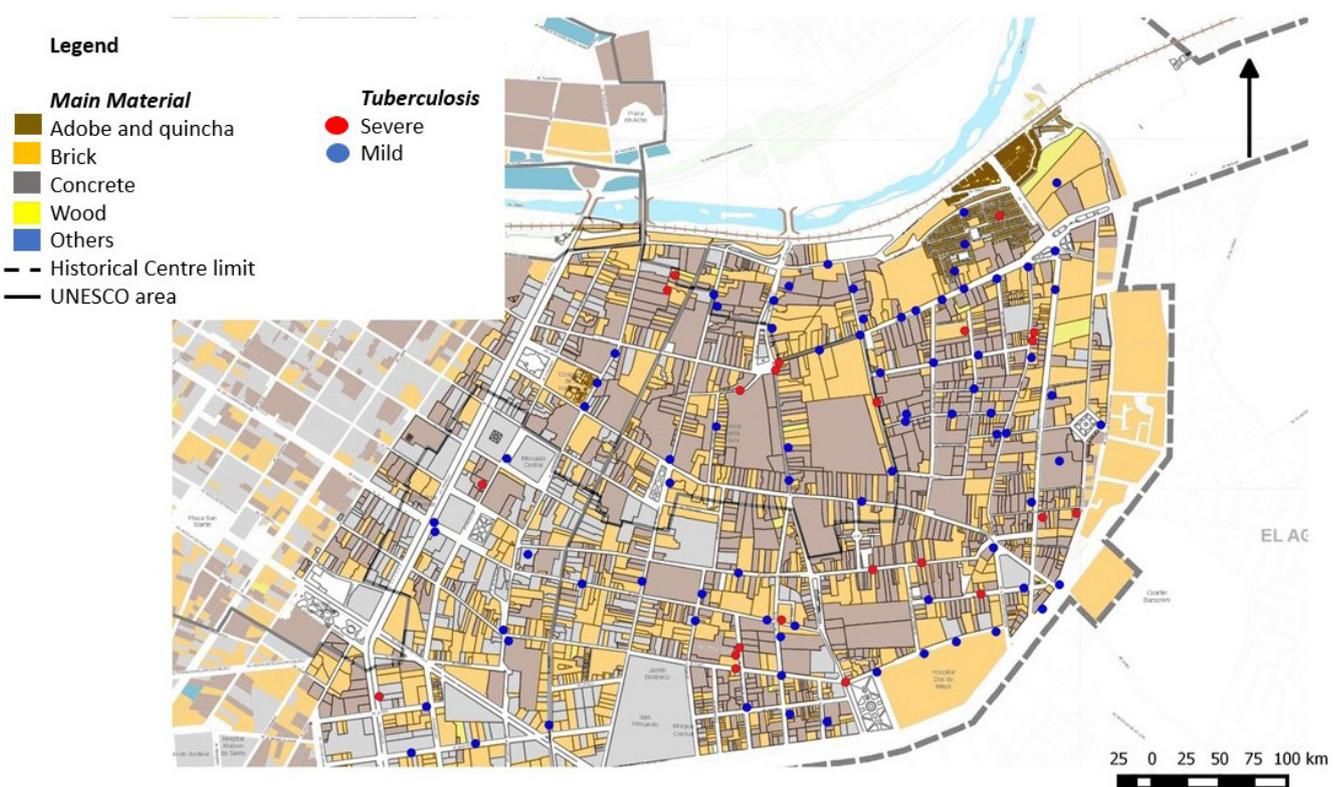


Figure 19. Tuberculosis incidence related to population density in Barrios Altos (created by the authors using Juan Perez Carranza information and PROLIMA data).



reducing health risks. For *posesionarios*, tenure insecurity increases the risk of eviction, building collapse and health issues whilst also limiting their mechanisms to cope. However, despite not paying rent, *posesionarios* often pay taxes to show the legitimacy of their occupation and resist eviction.

"I pay taxes to MML as this proves I've lived here legally for a long time." – DORA, Quinta San José

"I've been paying taxes since 1995. It's very important to pay taxes." – Resident, Quinta Santa Rosa (Sebastian Lorente)

Despite the benefits of owning their homes, the ability of owner-occupiers' to upgrade their buildings is limited by their socio-economic condition, resulting in heteroge-

Figure 20. Heterogeneous upgrading (taken by L. Fischer, 2015)



Figure 21. Removal of earthquake supports and building into communal space (taken by L. Fischer, 2015)



neous upgrading within Quintas. Frequently, an owner-occupier's attempt at improving their building's strength, size and quality exposes the surrounding neighbours to additional risks e.g. building collapse. Therefore, owner-occupiers' coping mechanisms externalises everyday risk onto others. Moreover, the resultant random landscapes of buildings inadvertently increase long-term risk, as structures are collectively weakened against earthquakes.

"The housing structure is risky as some people build badly and use weak materials to upgrade their homes." – Resident, Quinta Senora de los Milagros

Furthermore, surveys revealed that owner-occupier Quintas often had little or no form of social organisation. This facilitates the residents encroaching on communal spaces to gain space or removing inter-building supports and earthquake safe zones (Figure 21), additionally contributing to heterogeneous upgrading. This again increases long-term risk as the attempt by few individuals to develop coping mechanisms for perceived risks, reduces the access of other residents to communal space.

5.7 Social Organisation

Interviews during transect walks revealed that social organisation is low in Barrios Altos. This hinders residents without property rights from gaining access to services and housing tenure.

A root cause of the lacking social organisation highlighted by Quinta leaders is the mistrust amongst the residents, as well as residents' mistrust of the municipality. This lack of trust forms a significant barrier to collective decision-making and planning, allowing risks to be amplified. Additionally, this lack of social organisation

Figure 22. Residents of San José (taken by L. Fischer, 2015)



hinders the formation of savings groups for long-term community driven risk reduction (although fieldwork did reveal one active savings group), as well as the formation of social movements amongst *barrioaltinos*.

This lack of organisation is further fuelled by the migration of the younger generations from the area. This disrupts social cohesion and leaves behind residents who are more vulnerable to everyday risks e.g. elderly, very young.

Many residents acknowledged the importance of being organised to obtain services, property rights, and resist eviction. Organisation at the Quinta level is also vital to gain tenure security, as housing associations are required under Law 29415. However, they also highlighted that long processing times and highly complex requirements undermine Law 29415’s effectiveness (see Appendix). This culminated in resident’s decision to halt the process. According to them, the halt resulted from the additional economic and administrative burdens engineered by this law, which reproduced the threat of eviction. This risk arises from the obligation to apply for credit through the formal financial mechanism, which was not possible for some residents, also the requirement to complete building renovation within one year under Law 29415. As, if these conditions were not met, the residents stood the risk of being evicted from their homes. This exemplifies the high demands and preconditions for obtaining tenure security through the Law 29415.

6. Transformative Change Strategies

6.1 Introduction

Our key findings revealed how the production and reproduction of everyday risk is linked to urban development in Barrios Altos. The coping mechanisms of everyday residents, the MML, building owners and the private sector also demonstrate how risk is perceived in Barrios Altos; in relation to its historical value and current residents needs.

Except everyday risk cycles are broken, it is envisioned that life and memory will continually be eroded from Barrios Altos, allowing its continual reclamation by non-resident actors e.g. the MML and private sector. However, despite the complexity, dynamism, differences in scale of everyday risk cycles, several opportunities have been identified toward their disruption and the achievement of transformative change. These opportunities have been developed under the vision of inclusive urban revival within which urban development is participatory, local, and incorporates everyday risk reduction. In this vision, environmental and living conditions will not only improve, but the residents right to the city will be activated, allowing for urban development that preserves and revives life and memory.

Based on the barriers and opportunities to change identified in our key findings, strategies towards breaking risk cycles and achieving transformative change through inclusive urban revival have been grouped into three themes (Figure 23):

1. Unity and Collaboration
2. Knowledge and Perception
3. Institutional and Legal Mechanisms for Urban Renovation.

Each strategy has been designed to build on the strengths and weaknesses of existing and previous stakeholder plans and programs for Barrios Altos, as well as on previous DPU strategies (DPU 2013, 2014). Furthermore, using Levy’s (1996) Web of Institutionalisation, strategies have been designed to interconnect with one another into

Figure 23. Strategy themes

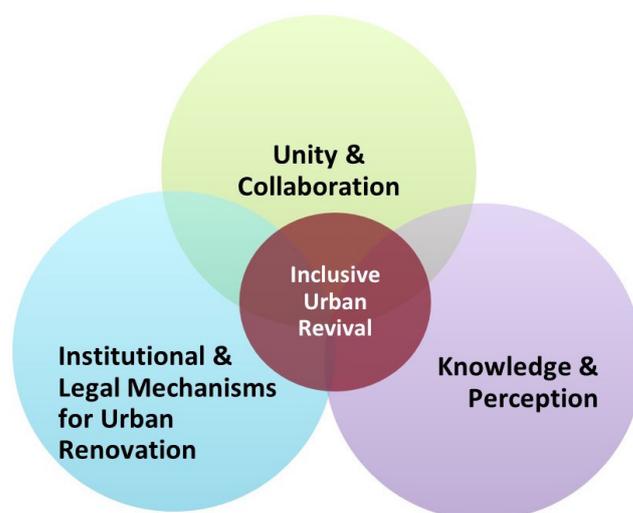


Figure 24. The six strategy aims towards transformative change

1. Communication and Collaboration between Stakeholders
2. Savings and Loans Associations
3. Resident-Led Mapping and Enumeration
4. Knowledge Building Workshops
5. Application and Implementation Process of Law 29415
6. Participatory Planning, Monitoring and Evaluation

a web, bearing on their key aspects. This accounts for the complexity of Barrios Altos and provides multiple entry points towards breaking risk cycles and achieving transformative change; both from the bottom-up and top-down. Within each theme, there are two aims towards transformative change, shown in Figure 24.

6.2 Theme 1: Unity and Collaboration

Our research has shown a lack of social organisation between stakeholders contributing to current initiatives being fragmented and exclusionary, also leading to risk reproduction. To create an inclusive city centre, communication and collaboration amongst residents and between residents and non-resident actors, should be increased and sustained.

Aim 1: Increase Communication and Collaboration between Stakeholders

Residents are to form housing organisations with democratically elected representatives, as the benefits of this have been observed during our fieldwork. This will strengthen cohesion within a Quintas and minimize individualistic upgrading, as residents would be working collectively, therefore breaking the identified risk cycle. Regular meetings, Quinta workshops and notice boards can be used to sustain this organisation and assist the streamlining of activities.

Furthermore, Barrios Altos Quinta representatives are to meet regularly to streamline activities, raise awareness of events, and exchange knowledge on projects and plans. As the MML plans to demolish up to 40% of the historic centre, this common problem may be used to promote this social organisation. A collective organisation will provide stronger possibilities of resistance. Barrios Altos-wide meetings may also be facilitated by NGOs e.g. CIDAP who currently work in the area, to ensure all voices are heard equally.

Once this neighbourhood-wide organisation has gained momentum, workshops will be organised involving the residents’ representatives and other key stakeholders including the MML and its different departments like PRO-LIMA, SEDAPAL, and private sector representatives. This will be coordinated and facilitated by a neutral party e.g. CIDAP, ELÍS, or universities. These meetings are to improve communication and understanding between stakeholders, allowing inclusive, locally contextual planning that does not exclude current residents (Figure 25). Additionally, these meetings should be proactively encouraged by the MML, as resident participation will lead to better-targeted plans. Importantly, we propose that these workshops take place within Barrios Altos allowing non-resident stakeholders to observe the situation in Barrios Altos, thus providing a stronger base for the residents’ voices. Furthermore, walking-meetings can take place, whereby stakeholders walk through Barrios Altos during meetings to gain a better perspective of the neighbourhood-wide conditions.

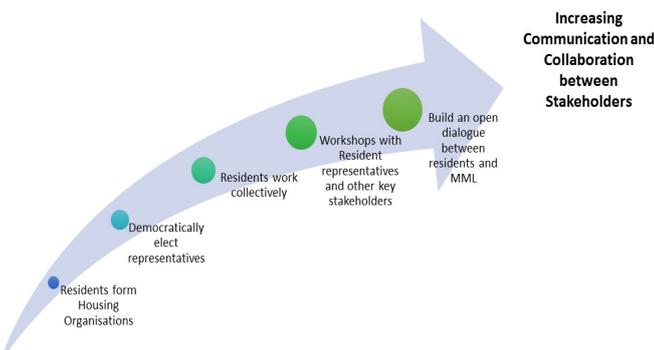
Key stakeholder meetings would be held more frequently over the long-term to ensure that communication is sustained. It is also particularly important to ensure sustained dialogue between the MML and residents. If executed well, this will trigger organisation from both top-down and bottom-up, and also build trust amongst stakeholders. Furthermore, this cooperation will modify stakeholders’ perceptions of each other, and of Barrios Altos. Overall, sustained collaboration will allow for targeted and effective planning that improves physical, social and environmental conditions, recaptures the residents’ right to the city, and reduces everyday risks.

Aim 2: Promote Savings and Loans Associations for long-term everyday risk reduction

When disasters occur e.g. burst pipe or collapsed building, most residents raise funds using post-disaster fund-raising parties known as ‘polladas’. However, only one Quinta of the 17 visited had active savings groups geared towards urban renovation projects. We propose the formation of “Savings and Loans Associations” amongst 10 to 25 residents, in order to regularly save towards urban renovation for everyday risk reduction, rather than relying solely on post-disaster fundraising. Collective saving can also be used to gain access to bank credit and provide a bridge to more funds.

Once established, these “Savings and Loan Associations” function like a community bank where individuals can save and borrow money for a small service charge. This creates more financial stability, offering credit access to residents who usually would get such through formal financial institutions. Furthermore, the act of saving collectively allows residents to undertake larger projects with greater impact than their individual efforts would have allowed. Additionally, this social fund will offer a basic insurance for its members (Figure 26).

Figure 25. Aim 1: Unity and collaboration



Promoting savings groups benefits can trigger social organisation, and vice versa. Thus, the combination of this theme's strategies will reduce heterogeneous upgrading. Furthermore, residents collaboration and collective saving initiative, may serve to change the perceptions of the MML and private sector.

Box 3: Savings and Loan Associations in Practice

Savings groups are often born locally in a decentralized manner and exist in various forms e.g. savings clubs, mutual aid groups, rotating savings, credit associations, and cumulative savings and credit associations (Martin, 2014).

Due to their informality, its rare to have a precise numbers of participants. However, Rippey (n.d.) and Goss (2010) estimate respectively that 7 to 100 million households participate in saving groups worldwide. According to a report from Oxfam America, members of a saving led group in Mali earned an annual return of 30 to 40 percent on their savings. In a household survey conducted in Zanzibar members of a savings groups ranked improved living (22%) and housing (21%) conditions as well as increased incomes (20%) as the major changes resulting from Village and Loan Associations (Oxfam, 2013). The greatest advantage of savings groups is their cost-effectiveness for their participants as well as the flexibility, transparency and proximity that they offer (Rippey, n.d.).

Figure 26. Some key benefits of savings and loans associations

SAVINGS & LOANS ASSOCIATION

- + Financial stability
- + Access to credit for residents who cannot formally obtain credit from banks
- + Take on larger collective projects to improve environmental conditions
- + Provide basic insurance to members

6.3 Theme 2: Knowledge and Perception

The strategy theme stems from our observation that perceptions towards Barrios Altos are homogenizing and negative. Our key findings reveal it to be complex, dynamic and diverse. Also, many residents lacked an understanding of important everyday risks and how they could be minimized (e.g. Law 29415, health issues), thus hindering their ability to formulate adequate coping mechanisms.

Aim 3: Increase Resident-Led Mapping and Enumeration

In order to demonstrate the diversity within Barrios Altos, residents should continue and expand on the existing resident-led mapping and enumeration, initiated 2 years ago (Figure 27). Residents, with CIDAP's assistance, who are familiar with this exercise will train other residents on standardization techniques during community meetings (initiated under Aim 1). The data and maps produced will be owned by the residents, and processed and stored with the assistance of CIDAP. Furthermore, the results can be used to demonstrate to other residents what is possible, encouraging social organisation.

The results of resident-led mapping can then be used to change stakeholders' perceptions of *barrioaltinos*. Additionally, this information can be used for planning and policy making to ensure they are locally targeted. How-

Figure 27. Resident-led mapping project

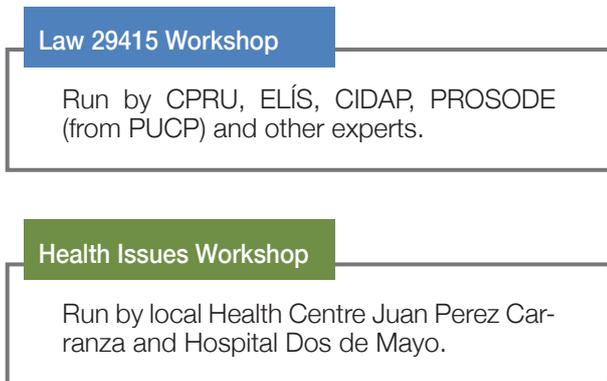


ever as residents own the data, it is their decision as to what information will be provided, in order to prevent other stakeholders using this information against them. To improve planning, policymakers should also encourage residents to collect information and input into planning, by participating in the process. This would build further collaboration, and change in perception.

Aim 4: Promote Knowledge-Building Workshops

As many residents lacked knowledge on legal mechanisms to gain tenure security through Law 29415 and on health issues, regular workshops to increase residents' knowledge on important issues should be initiated (Figure 28). Initially these workshops are to focus on Law 29415 and health issues, with residents suggesting other topics and areas to be subsequently included. Workshops regarding health issues are to be operated by local hospitals whilst those on legal aspects are to be led by residents with expert knowledge e.g. CPRU, NGOs e.g. ELÍS or CIDAP, or PROSODE from PUCP. As residents' knowledge increases, new residents will be able to lead workshops, expanding workshop coverage.

Figure 28. Aim 4: Workshops



These workshops will raise awareness and knowledge amongst *barrioaltinos* of everyday risks and the potential individual and collective coping mechanisms that residents can utilise. Similarly, this can be used to trigger other strategies within the web.

6.4 Theme 3: Institutional and Legal Mechanisms

Presently, the institutional and legal mechanisms for urban renovation are not effectively utilised by the residents or MML. This results from a lack of awareness of the relevant laws and schemes, their complex and lengthy process, and their stringent requirements limit-

ing the number of beneficiaries e.g. *Mejorando Mi Quinta*. However, if these mechanisms are revised and made more inclusive, many of these barriers to transformative change can be overcome.

Aim 5: Evaluate the Application and Implementation Process of Law 29415

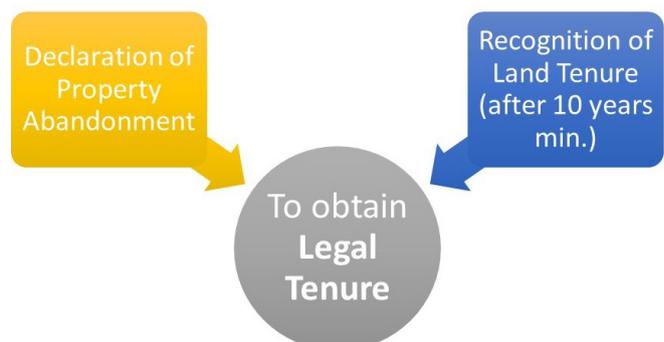
Despite its importance in urban renovation, Law 29415 is not effectively utilised by the residents or implemented by the authorities. This is largely due to complicated and restrictive application criteria and long processing times (see Appendix), contributing to the breakdown of social cohesion, as residents are discouraged from applying.

According to Law 29415, there are two procedures for obtaining legal tenure, the declaration of the abandonment of the property by the Municipality or the recognition of the land tenure after a minimum of 10 years of adverse possession of a property; declared by an arbitrator or by notary means (Figure 29).

Currently, the MML only considers notary cases, excluding residents who do not meet the requirements but have applied through the other processes. Residents who receive approval have one year to complete the physical renovation of their buildings, otherwise face the risk of eviction. Furthermore, Law 29415 obliges residents to apply for credits within the formal financial mechanism, marginalizing those who do not fulfil the requisites for credit access.

To improve its operationalization, Law 29415 needs to be evaluated by the MML and other relevant authorities in collaboration with residents in order to incorporate end-user feedback. Actions should then be taken to amend Law 29415. This evaluation process should be sustained over the long-term, utilising workshops from other strategies, and may be extended to include other legal aspects.

Figure 29. Process of obtaining legal tenure



Aim 6: Institutionalising Participatory Planning, Monitoring and Evaluation

Under Law 29415, urban renovation is led by the MML, however the failure of previous projects, lends evidence to their lack of financial and managerial capacity for this purpose.

The Integral Improvement of Neighbourhoods Program (Programa de Mejoramiento Integral de Barrios) is a national government program that has been implemented successfully. The aim of this program is to help improve life quality of residents in poor and marginalised urban neighbourhoods. This project involved the formation of a partnership and the financial cooperation between the National Ministry of Housing, Construction and Sanitation, local governments, and local communities. This model encouraged social organisation and community development to ensure that the empowerment, participation and entrepreneurship of residents was increased. Local governments also gained support from this partnership model, helping them to strengthen their management skills, knowledge and abilities towards achieving program goals

Due to its success, this partnership model between the national government, municipal government, and local residents should be replicated in Barrios Altos within projects and programs aimed at addressing *tugurios* and urban renovation (Figure 30). In addition, other ac-

tors such as the private sector are to be included following the building of the initial partnership between the national government, MML, and residents. To ensure the continued success of this, participatory monitoring and evaluation should be encouraged, where the beneficiaries of the programme collectively evaluate its success and failures through a reflective and action-oriented process.

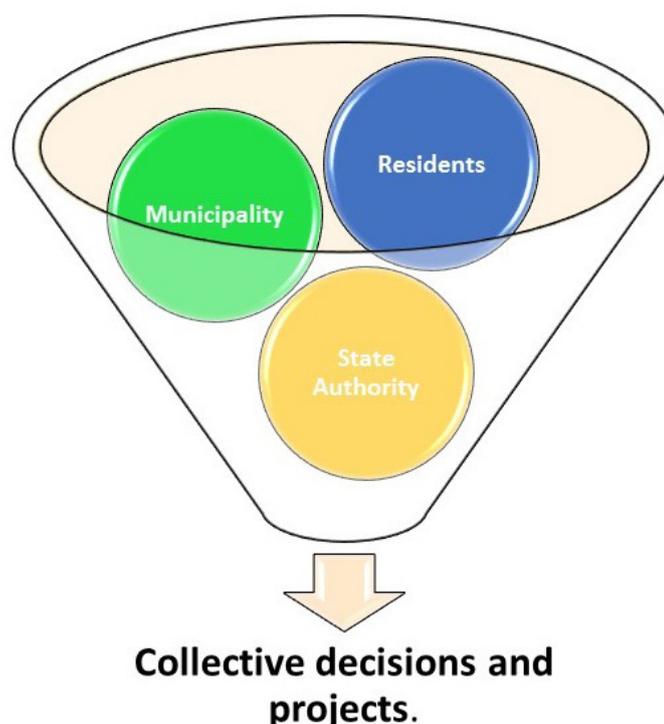
We propose that in the long-term, the participation of residents be institutionalized in order to overcome administration changes and facilitate a planning model that addresses the residents' imminent needs. Furthermore, this builds the residents sense of ownership and involvement, reconnecting them to the rest of the city.

6.5 Strategy Web, Monitoring & Evaluation

As stated previously, our strategies have been designed to inter-connect, forming a web which allows for multiple entry points towards transformative change, as, whichever strategy is initiated first, feedbacks to trigger others. In order to construct the web, the key aspects of each theme's strategies were identified and inter-linked to demonstrate how this feedback occurs.

Within unity and collaboration, strategy theme 1, the key aspects from our strategies are: policy & planning, action, political commitment, accountable representa-

Figure 30. Tri-partite partnership model



tives, stakeholder participation, community cohesion, and savings groups formation. From theme 2, knowledge and perception, the key aspects are: research, awareness and education, workshops, policy and planning, stakeholder participation, and community cohesion. Finally, the key aspects from theme 3, institutional and legal mechanisms, were: policy and planning, action, monitoring and evaluation, workshops, and mainstreaming of responsibility. Across each theme the same key aspects were identified in order to form linkages between themes and form the strategy web, which is shown in Figure 31. Table 2 shows how these strategies will be monitored and evaluated.

7. Conclusion

In Barrios Altos, everyday risks are interwoven within urban development. This is recognised by all stakeholders, as all argue that urban development is necessary to reduce everyday risk. However, the general framing of everyday risk as homogenous across Barrios Altos is misleading, resulting in the proposal of extreme solutions that frequently prioritise outside influences over the internal conditions within Barrios Altos.

However through our research we uncovered that, everyday risk is diverse, dynamic and complex, due to the interaction of multiple vulnerability factors influencing which

Table 2. Monitoring and evaluation of proposed strategies

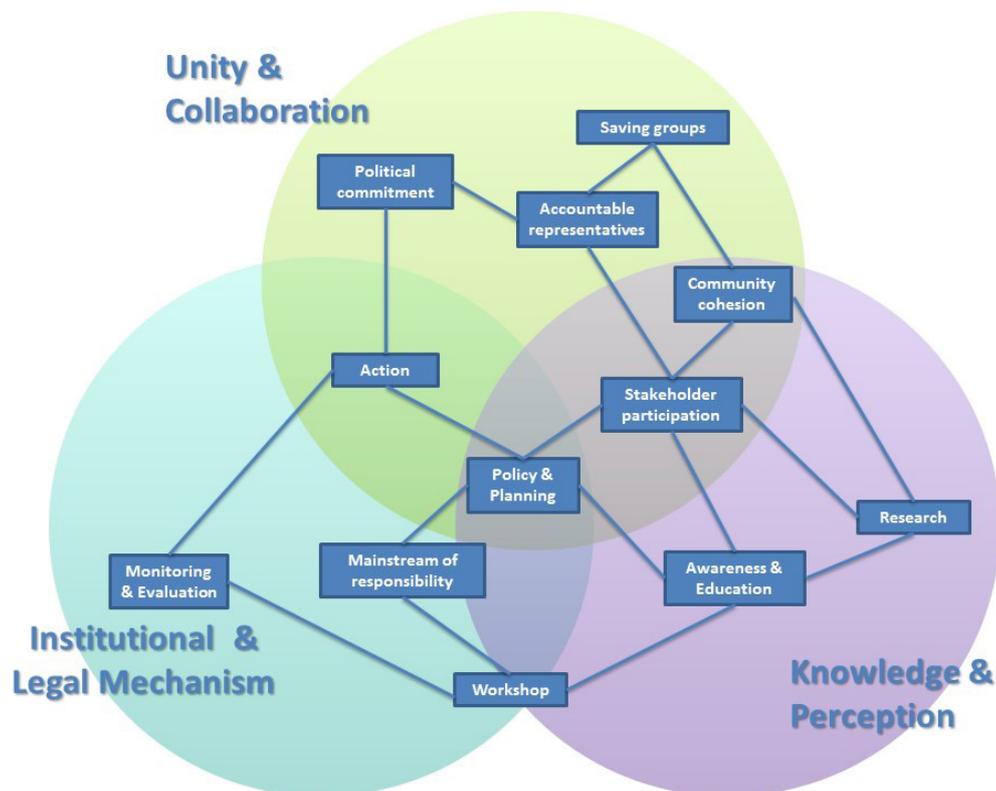
Strategy Aim	Timeframe of implementation	Monitoring indicators	Monitor
1. Increase collaboration and communication between different stakeholders	Short term	Formation of housing associations	Residents & CIDAP
	Sustained	Regularity of stakeholder meetings	Meeting facilitators (Universities/NGOS)
2. Promote Savings and Loan Associations	Short to medium term	Amount saved	Quinta representative & Savings group organiser & NGO
	Sustained	Number of associations	Quinta representatives & NGO
3. Increase resident led mapping and enumeration	Short term	% of Barrios Altos covered	CIDAP
	Regular intervals	Detail and quality of maps	CIDAP (& representatives)
4. Promote knowledge building workshops	Short to medium term	Number of attendees	Workshop leader & Quinta leaders
	Regular intervals	Participant's feedback	Quinta leaders & Workshop leader
5. Evaluate the application and implementation process of Law 29415	Start in short term	Number of applications	MML
	Regular intervals	Processing time	MML & Residents
		Applicants feedback	MML
6. Institutionalising participatory planning, monitoring and evaluation	Medium to long term	Implementation of initiative	CIDAP & ELIS & Universities
	Sustained	Transparency	CIDAP & ELIS
		Stakeholder feedback	CIDAP & ELIS

of these risks certain individuals or groups of residents experience, as well as the operation of risk reproduction cycles. Furthermore, residents' coping mechanisms are often short-sighted and result in the reproduction of risks for them and their surroundings.

Recognising the diversity of everyday risk and how it can be reduced within urban development provides an opportunity to achieve transformative change in Barrios Altos. This comes under the banner of inclusive urban

revival, whereby urban development seeks, not only to preserve heritage but also initiate and sustain resident participation within planning. By so doing, risk cycles can be disrupted and the residents right to the city is activated, placing Barrios Altos on a pathway to inclusive transformative change one that incorporates its current residents. These multiple entry points towards inclusive urban revival reflect the complexity within Barrios Altos and provide a strong opportunity to achieving transformative change.

Figure 31. Web of strategies to achieve inclusive urban revival (created by the authors following Levy, 1996)



References

Adger, W. (2006). Vulnerability. *Global Environmental Change*, 16(3), pp.268-281.

Attoh, K. (2011). What kind of right is the right to the city?. *Progress in Human Geography*, 35(5), pp.669-685.

Betancur, John (2014). Gentrification in Latin America: Overview and Critical Analysis. *Urban Studies Research*, Volume 2014 (2014), pp.1-15

Bull-Kamanga, L., Diagne, K., Lavell, A., Leon, E., Lerise, F., MacGregor, H., Maskrey, A., Meshack, M., Pelling, M., Reid, H., Satterthwaite, D., Songsore, J., Westgate, K. and Yitambe, A. (2003). From everyday hazards to disasters: the accumula-

tion of risk in urban areas. *Environment and Urbanization*, 15(1), pp.193-203.

Blaikie, P., Cannon, T., Davis, I. and Wisner, B. (2004) *At Risk: Natural Hazards, People's Vulnerability, and Disasters*, Routledge, London

De los Rios, S., 2011. Por el Rescate del Centro, in Casa y Mas, de Comercio, 23 Feb 2011. Available at: http://fenix.vivienda.gob.pe/OBSERVATORIO/Noticias/Por_el_Rescate_del_Centro.pdf

De los Rios, S. and Cordova, R. (2007). Centro Historico de Lima, Patrimonio Humano y Cultural en Riesgo. [online] Available at: http://www.wmf.org/sites/default/files/wmf_publication/Lima-Exhibition-Panels.pdf. Last accessed 4th June 2015.

- Gaillard, J. and Mercer, J. (2012). From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography*, 37(1), pp.93-114.
- Harms, H. (1997). To live in the city centre: housing and tenants in central neighbourhoods of Latin American cities. *Environment and Urbanization*, 9(2), pp.191-212
- Harvey, D. (2003). The Right to the City. *International Journal of Urban and Regional Research*, 27(4), pp.939-941.
- Harvey, D. (2008). The Right to the City. *New Left Review* 53. pp. 23-40.
- Hardoy, J., Pandiella, G. and Barrero, L. (2011). Local disaster risk reduction in Latin American urban areas. *Environment and Urbanization*, 23(2), pp.401-413.
- Heritage on the Wire. (2012). Historic Mansion in Lima's Old Town Collapses. [online] Available at: http://globalheritagefund.org/onthewire/blog/limas_old_town. Last accessed 4th June 2015.
- INDECI. (2011). Riesgo sísmico y medidas de reducción del riesgo en el Centro Histórico de Lima, pp. 1-93.
- Lefebvre, H. (1991). The production of space, trans. Donald Nicholson-Smith (1974). p. 282.
- Lefebvre, H. (1968). *Le Droit à la ville*. Paris: Anthropos.
- Levy, C. (1996) The process of institutionalising gender in policy and planning: The web of institutionalisation. DPU Working Paper No. 74, pp1-28.
- Lizarzaburu, J. (2015). *Lima Milenaria: Gestión Castañeda prepara la demolición de cerca del 40% del Centro Histórico de Lima*. [online] Available at: <http://limamilenaria.blogspot.co.uk/2015/04/gestion-castaneda-prepara-la-demolicion.html> [Accessed 22 May 2015].
- Maestro. (2014). *Maestro ingresa a la emprendedora zona de Barrios Altos*. Available: http://www.maestro.com.pe/noticias/noticias_detalle/2 . Last accessed 4th June 2015.
- Ministry of Health - Peru (MINSA). (2015). Statistics for Lima City - Morbilidad 2014 for Juan Perez Carranza and Dos de Mayo Hospital. (online) Available at: http://www.rslc.gob.pe/portal/index.php?option=com_content&view=article&id=103&Itemid=454 [Accessed 04 June 2015].
- Ministry of Housing, Constructions and Sanitation, (2014). Integral Improvement to Neighbourhoods Program. (online) Available at: <http://www.vivienda.gob.pe/pmib/>. [Accessed 04 June 2015].
- Ministry of Housing, Constructions and Sanitation, (2015). 2011-2014 Report-Peru A Window to Family Welfare. (online) Available at: http://issuu.com/mvcs7/docs/mvcs_-_memoria_2015__pliego_ . [Accessed 04 June 2015].
- Municipalidad Metropolitana de Lima, MML. (2011). Ordenanza No. 1576.
- Modifican Reglamento de Organización y Funciones de la Municipalidad Metropolitana de Lima referente a la creación del Consejo de Desarrollo y de la Secretaría Técnica para el Cercado de Lima CODEL. Retrieved from [http://spij.minjus.gob.pe/CLP/contenidos.dll/CLPleggobloc/coleccion00000.htm/a%C3%B1o65046.htm/mes69046.htm/dia69294/sector69295/sumilla69296.htm?f=templates\\$fn=documentframe.htm\\$3.0#JD_ORD1576](http://spij.minjus.gob.pe/CLP/contenidos.dll/CLPleggobloc/coleccion00000.htm/a%C3%B1o65046.htm/mes69046.htm/dia69294/sector69295/sumilla69296.htm?f=templates$fn=documentframe.htm$3.0#JD_ORD1576). [Accessed 04 June 2015].
- Okello, M., Oenga, I. and Chege, P. (2015). *Participatory Urban Planning Toolkit Based On The Kitale Experience*. 1st ed. [ebook] East Africa: Practical action, pp.1-33. Available at: <https://practicalaction.org/docs/ia3/participatory-urban-planning-toolkit-kitale.pdf> [Accessed 4 Jun. 2015].
- Oxfam America and Freedom from Hunger (2013): Saving for Change: Financial inclusion and resilience for the world's poorest people, Oxfam America (online) Available at: <http://www.oxfamamerica.org/explore/research-publications/saving-for-change-financial-inclusion-and-resilience-for-the-worlds-poorest-people/>[Accessed 03 June 2015].
- Paul Rippey (n.d.): Savings groups and financial inclusion, The Guardian (online) Available at: <http://www.theguardian.com/global-development-professionals-network/dai-partner-zone/savings-groups-and-financial-inclusion> [Accessed 03 June 2015].
- Pelling, M. (2011) *Adaptation to Climate Change: From resilience to transformation*, New York: Routledge, 203pp.
- Peru21, (2014). *Tuberculosis en Perú: Cifra baja, pero seguimos liderando ranking*. [online] Available at: <http://peru21.pe/actualidad/tuberculosis-peru-cifra-baja-seguimos-liderando-ranking-2175444> [Accessed 4 Jun. 2015].
- Prolima, (2014). *Plan Maestro del Centro Historico de Lima al 2035*. Prolima.
- Romero-Lankao, P., Hughes, S., Qin, H., Hardoy, J., Rosas-Huerta, A., Borquez, R. and Lampis, A. (2014). Scale, urban risk and adaptation capacity in neighborhoods of Latin American cities. *Habitat International*, 42, pp.224-235.
- Salah Goss (2010): One Early Success Story: Savings Led Groups, Bill & Melinda Gates Foundation (online) Available at: <https://docs.gatesfoundation.org/Documents/one-early-success-story.pdf> [Accessed 03 June 2015].
- The Bartlett Development Planning Unit (DPU). (2013). Barrios Altos – Urban Renovation with Life and Memory. In: *Transformative planning for environmental justice in metropolitan Lima*. London: The Bartlett Development Planning Unit.

The Bartlett Development Planning Unit (DPU). (2014). Barrios Altos - Co-producing the Right to the Centre In: *Environmental Justice in Lima : Co-learning for Action*. London: The Bartlett Development Planning Unit.

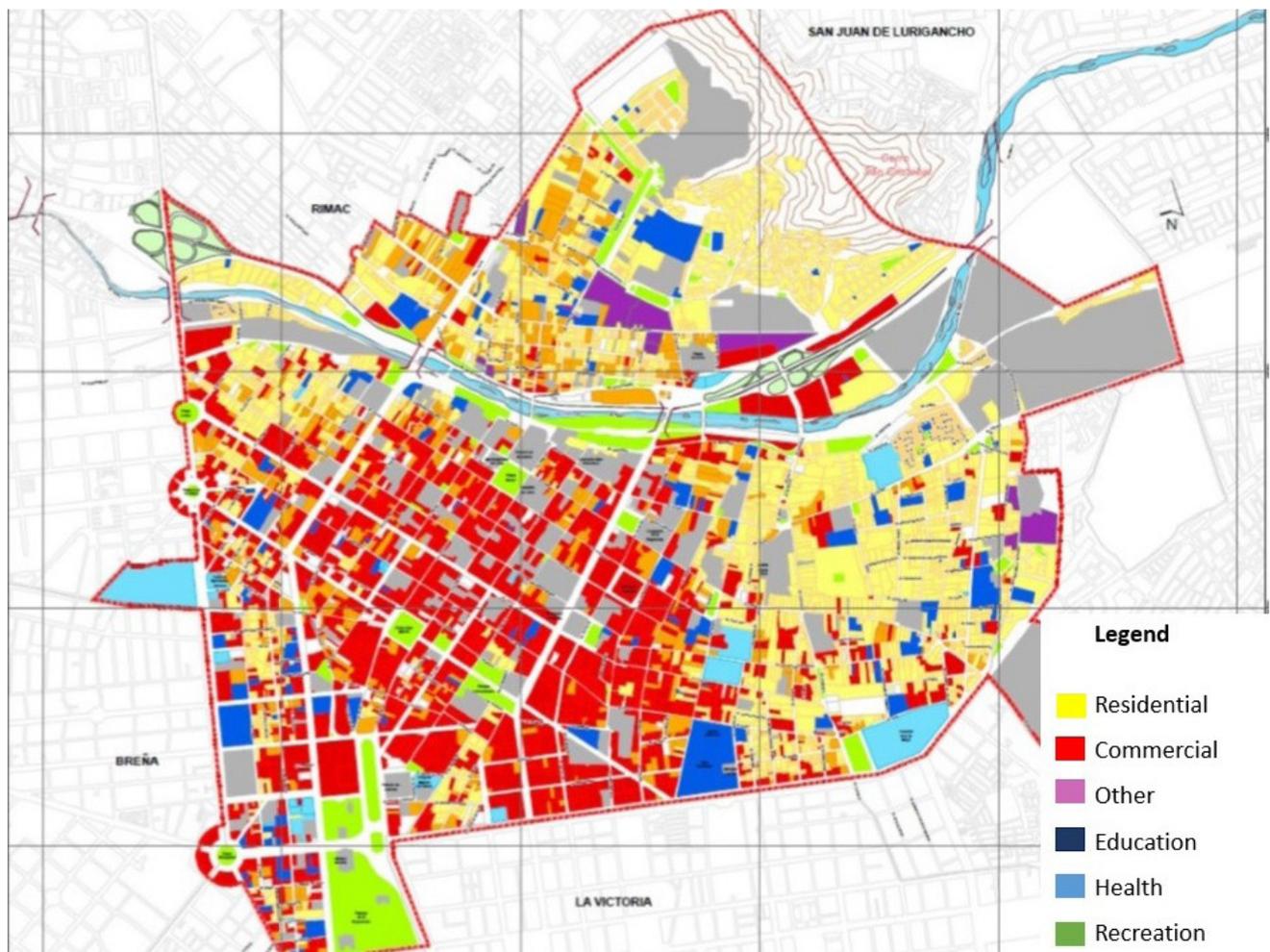
UNESCO. (n.d.). Historic Centre of Lima. (online) Available at: <http://whc.unesco.org/en/list/500/> [Accessed 04 June 2015].

Xavier Martín (2014): What Are Savings Groups? - The Evolution Of Group Mechanisms For Savings And Credit, ProSavings, Multilateral Investment Fund, Inter-American Development Bank, Washington, D.C. (online) Available at: http://www.pro-savings.org/system/tdf/Note%20-%20Savings%20Groups%20in%20Latin%20America%20series_1.pdf?file=1&type=node&id=747 [Accessed 03 June 2015].

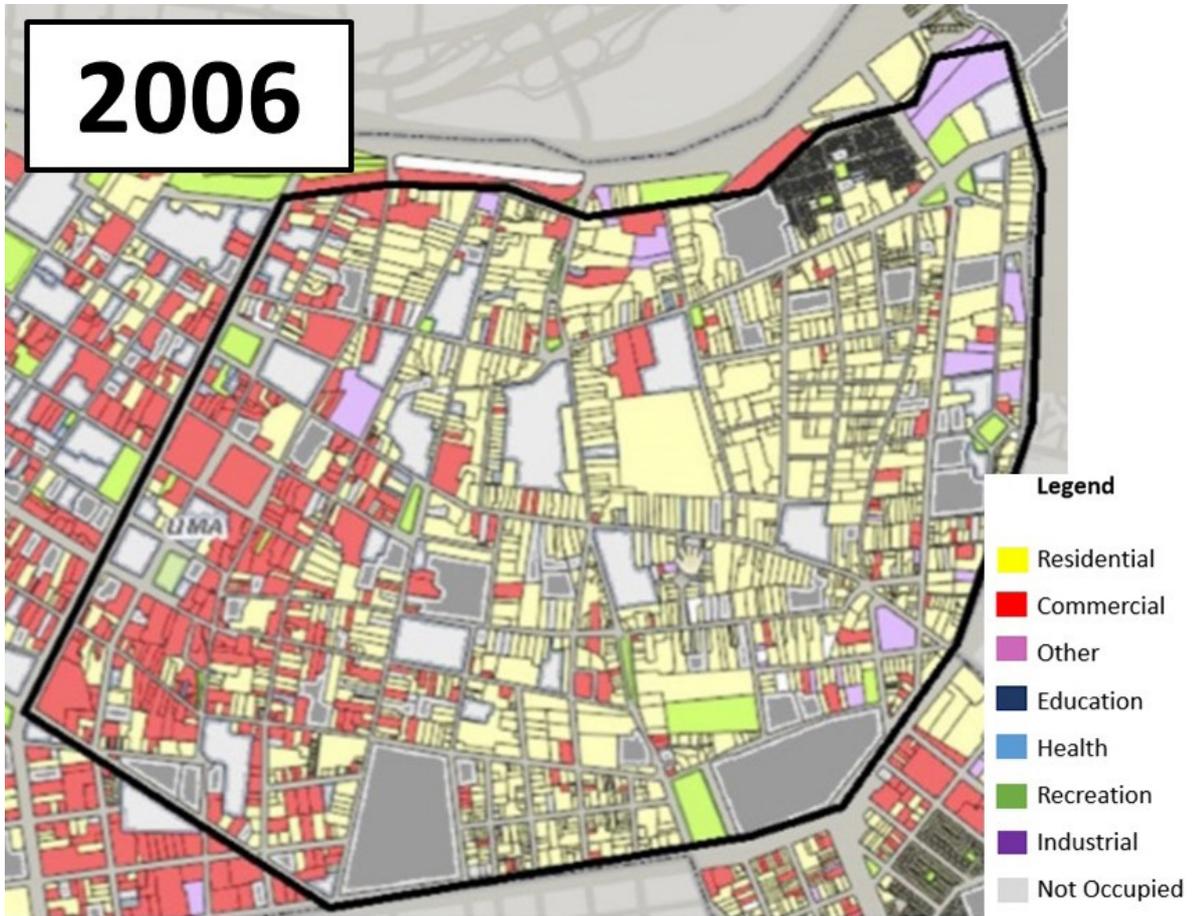
Appendices

Appendix 1 – Land use changes

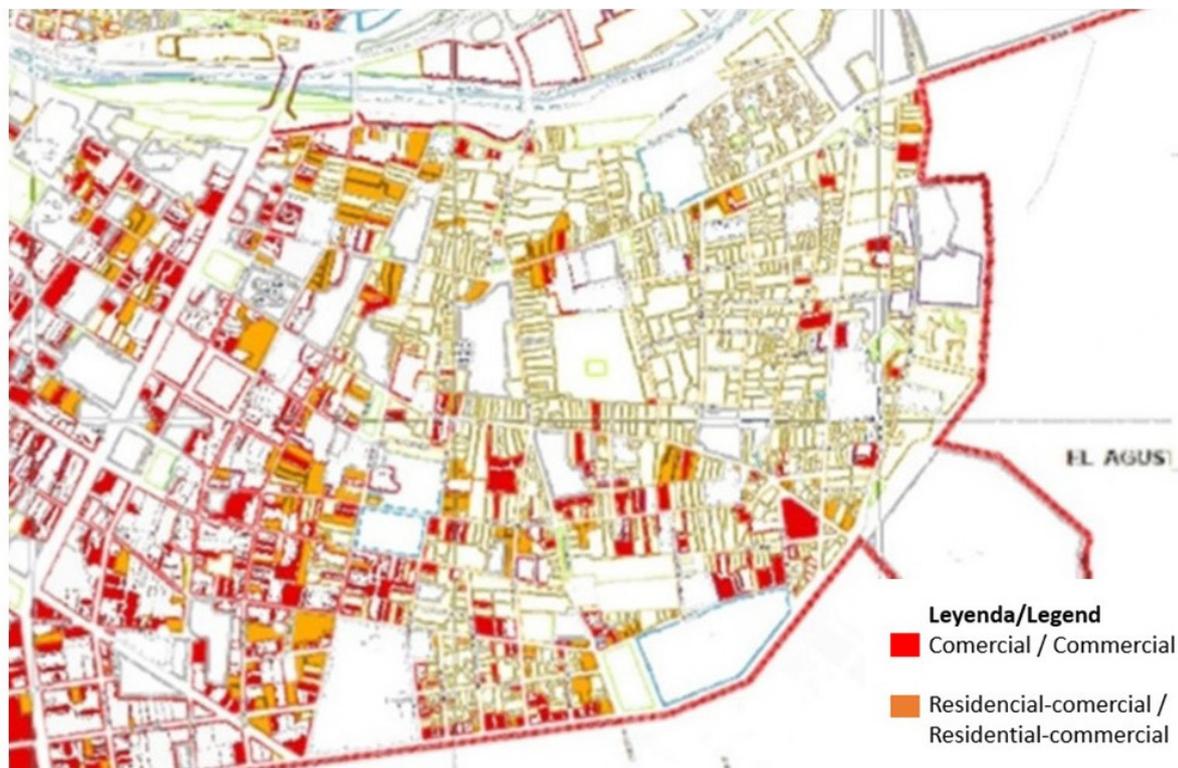
Map 1. Barrios Altos Land Use Map 2012. Source: PROLIMA



Map 2. Barrios Altos Land Use Map 2006. Source: DPU, 2013



Map 3. Newly expended commerical and mix use area from 2006 to 2012. Source: DPU, 2013



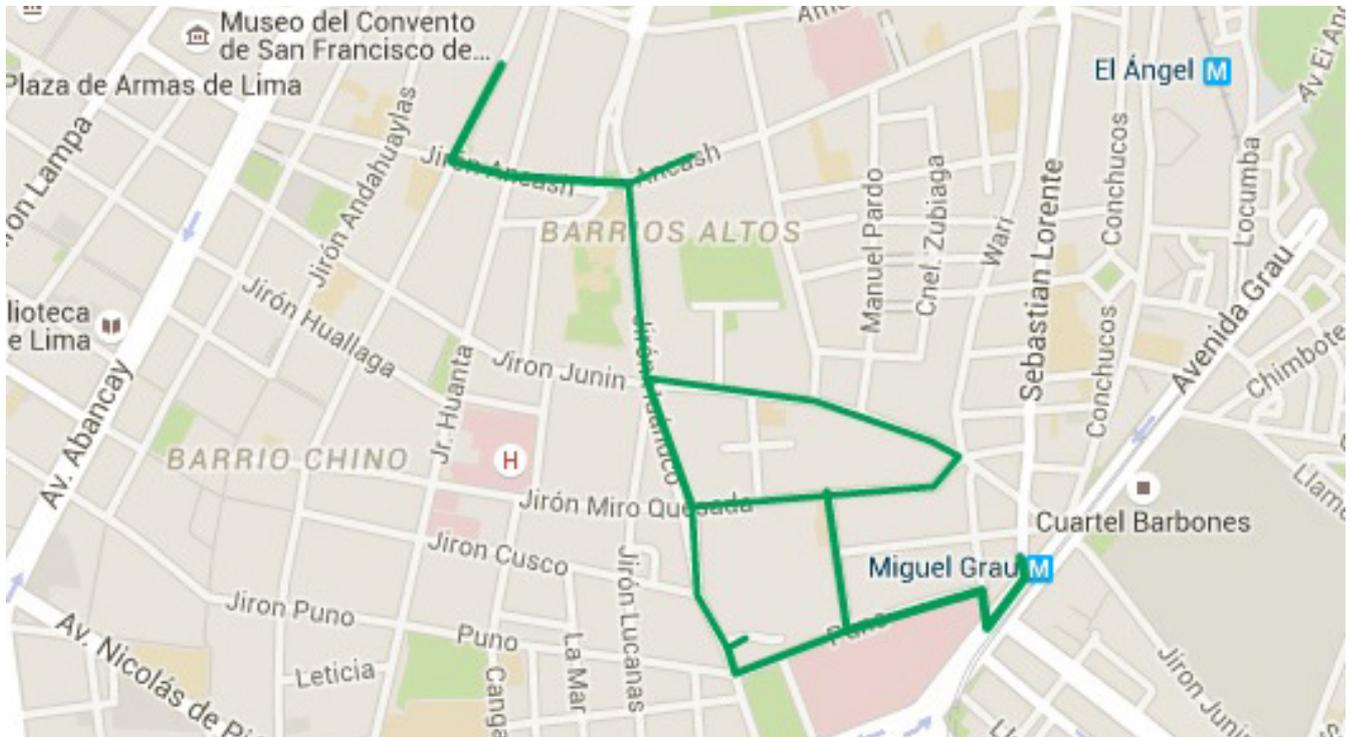
Appendix 2 – Methodology Table

DATE	ACTIVITY/ LOCATION	NOTES
26/04/15	City Tour	Gained an introduction to 3 case study sites (Costa Verde, El Agustino, Jose Carlos Mariategui).
27/04/15	<ol style="list-style-type: none"> 1. Group Presentation to local partners and interns 2. Meeting with CIDAP (Silvia De los Ríos). 3. Planned 1st transect work 	<ol style="list-style-type: none"> 1. Presented preliminary findings and gained feedback over potential areas of research and improvements. 2. Discussed our preliminary findings and potential areas to visit with our local partner. 3. Allocated transect walk responsibilities for each group member and designed EpiCollect+ form.
28/04/15	Transect Walk 1 (Quinta 641; Quinta 1274; Quinta Baselli; Quinta 1388; Maestro Warehouse; Psje Muña; Juan Perez Carranza Health; Central Market Area)	<p>To improve our understanding of the spatial landscape of Barrios Altos and the everyday risks affecting people and their coping mechanisms.</p> <p>After an initial meeting and discussion with Luis and Oscar, we visited 5 quintas and a local hospital. Later we coordinated our notes.</p>
29/04/15	<ol style="list-style-type: none"> 1. Presentation: Linda Zilbert 2. Group work 	<ol style="list-style-type: none"> 1. Presentation from local risk expert on understanding risk. 2. Further fieldwork data organising.
30/04/15	<ol style="list-style-type: none"> 1. Interviews at Juan Perez Carranza Health Centre and Hospital Dos de Mayo (Dr Julio Cesar Altamirano Cancharis (Chief Doctor); Ms Gaby Mantari (Head Nurse); Mr Ivan Chancos (JPC Statistician); Mr Luis Angel Gusra Rex (Sanitation Inspector); David Acenastre Paivs (Environmental & Sanitation Inspector)) 2. Presentations: Water issues in Peru and Lima (SEDAPAL) 3. Attended evening Quinta leader meeting with a talk on Housing Cooperatives in Uruguay 	<ol style="list-style-type: none"> 1. Medical staff were interviewed to gain information and data on health issues in Barrios Altos. 2. Presentation and Q&A on SEDAPAL's plans for future projects in Lima. 3. Exposed our work to wider audience and observed general discussions amongst resident stakeholders
1/5/15	Transect Walk 2 (Quinta San Jose; Quinta Santa Rosa; Quinta Huanuco; Quinta Virgen Del Chapi)	To meet more residents and investigate factors that influence vulnerability and the coping mechanisms that residents undertake.
2/5/15	Focus group	Spent the day planning a focus group, which we undertook in the evening in Quinta San Jose. 2 simultaneous focus groups were ran, one on risk and mapping and the other on a timeline of risk.

3/5/15	Group meeting	Evaluated focus group performance and results and identified improvements.
4/5/15	<p>Interview with INDECI</p> <p>2. Talk on Plan Lima Callao 2035</p> <p>Meeting with CIDAP (Silvia De los Ríos)</p> <p>4. Designed a quinta survey</p>	<p>1. Discussion of risk and plans in Barrios Altos.</p> <p>2. Gained an understanding of the Plan's vision for Barrios Altos.</p> <p>Relayed key findings so far and received feedback.</p> <p>4. Identified key attributes and questions to investigate</p>
5/5/15	Manzana survey of Quinta San Jose's manzana	Undertook 7 quinta surveys within the manzana. As well, we mapped the land use across the manzana.
6/5/15	Evening meeting with Quinta leaders for devolution of our key findings.	Produced a presentation and designed a data collection activity to deliver our key findings and receive feedback.
7/5/15	Group work	Collation of data and key findings. Initial strategies were worked upon, and additional data that was required was identified.
8/5/15	Transect walk	Visited 3 new quintas to collect data from different ownership types and plug data gaps.
9/5/15	Group work	Finalised our key findings and began developing our strategies.
10/5/15	Group work	Further progressed our strategies and began producing a final feedback presentation. As well we refined our hypothesis.
11/5/15	Group work and Skype meeting (Silvia De los Ríos, CIDAP)	Finalised our strategies and presentation and obtained feedback from our partner.
12/5/15	Final presentation to key stakeholders	Gained valuable feedback on our work from key stakeholders.

Appendix 3 – Transect walk routes

Source: Google Maps



Appendix 4 – 2015 MML map of proposed demolition

Source: Lizarzaburu, 2015



Demolition of Lima Historic Centre

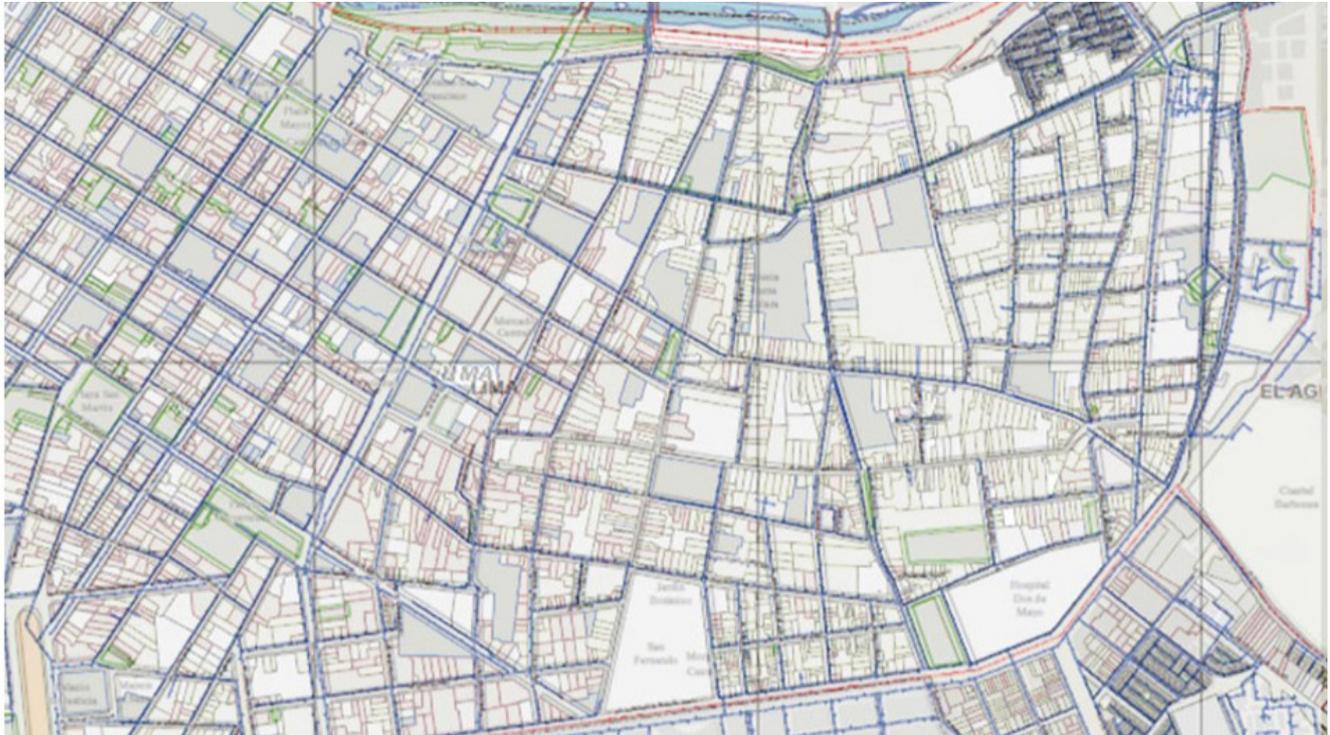
Totals	Cercado	Rimac
Manzanas 450	384	66
Estate 7,126	5,486	1,640
Morozonas 1,696	1,334	362

“Plans to demolish up to 40%”

	Total Area -	6,500,000 m ²		
UNESCO area	Minimum area to be demolished	1,525,000	36,600 living	\$ 366, 000, 000
Monumental Urban Environment	Maximum area to be demolished	2,347,000	54,800 living	\$ 648, 000, 000
	Built area to be restored	1,661,000	\$ 768, 762, 500	\$ 412, 782, 500

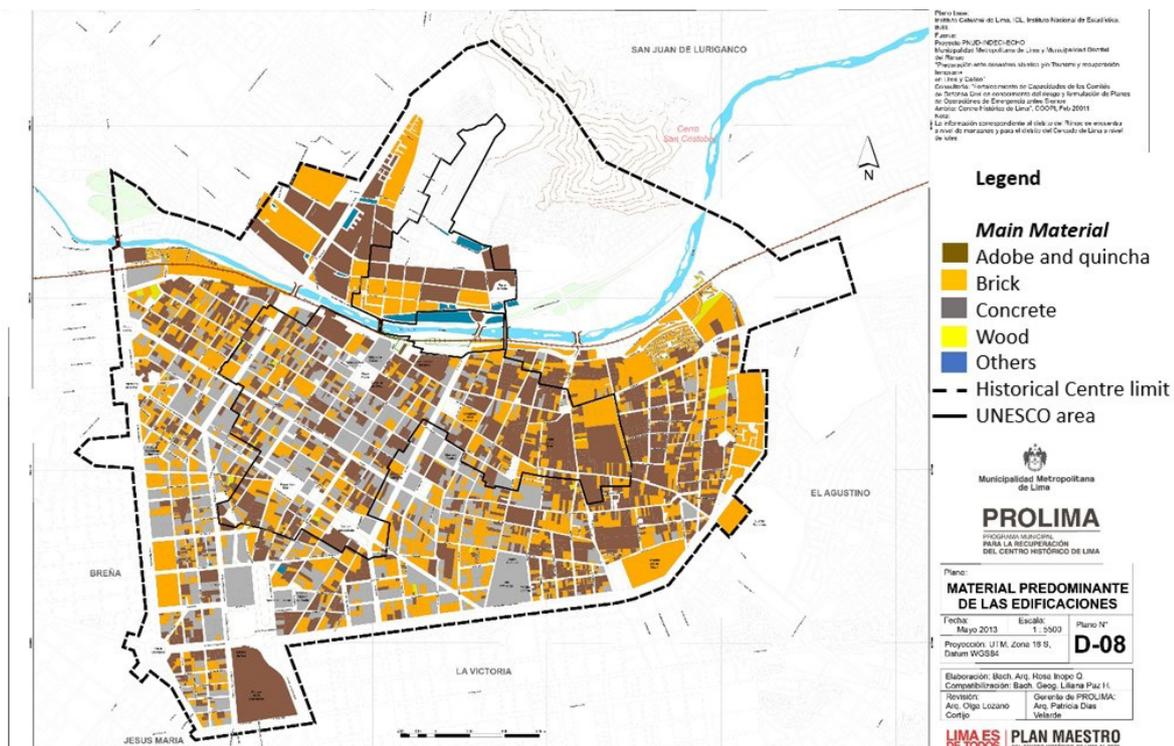
Appendix 5 – Water infrastructure coverage

Source: DPU, 2013



Appendix 6 – Building material

Source: ProLima



Plano Lima
Proyecto: Catálogo de Lima, CL, Instituto Nacional de Estadística e Informática
Elaborado por: ProLima
Proyecto: PU (D-NDSC-EDCO)
Municipalidad Metropolitana de Lima y Municipalidad Districtal de Miraflores
Elaborado por: Arq. Rosalva Alvarado y Arq. Patricia Díaz
Año: 2013 y 2014
Creado por: Taller de Trabajo de Especialistas de los Centros de Estudios de la Universidad de Lima y el Centro de Estudios de la Universidad de Lima
Año: 2013 y 2014
La información correspondiente al título de este Plano se encuentra en el Anexo de Materiales y para el título del Centro Histórico de Lima en el Anexo de Límites.

Legend

- Main Material**
- Adobe and quincha
- Brick
- Concrete
- Wood
- Others
- - - Historical Centre limit
- UNESCO area

Municipalidad Metropolitana de Lima

PROLIMA
PROYECTO MAESTRO PARA LA RECUPERACIÓN DEL CENTRO HISTÓRICO DE LIMA

Plano: **MATERIAL PREDOMINANTE DE LAS EDIFICACIONES**
Fecha: Mayo 2013 Escala: 1:2500 Plano N° **D-08**
Proyección: UTM, zona 18 S, Datum WGS84

Elaboración: Arch. Arq. Rosa Inopa O
Compañerización: Arch. Geog. Liliana Paz H.
Revisión: Arq. Diego Luciano Arq. Patricia Díaz Cortijo

LIMA ES DE TODOS | PLAN MAESTRO DEL CENTRO HISTÓRICO DE LIMA AL 2025

Appendix 7 – Health statistics from Juan Perez Carranza Health Centre

	Child (0 - 11)		Adolescent (12 - 17)		Young adult (18 - 29)		Adult (29 - 59)		Elderly (60+)		Adult (30 - 59)		Grand Total
	F	M	F	M	F	M	F	M	F	M	F	M	
Acute respiratory infections	1462	1651	154	126	302	168	21	5	350	273	706	374	5592
Nutritional deficiencies	71	109	46	27	135	9	9		145	69	354	87	1061
Diseases of the skin	117	116	37	32	69	41	3	4	76	70	150	93	808
Sexually transmitted diseases	1		29		299	1	19		12	1	377	3	742
Tuberculosis	4	4	2	8	18	23	2	1		10	14	35	121
HIV											3	3	6
	2843	3185	836	560	2574	731	163	41	2324	1673	5020	2109	22059

Appendix 8 – Quintas visited

No.	Quinta	Ownership type	UNESCO	Occupancy type	Organised
1	Quinta 641 (Jr Huánuco)	Beneficiencia	Yes	Unknown	Unknown
2	Quinta 1388 (Jr Miro Quesada)	Private Foundation	Yes	Unknown	Unknown
3	Quinta Muña (Jr Huánuco)	Private Foundation	No	Unknown	Yes (Housing Association and Polladas)
4	Quinta 1274 Nr. Sra. De la Candelaria (Jr Junin)	Beneficiencia	Yes	Unknown	Unknown
5	Quinta Baselli	Private (known)	Yes	Posesionario	Yes (Housing Association)
6	Quinta Women only (Jr Huánuco)	Private (unknown- deceased)	Yes	Posesionario	Yes (Housing Association)
7	Quinta San Jose (874 Jr Huánuco)	Private Foundation	No	Posesionario	Yes (Housing Association and Polladas)
8	Quinta Santa Rosa (Sebastian Lorente)	Private (known)	No	Posesionario	Yes (Housing Association)
9	Quinta Senora de los Milagros	Private (originally Church)	Yes	Self-owned	No
10	Quinta El Carmelo	Private (originally Private)	No	Self-owned	No
11	Quinta 1290	Private (originally unknown)	No	Self-owned	Unknown
12	Quinta Santa Rosa (Jr. Miro Quesada)	Private (originally Church)	No	Self-owned	Yes
13	Quinta Carmen	Private (originally Foundation)	No	Self-owned	No
14	Virgen de Fatima	Private	No	Posesionario	Yes (Neighbours Association – Junta Vecinal)
15	Quinta San Jose (234 Sotomayor)	Private	No	Posesionario	No
16	Quinta Santa Clara (Casa de Lucha Reye)	Beneficiencia	Yes	Renters	Yes
17	Quinta 300 to 308 Jr Paruro	San Marco University	Yes	Renters	No

Appendix 9 – Urban Renovation Law 29415 Information

Currently, the legal framework for urban renovation in areas under *tugurio* condition housing is regulated by Law 29415 for legal regularization and physical renewal; the supreme decree 011-2010 which details the stages and procedures for urban renovation under Law 29.415 and the Ordinance 1590-2012 (Also, see Appendix M 2013 ESD report).

The urban renovation process under this legal framework includes a wide range of stages and requirements that need to be fulfilled for the successful closure, as follows:

- i. The registration of the *posesionarios* living in buildings in need of urban renovation and the declaration of the buildings to be in a *tugurio* condition. In these administrative procedures, the Neighborhood Organisation and Urban Renovation MML sub-departments are to participate.
- ii. Declaration of treatment zones for urban renovation by Urban Renovation MML sub-departments. Only if the building is included within a treatment zone can it be included within the urban renovation process.
- iii. Declaration of the compliance of the requirements for establishing a housing association by the *posesionarios* of the building.
- iv. Regarding the first and second phases, these can be initiated directly by the MML or at the request of the neighbours. In the third case, the residents must request the initiation of the procedure through official forms provided by the municipality and pay the associated fees
- v. Once stages I to III are completed, the regularization of legal land titles begins. There are two options for transferring the land ownership according to Law 29415. These are the declaration of the abandonment of the property by the Municipality or the recognition of the land tenure after a minimum of 10 years of adverse possession over a property by residents, declared via arbitrator or notary (acquisitive prescription). Currently, the MML only considers procedures embarked through the notary process. Additionally, it is possible to transfer ownership to the residents through a conciliation or negotiation process with the owner, led by the municipality.
- vi. Once the abandonment of the building or the acquisitive prescription is declared, the property can be transferred by the Municipality to the housing association if they fulfil a series of

requirements including an urban renovation project approved by the Municipality, the written commitment to implement the urban renewal project, an economic-financial commitment subscribed with the financial, banking or housing development entity.

- vii. Finally, if the housing association accomplishes the physical renewal project within one year, the legal ownership of each unit can be transferred by the association to the unit occupier. If the project is not completed within one year, the property will be reversed to the Municipality.

In summary, the procedure for urban renovation under law 29415 is very extensive and complex, but more importantly, the process rests on highly demanding organizational, financial and time requirements for the residents, but without providing any financial or technical support to the residents, who face being deprived of the ownership of their homes if they do not complete the physical renovation of buildings within a year

Furthermore, the law does not establish a special financial mechanism according to the needs and economic possibilities of the residents. Instead, it obliges them to submit to credits within the general formal financial mechanism, and with this, marginalizes those residents who do not fulfil the requisites for obtaining access to credit. Actually, interviews revealed that some Quintas, such as Quinta San José have stopped the processes started under law 29415 because they see the financial mechanisms as a threat to an inclusive urban renovation.

Urban renovation and national government

Under Law 29415, the municipal authority leads the urban renovation process with minimum participation from central government institutions. However, previous experiences implemented by the municipality have showed its lack of capacity for successfully driving these initiatives. For example, the *Mejorando Mi Quinta* program seriously failed mostly due to financial restraints (Betancur, 2014).

In contrast, the Housing, Construction and Sanitation Ministry 2011-2014 report (Ministerio de Vivienda, Construcción y Saneamiento, 2014), shows a series of positive numbers in investments and social impacts of the measures. According to the report, two of the five key tools for transforming the country in terms of housing issues are the formalization of property rights and an integral management of cities and neighbourhoods. Besides this, the great results regarding property rights tenure have not been reflected in Barrios Altos, without any particular strategy for addressing the particularities of the urban renovation driven by Law 29415 existing.

Moreover, even though the report mentions that central government, municipalities and communities have worked successfully together in the Integral Improvement of Neighbourhoods Program (Programa de Mejorami-

ento Integral de Barrios), this only includes investments in communal commercial centres, recreational spaces and mostly on roads and streets (82%), and does not include aspects regarding housing infrastructure.



3. El Agustino. Beyond everyday risk: Transforming an invisible settlement into a visible community

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*Pauline Pigott
Siobhan Sadiq
Josh Shelley
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Appendices

Acknowledgements

We would like to extend our gratitude to our partner organisation Servicios Educativos El Agustino (SEA), and especially Carmen Robles and Lorena Escobedo, who acted as our guide, knowledge source and doorway into El Agustino; and to the Red de Mujeres womens' networking group for inspiring us with their expertise in our mapping methodology.

We would also like to thank the following people and institutions who, through interviews, presentations and talks provided us with their valuable knowledge and insights: The mayor of El Agustino - Richard Soria, the representatives from UNDP, GODISA, and the residents of El Agustino. Especially, to the Junta Directiva Asentamiento Humano El Independiente for sharing their stories and giving us a better insight into life in El Agustino.

Finally, we are immensely grateful to Adriana Allen, Rita Lambert and the DPU staff, in particular our tutor Étienne von Bertrab. This project would not have been possible without the constant stream of encouragement, support and constructive feedback provided throughout the entirety of the research project.

Abbreviations

APRA - Alianza Popular Revolucionaria Americana

GODISA - Gobierno Distrital de Salud

FDPJUPEA - Federacion Distrital de Pueblos Jóvenes y Urbanizaciones Populares de El Agustino

MIADES - Micro Áreas de Desarrollo

NGO - Non-Governmental Organisation

PAHO - Pan American Health Organisation

Red de Mujeres - Red de Mujeres Organizadas De Lima Este

SEA - Servicios Educativos El Agustino

TB - Tuberculosis

UNDP - United Nations Development Programme

WHO - World Health Organisation

Executive summary

Risk and social injustices manifest themselves in many different forms. The aim of this research project was to understand the root causes of everyday risks and social injustices in one of the oldest informal settlements of Lima, in order to formulate potential strategies that build on the current existing coping mechanisms to overcome these risks. Another key consideration was the role that residents had in recreating these risks and the reasons behind this. The theoretical framework used for this case study is that of Environmental Justice, specifically adapted to our area by using the concepts of administered invisibility, slow violence, and tyranny of scale. This concept of Environmental Justice was particularly chosen, to investigate and demonstrate the ways in which misrecognition, lack of participation and maldistribution of services and resources create a degraded environment prone to the further reproduction of risks in our area.

The focus of this research was the district of El Agustino, and more specifically the area of El Independiente. Findings from this research project showed that the perception of everyday risks differed between residents and professionals as well as government and institutional actors. This in turn reflected the different approaches adopted and ideas conceived for development and everyday risk mitigation in the area. We utilized workshops, interviews, and capacity mapping to further diagnose and understand these. Findings also showed that the state treats the residents of El Independiente as 'invisible', which was one of the leading causal factors for the production and reproduction of everyday risk in the area. A lack of sense of community amongst the residents was also seen to be hindering effective coping mechanisms, subsequently producing, and reproducing risk.

One of the strategies formulated to reduce the production of everyday risk in El Agustino was to make the communities more visible in the eyes of the authorities, as well as to reconnect the residents, encouraging a sense of solidarity and community. To do this, we proposed that community-led organizations engage in knowledge production in order to document their situation, this would not only demonstrate unity and organization to the authorities, but also foster the involvement of the latter in improving the living conditions of the people of El Agustino.

1. Introduction

1.1 Background

Lima, the capital and economic heart of Peru (Collier, 1976) has experienced radical changes in its demographics over the past 70 years. As such, the rapid expansion of both the size and population of the city has brought along its own problems that need addressing. As part of the collaborative action-learning platform Learning Lima, we have been investigating the production and reproduction of everyday risk as experienced by the citizens of El Agustino.

El Agustino is a centrally located district in Metropolitan Lima, with a population of approximately 200,000 (City population, 2007), also with three distinct topographies: the area along the banks of the river Rimac, a flat area, and a hilly area (Maps 1, 2 and 3). The district is known to be one of the poorest in Lima and one of the most overcrowded: 90% of its working population are informally employed (Wiley, 2006), the rate of TB infection is one of the highest

Map 1. Location of El Agustino in Metropolitan Lima. Source: Created by author



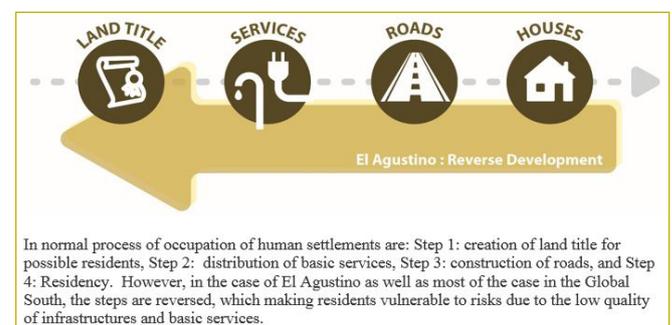
in Peru, as is the level of crime (Collier, 1976). Within El Agustino, we decided to specifically focus on the hilly area of El Independiente, where the community was founded in 1954. This area has a population of approximately 4,080. The aim was to identify existing coping mechanisms employed by residents to mitigate everyday risks, as well as develop transformative strategies through “the production of knowledge” which ultimately contributes towards disrupting the risk cycles present in El Agustino.

1.2 Historical context

El Agustino originally consisted privately owned land, which then saw a series of land invasions starting in the 1940’s (Schonwalder, 1998). Squatters held several protests in an attempt to keep ownership of their plot of land, and prevent forceful removal from the area. This encouraged cohesion and a strong sense of community amongst the original residents. These squatters consisted primarily of internal migrants from the rest of Peru, in particular from the Andes, where collectiveness was already a large part of their culture (Matos Mar 1977, 1968). El Agustino especially was attractive for new arrivals as the nearby informal markets of La Parada and La Gamarra offered services and job opportunities (Map 2).

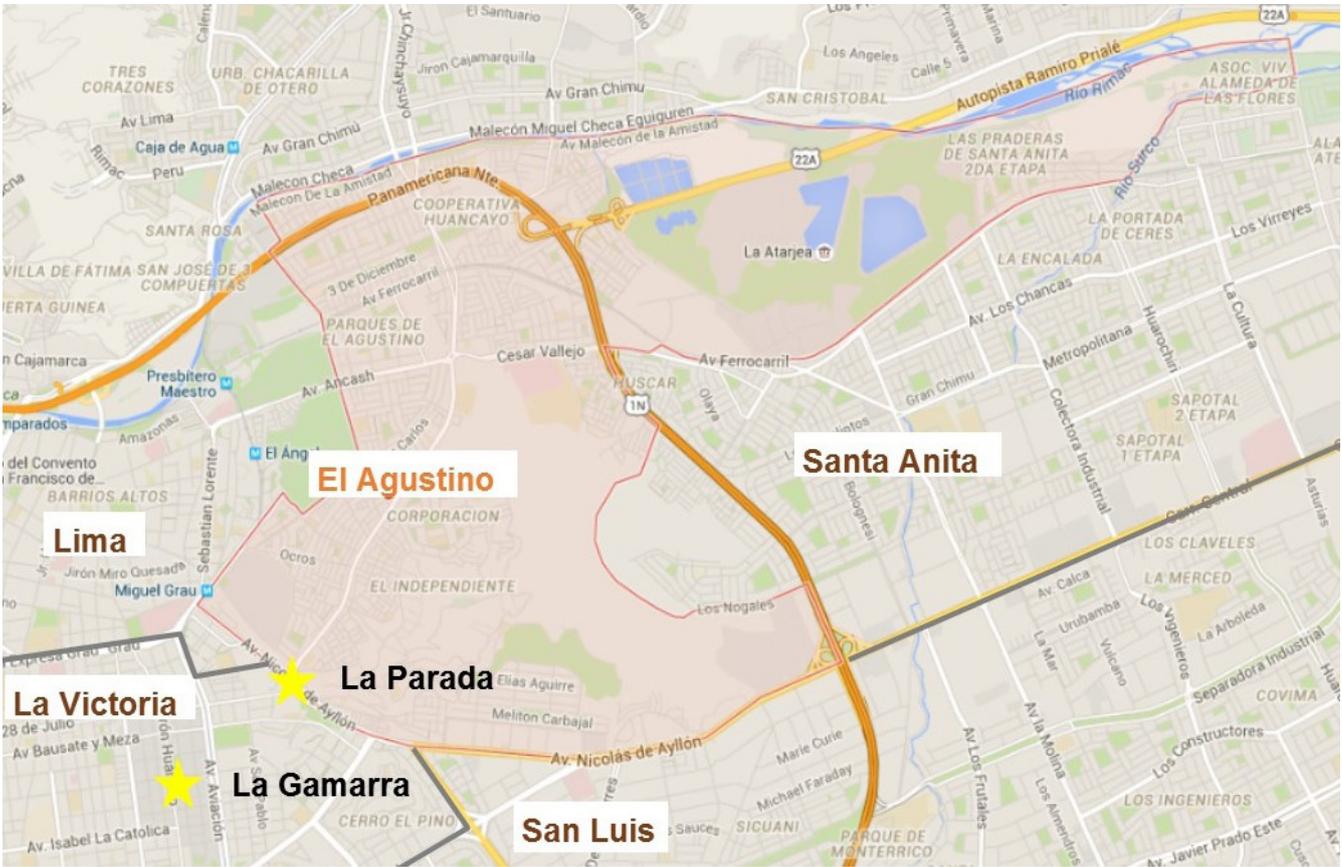
The invasion of El Agustino was also unique because of its reversed process of land occupation (Figure 2) which made residents more vulnerable to risks, given the consequent lack of infrastructure and basic services.

Figure 2. Scheme of development of human settlements in Lima compared to El Agustino. Source: Created by author



In 1961, the law of the Barriadas was introduced to grant the dwellers legal land titles, and provide sanitation facilities for all barriadas that existed prior to 1960 (Lobo, 1981). This split the community, as the now ‘legal’ residents of El Agustino who settled prior to 1960 do not share a common cause with the newer arrivals who settled in the area post-1960. This has created a class divide between the legal and illegal occupants of the area.

Map 2. Location of El Agustino and informal markets. Source: Created by author



Map 3. Three topographies in El Agustino. Source: Created by author

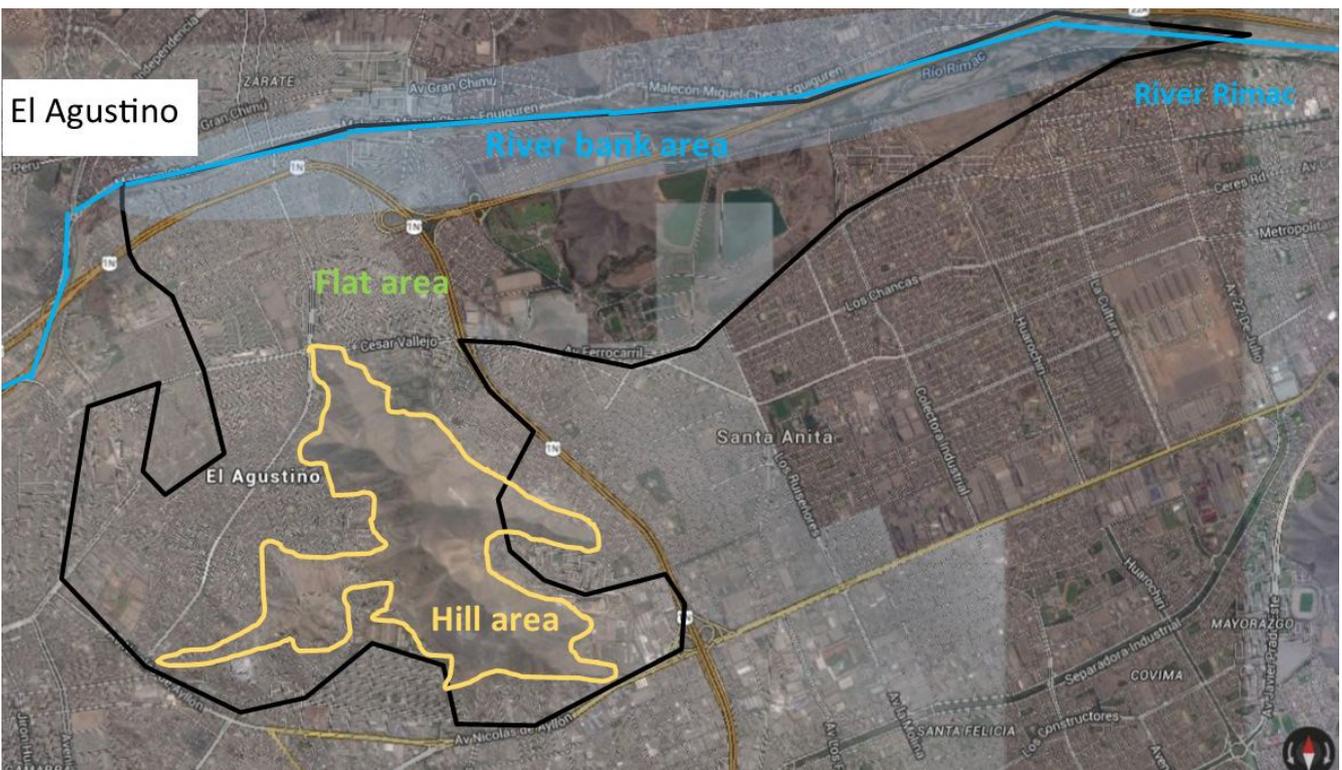
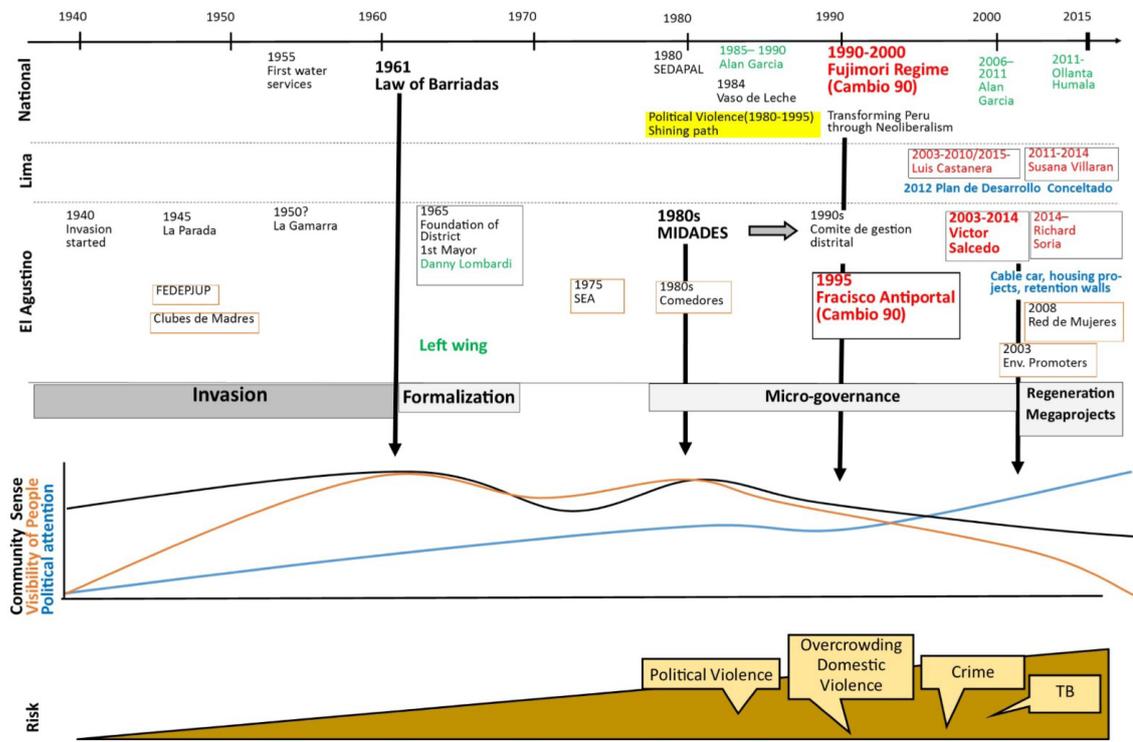


Figure 1. Historical timeline of El Agustino with population visibility, community sense and political attention over time, as well as important events and their impact. Source: Created by author



This timeline demonstrates how the government interventions in national, Metropolitan Lima and El Agustino level have impacted the community sense, visibility of the people in the politics and political attention to El Agustino. We have identified that creation of Law of Barriadas (1961), MIADES project (1980s) and Fujimori regime brought critical changes in El Agustino. In addition, this indicates historical change in trend of political approach and major political shift from left wing to right wing after 1990s. We also estimated that due to reverse human settlements development in El Agustino, political violence, and increase in number of migrants to the district, the level of risks has accumulated throughout history.

The first government of El Agustino, formed in 1965, started the process of formalizing the area. Up until the late 1980's the residents showed strong leftist tendencies, repeatedly voting the left wing in local mayoral as well as national elections. These left-wing politicians experimented with ways to govern the area and often tried to engage the already existing popular organizations in El Agustino, such as women's groups and neighborhood movement coalitions, like the FDPJU-PEA (Schonwalder, 1998). However, the victory of the populist APRA party in 1985 and the subsequent right-winged Fujimori regime that came to power in 1990 dismantled the leftist policies in place in El Agustino. For example, the MIADES forum project, which started in 1987 as an attempt to rejuvenate cooperation between urban popular movements and the municipal administration, whilst showing potential and indeed promoting co-management, deteriorated two years after initiation. This was due to a lack of funding from the central government and the political crises caused by an undermining of existing policies by the APRA regime (Schonwalder, 1998) (Map.4). Popular movements in El Agustino suffered another blow after 1989 due to the right-winged Fujimori regime combined with the mayor of El Agustino, Francisco Antiportal, who belonged to

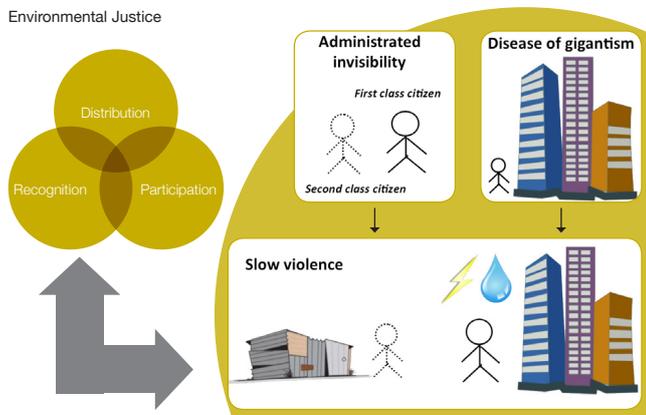
the same political party as Fujimori's Cambio 90. Both were in favour of a centralized decision-making processes and thus reduced support for community led initiatives (Schonwalder, 1998).

2. Conceptual framework and Hypothesis

2.1 Conceptual Framework

Environmental Justice (EJ) encompasses the *recognition* of marginalized groups in society, the *participation* of all those who were otherwise, usually excluded from decision making on policy processes. It also advocates for the *fair distribution* of both benefits and burdens in a society. Environmental injustice occurs when these three dimensions are not realized (Young, 1990). In the case of everyday risk and injustices in El Agustino, this is investigated within the context of the historical development of El Agustino, as well as by looking at other key concepts specific to El Agustino, namely what Nixon (2011) terms as 'the disease of gigantism', 'administered invisibility' and 'slow violence'.

Figure 3. Theoretical framework. Source: by the authors based on Young (1990) and Nixon (2011)



These terms are specialised lenses through which we have viewed the “standard” EJ framework. ‘Administered invisibility’ occurs when the state is aware of a group or section of society’s lawful existence as citizens of that state, yet purposely ignores them in the wider development of the state. This creates dual strata of citizenship, where some citizens are regarded as second-class and as such, ignored or deprived of services due to them the services, whilst wealthier first-class citizens enjoy the full benefits of citizenship offered by the state. This exemplifies the lack of recognition and distribution referred to in the EJ paradigm.

The ‘disease of gigantism’ describes a situation where the State purely sees development in ‘gigantic’ terms i.e. involving a focus on the execution of large-scale development projects aimed at improving what they conceive as aesthetically pleasing showpieces allowing the

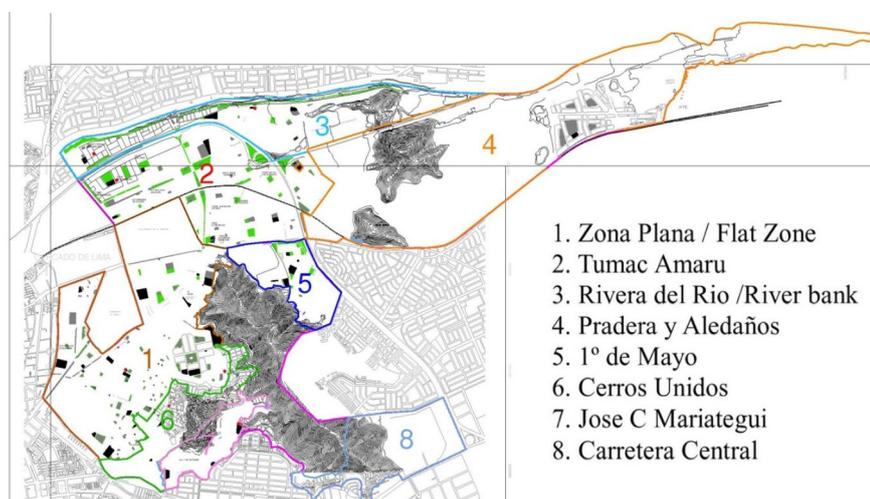
State demonstrate its “development” to the rest of the world or to their electorate. What States and developers sometimes fail to recognise is that incremental change can bring about equal if not greater positive change to an area. Once again, the disease of gigantism ties in with the EJ framework in that, this system that visualizes development in “gigantic” terms results in a lack of recognition of groups of people who do not fit into this form of development, as they neither participate in such projects nor reap the benefits of them.

‘Slow violence’ is a concept that results from the combination of ‘administered invisibility’ and ‘disease of gigantism’. Although ‘administered invisibility’ is not a direct form of violence, it still creates an unfair playing field and significantly places the ‘second-class citizens’ in a disadvantaged position. Violence is perpetuated in the form of lack of provision (or fair distribution) of services such as water and sewage systems, which increases the risk of disease transmission and reduces the chances to speedy recovery. In terms of the disease of gigantism, slow violence manifests through the potential disruption, reproduction of risk and the threat of eventual relocation that would result in the years to come through these large-scale development projects.

2.2 Concept of risk and everyday risk in El Agustino

Risk can be defined as the potential for a disaster or calamity to have an adverse effect on an individual or community (Somers, 2009). For instance, a community at risk from the effects of earthquakes is thus both exposed to the hazard (earthquake) and vulnerable to it (house prone to collapse).

Map 4. Zones in El Agustino created by the MIADES project to facilitate participatory governance



During the MIADES project, El Agustino was divided into 8 areas. Even though co-governance of MIADES project has ended officially, the spatial division of MIADES still exists for the governance of the area.

The combination of both hazard and vulnerability is what creates a risk. Adaptation to risk is not to be confused with resilience, which is the ability of a person to “bounce back” and repair any damage caused by the risk. In the context of El Agustino, our research project focused on understanding the perception of everyday risks by ordinary residents. El Agustino is vulnerable due to its economic instability and its reverse process of housing development, which stopped residents from being able to develop effective risk coping mechanisms. Additionally, the strength and quality of the residents’ coping mechanisms can be influenced by the priorities attached to those risks, which in turn leads to differing levels of investment in risk mitigation measures.

2.3 Hypothesis

The perception of risk in El Agustino varies between different actors. On the one hand, the communities are specifically focused on everyday risks related to water, health, crime, housing and accessibility, whereas long term concerns include the quality of education and infrastructural change. On the other hand, the government is focused on physical risks such as housing collapse due to landslides, and tends not to tackle the root causes of the risks. Consequently, proposed and attempted solutions mainly prioritize large-scale development projects in the area with private interests at heart, as opposed to tackling resident’s concerns and everyday risks.

Environmental injustice thus manifests itself through “administered invisibility” and the “disease of gigantism”. This coupled with the decline in community unity over time, produces, and reproduces everyday risk in the area through slow violence and a lack of a unified and coherent voice amongst the residents of El Agustino. A solution to the current situation of risk would be to give the community stronger visibility and raise their concerns to the authorities. This can be done by reinvigorating existing community organisations and empowering them through enhanced information collection methods, helping them network with NGO’s and other communities facing similar issues.

2.4 Research questions

Based on this hypothesis three main research questions were formulated:

1. How do different actors perceive risk and where are the risks located spatially?
2. What are the existing coping mechanisms and which factors prevent coping mechanisms from overcoming everyday risks in El Agustino?
3. What strategies could be implemented in order to overcome everyday risk?

3. 2. Methodology and Limitations

3.1 Methodology

Preliminary research in London

Preliminary research consisted of analysing secondary data sources including academic and news articles on the history, development and perceived problems and risks associated with El Agustino. This was in order to formulate preliminary research questions, a conceptual framework and a hypothesis on the production and reproduction of risks in El Agustino. Skype interviews with our partner NGO SEA provided extensive information on governance, community groups, everyday risks, and living conditions of the residents. Preliminary research work also included presentations and feedback in order to continuously refine and strengthen our research towards a more complete understanding of the area.

On the Field in Lima

Once in Lima we focused on the area of El Independiente as an entry point into our research. Our local partner SEA was also interested in resuming their work in that area. This was particularly due to that fact that the problems faced by inhabitants on the hillside were perceived as the most pressing, coupled with the fact that residents on the top of the hill were some of the most vulnerable to hazards in El Agustino. Focusing on a specific area also increased our familiarity with the district and local residents, which led to a buildup of trust, allowing us dig deeper towards understanding the lives of the people and investigating risk from their viewpoints.

We gathered information and data using, numerous tools, such as formal and informal interviews sessions, questionnaires, focus group sessions with children, youth, and women (Image 1), discussions and transect walks. This information has been documented in both audio-visual and written formats. (See Appendix 1, focus groups). Each of our research tools had a different objective, in order to attain a well spread and deep understanding of the area. Interviews for example, were used primarily, to understand the perception of risk and diagnose the problems faced by the residents, while capacity and vulnerability mapping attempted to understand the risks spatially. Capacity mapping was inspired by the methodology used by the *Red de Mujeres*; a women’s community network operating in El Agustino (Image 2). Consequently, a mapping workshop was held with the residents and community leaders to enlighten them on the importance of capacity mapping as a tool for spatially localising the skills of the residents (Image 3). Furthermore, it constitutes a tool that the community can continually utilize and build on. A community video screening session was also held in La Capilla, a chapel located on the hill of El

Independiente. This aimed at clearly presenting the issues of water injustice in the area as well as the benefits of the mapping exercise, whilst also encouraging a revival of community spirit by gathering and raising awareness around the commonalities of their housing and water issues (Image 4). The decision to hold the video screening session at the top of the hill as opposed to in the communal space at the bottom where events were usually held was conscious. This was in order to ensure that accessibility was not an issue

for the residents at the top, who usually did not participate in activities held on the flat areas of El Independiente (See Appendix 2 for fieldwork activities).

Our primary partner SEA played a significant role in our understanding of the socio-economic, political, and environmental dynamics of El Agustino. This included providing the group with knowledge on the roles and perceptions of various institutions and administrations, explaining the set-

Map 5. Location of El Independiente in Zone 6. Source: Municipalidad de El Agustino, 2012

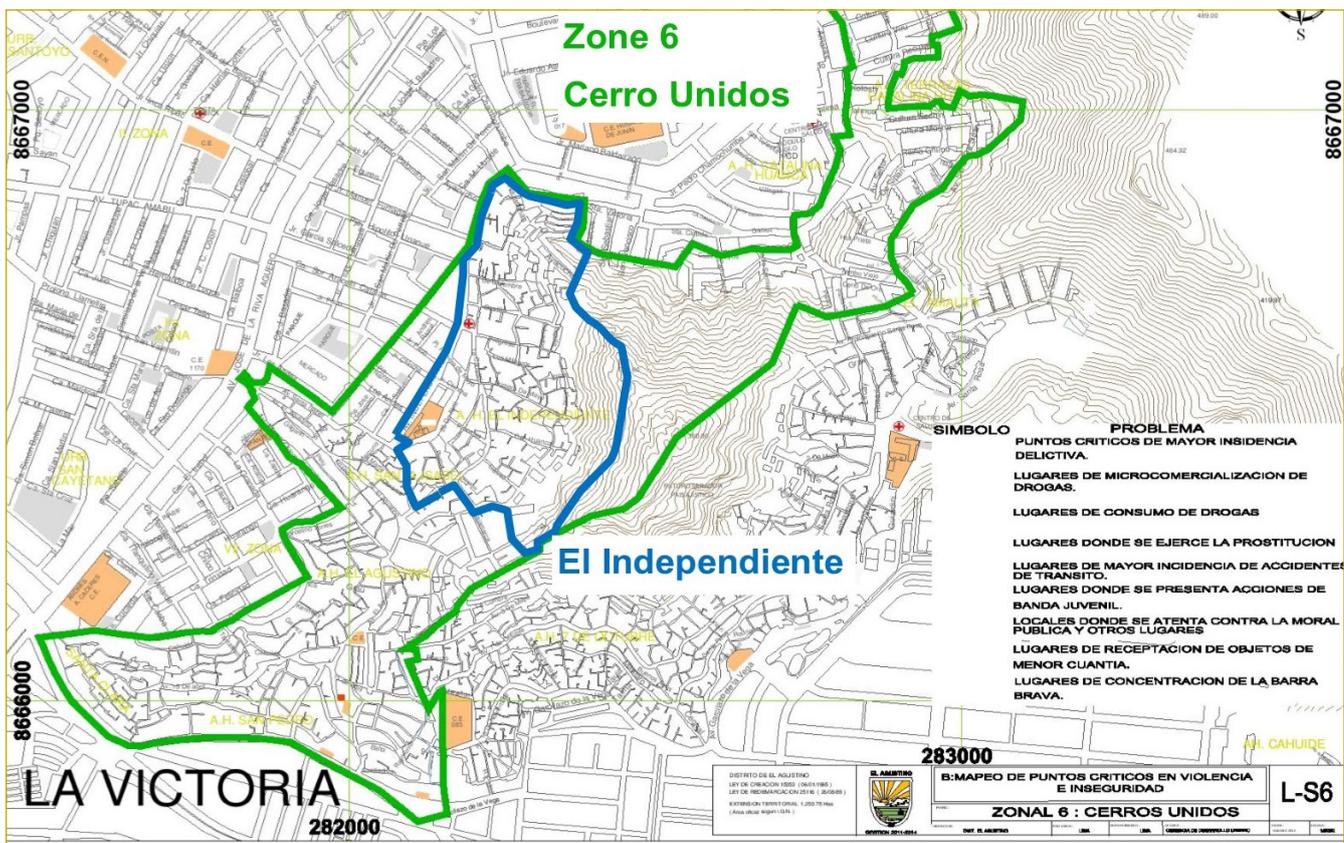


Image 1. Mapping exercise at focus group with children



Image 2. Red de Mujeres explaining their vulnerability and capacity mapping strategy



Image 3. Capacity and vulnerability mapping workshop

tlement and housing processes in El Agustino, as well as being a direct line of contact and communication with many actors for the purposes of interviews. The Junta Directiva, a locally elected group of community leaders, whom we met through SEA, were a critical source for canvassing public perception of risks, risk-coping mechanisms, and provided further local contacts. They acted as guides and provided a wealth of knowledge, given that they knew the area and people. They also played an important role in the mapping processes. Our research team also leveraged on the different lectures organized by the DPU held during the trip, grasping the opportunities to question and converse with guest speakers that had specialised knowledge. This enabled us better understand the differing perceptions of risk production and reproduction. Communication with guest lecturers from both public and private bodies including SEDAPAL further enabled us consolidate the fieldwork research with elements of information that would have been otherwise impossible to gather.

Post Lima

Upon returning to London, we critically analysed the changing assumptions before and during the fieldtrip. A number of assumptions were thus modified to reflect the reality of the situation and some new concepts and strategies were formulated. Throughout the entire research, the group kept a detailed and well-organised system of video clips, pictures and audio recordings, from which we created an audio-visual output of final research findings in an easily accessible format.

3.2 Limitations

As previously noted, the focus of our research was streamlined to one area in El Agustino, namely the hilly area of El Independiente. Consequently, some aspects of the broader perspective of El Agustino were lost. For

Image 4. Video screening night at Capilla

example, the data collected on factories and associated air pollution and health effects located near the riverbank and flat areas of the district was from a limited number of respondents (See Appendix 3 for interview with environmental promoters). Interviews and focus groups also suffered from selection bias, as respondents were contacted by community leaders, and our research team only had contact with those that showed interest rather than with a truly representative portion of El Independiente.

In order to gain the perspectives of as many individuals and organisations as possible, we interviewed various actors including random samples of residents, the Mayor of El Agustino, representatives at the WHO, UNDP, Environmental Promoters, GODISA, SEDAPAL, and the activist Carlos Franco Pacheco. However, a significant amount of data came from SEA and the Junta. Although the information was highly valuable to the research project, this may result in certain findings not necessarily being a reflection of the entire community. The “public events” such as the video screening also encountered some issues, as it was difficult to attract a wide variety of participants other than those directly involved and affected by the problems. An ideal approach to generating interest and boosting the number of participants would have included early and clear advertising of the events beforehand.

4. Key Findings

4.1 Everyday Risk in El Independiente

Our findings identified a number of everyday risks in El Independiente, including the risk of drug related violence and crime, domestic violence, the risk of contracting illnesses (especially TB), health risks from having insufficient water supply and injury from poor public infrastructure such as collapsed stairways or

Table 1. Risk Perceptions Matrix. Source: by the authors

Type of risk		Daily			Cumulative				Latent				
		Domestic Violence	Crime/Theft	Accidents (falling down stairs, road accidents)	Diseases (TB and HIV)	Poor sanitation/hygiene	Services cut-off (water)	Drug addiction	Isolation	Landslides and Earthquakes	Relocation	Spread of water borne diseases (Dengue due to poor sanitation/ improper storage of water)	Collapse of House
Community	Children		X	X		X		X	X				
	Youth		X	X	X		X	X	X				
	Women	X	X	X	X	X	X	X	X		X	X	X
	Leaders	X	X	X	X	X	X	X	X	X	X	X	X
NGO's and Professionals	SEA	X	X		X	X	X	X		X	X	X	X
	Ricardo Conde (Architect)			X						X	X		X
	WHO			X	X	X						X	
	UNDP		X							X			
Authorities	Municipality (Mayor Richard Sorio)	X	X		X	X	X	X		X		X	X

Figure 6. Categories of risks in EI Independiente. Source: Created by authors

Everyday risk (Risk acceptance)	The severity of the risk is not considered severe enough (either on its own or compared to other risks) which leads to people accepting the risk and not taking preventative measures
Cumulative risk	Risks that increase with each added risk (amplification of risk)
Latent risk	The present or potential risk but is not currently active

extremely narrow streets. These differed somewhat from what professionals and public bodies identified as main risks, usually focused on mostly large, one-off disasters, such as housing collapse from earthquakes. Moreover, perceptions on issues of everyday risk in EI Independiente varied amongst different groups within the community such as children, youth, women, and community leaders (See Appendix 4 for survey results). To enable us further understand the situation, we also categorized risks into daily, cumulative and latent, linking perceptions of risks to different actors (Table 1) (Figure 6).

This matrix afforded us a better understanding of the ways in which daily and cumulative risks were perceived within the community, including how mostly authorities and professionals perceived latent risks.

Illness and Health Risks

We identified that these types of risk were highly produced and reproduced institutionally and socially. For example, with regards to the problem of Tuberculosis (TB), patients were usually stigmatised by the rest of the community once it became known that they suffered from it. Hence, sufferers would rather conceal the fact that they had the disease than try to reduce their chance of infecting others or seeking medical help, as doing so would mean facing the possibility of being ostracized from the community. We also found that government attempts at eradicating the disease were insufficient due to a lack of follow-ups, which meant that most patient only followed their treatments half-way through, resulting in the prevalence of a drug resistant TB in the area (See Appendix 5). In addition, bad ventilation and overcrowding in housing constitute other factors that exacerbate the risk of TB in EI Agustino.

Risks of waterborne diseases are increased by the fact that people need to store water in water tanks or canisters. Of the 681 formalised lots within EI Independiente, only 49 who are located on the flat areas of the settlement have access to water for 12 hours in a day. This comes with a water meter and charges accordance with their water consumption. The remaining 632 lots, located on the hill have access to water for only 2 hours in the morning and 2 hours in the evening (Robles, 2015). Additionally, 100 lots exist, which have no land titles and thus have no access to water. These are located in the upper part

of the hill (Map 5, Figure 7). People therefore store water in order to have access to it throughout the day, but this can be a health hazard as it provides a breeding ground for the mosquitoes that transmit Dengue fever.

SEDAPAL justifies the insufficient water supplies by stating that water is a limited resource, which is expensive to install in informal settlements, especially in the hilly areas given that they require more technical resources and work (Alarcón et al., 2015). Moreover, SEDAPAL claims that the rest of Lima is currently heavily subsidizing the 4 hours of water per day supplied to the upper areas of El Independiente (Alarcón et al., 2015). In contrast to this, we discovered that these residents pay an average of 33 soles per month for 4 hours of water per day (Image 5), compared to whilst those living in richer districts such as Miraflores pay 25 soles for 24 hours of water supply (Image 6). During the fieldwork, some residents suggested that the residents of poorer settlements are in fact subsidizing richer resident's access to water (see Shadow Appendix 2).

In addition, even within El independiente, there is injustice in the price of water. Residents with only 4 hours access to water pay a fixed rate of around 33 soles per month. SEDAPAL water bills state that these households consume 500 litres per day. Whereas our findings reveal that the consumption is in fact lower than this, being about 80 litres per day (see Images 5 and 6).

Housing and Public Infrastructure

The risk of injury accruing from poor infrastructure, such as steep stairs (Image 7), seems to be attributable to a lack of coordination and knowledge about what is necessary and desirable amongst state actors at the municipal and city level, and residents. For example,

Figure 7. Percentage of Lots with Access to Water in El Independiente. Source: Created by the authors based on Robles (2015)

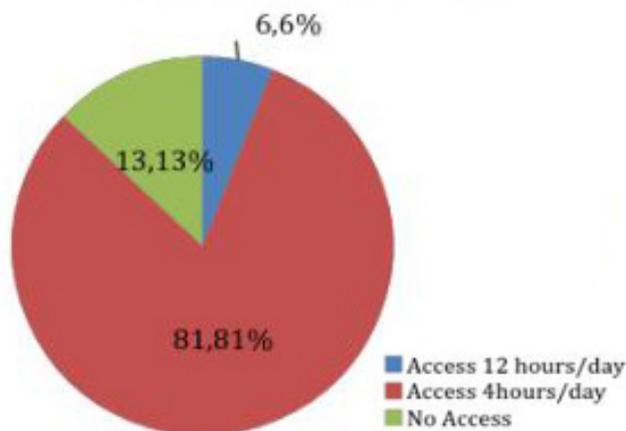
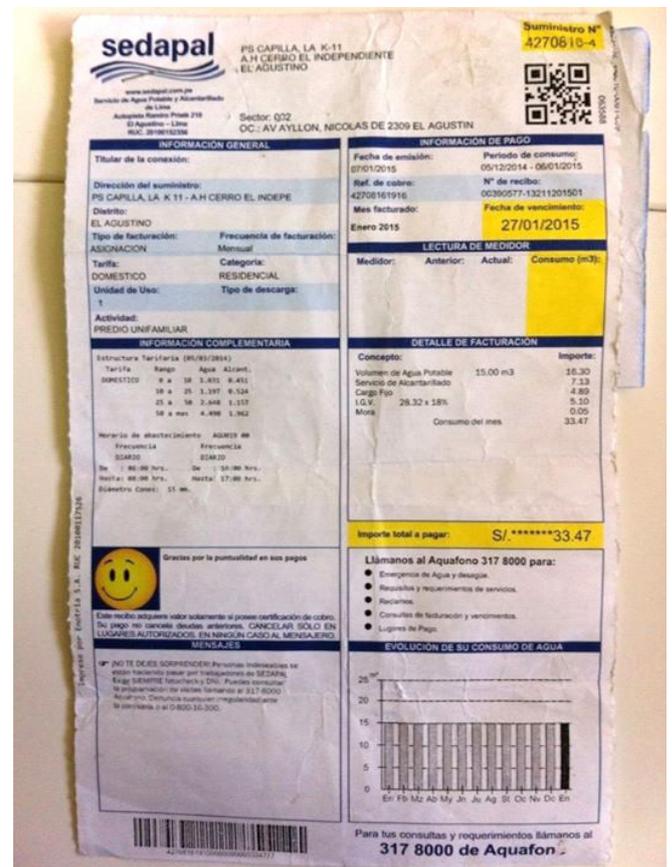


Image 5 and 6. Left SEDAPAL water bills in El Independiente (5) and right: in Miraflores (6). Source: SEDAPAL, 2015



whilst state actors seem to desire large scale development projects such as the mega housing project and cable car facility proposed under the previous mayor of El Agustino Victor Salcedo (Soria, 2015) (See fact file), findings showed that residents in fact wanted more lighting in streets and improved accessibility to areas in terms of widened roads and staircases. We also found that when these investment projects were eventually implemented, they were concentrated within the flatter areas of El Agustino, which therefore receives a majority of these services (see Appendix 7).

This accentuates social and physical inequalities between the top and bottom parts of the hill, which in turn reinforces the 'invisibility' of the people living on top of the hill.

In addition, housing collapse is a concern for some (Image 8). The government has invested in retention walls in several areas to safeguard against landslides and housing collapse; however, this coping mechanism is

Image 7. Risk of injury due to steep stairs and no lighting.
Source: by the authors



Image 8. Self-constructed house in El Independiente.
Source: by the authors



not sufficient as, a fundamental cause of houses collapsing is the quality of the housing itself. Instead of improving housing quality, the government rather opts to relocate victims of housing collapse as demonstrated by the Kuelap projects (see Appendix 6). Overcrowding, especially on the hilly area of El Agustino is an important factor, generating other risks, including health risks (such as TB), crime, and domestic violence due to the lack of personal space within the houses.

Crime and drug use

With only 34 police officers patrolling the entirety of El Agustino, many crimes go unpunished (Soria, 2015). Some areas, especially the upper parts of the hill in El Agustino, are regarded too dangerous for police officers to patrol. Residents reported that people often carry out robbery attacks within the vicinity of their residence. Immediate neighbours were usually not the targets, but rather residents living further up or further down the hill from them. This further demonstrates the lack of solidarity correlating with the different settlements times-frames of residents on the upper and lower levels. This insecurity has instigated an unwillingness to invest in home improvement, as whenever they do attain something of value, there is the risk of it being stolen. To most common motive for criminal activities was to fund drug addiction, this was especially visible amongst the youth. There is a linkage between the high crime rates, drug addiction and poor levels of education, with school drop-out rates amongst the youth being on the high (America Solidaria, 2011). Domestic violence is also prevalent as it is a by-product of a number of factors including overcrowding, drug use and alcoholism, stories of which have been shared by some residents with experience in these regards (See Shadow Appendixes 2 and 3).

Findings from vulnerability and capacity mapping

Map 6 shows levels of vulnerability in the entire El Independiente. As described in sections 4.13, the top of hill is an insecure zone due to drug consumption and a lack of water services. This map also demonstrates that even though the hazards and vulnerabilities we mapped (Image 9,10, and 11) were only limited to the area through which we walked during the transect walks, people were more at risk at the top of the hill than at the bottom. In addition, many informal settlements at the highest point on the hill are not officially mapped at all, indicating that the authorities do not recognize these informal settlements. Residents living there also do not possess a land title; making their tenure precarious.

The vulnerability and capacity mapping exercise, especially of Zone M in El Independiente, informed us not only of the hazards but also of the potential to overcome them by knowing the existing capacities of the residents (Fig-

ures 4 and 5). For example, the map shows little public and green space; however, it also shows the possibility of converting an abandoned lot to public space, using the knowledge and manpower of locals.

4.2 Current coping mechanisms by community and reproduction of risk

The communities in El Independiente have developed some coping mechanisms to reduce everyday risk. For example, water is stored in sealed tanks whenever possible to both save water and reduce the chance of spreading disease. A construction booklet provided by SEA gives instructions on how to build houses in a safer way. Parents attempt to keep their children at school for as long as is feasible for the family, and try to organise sporting and other events as often as possible to reduce the chance of the children engaging in drug or crime related activities. Finally, there are instances where public staircases have been built by the community themselves. Many of these coping mechanisms help residents deal with risk on a daily basis, but are largely insufficient for overcoming the entirety of risks in the area.

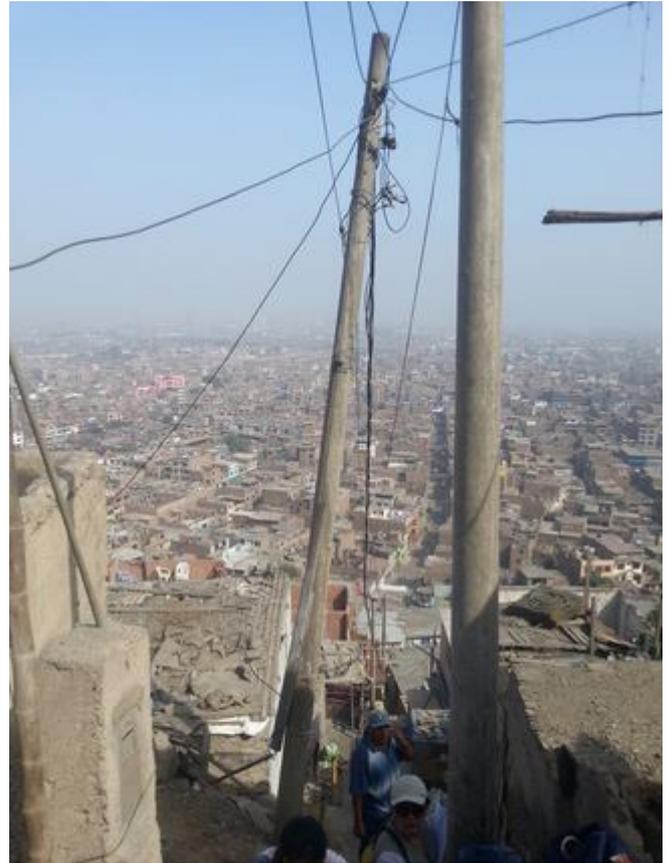
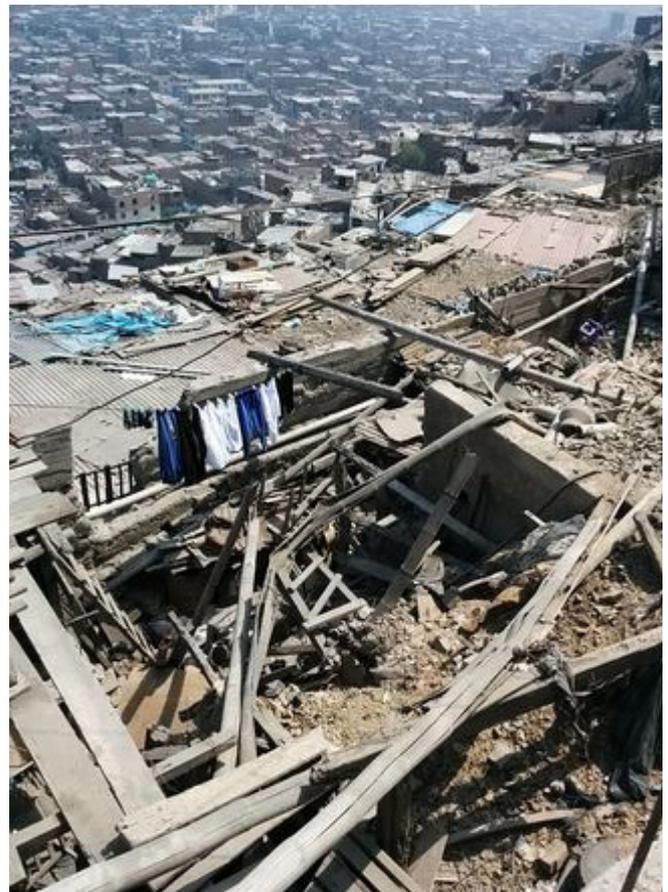


Image 9,10, 11. Left to right: (9) Broken sewage pipe (10) electricity pole at risk of falling (11) collapsed building. Source: by the authors



Map 6. Vulnerability map of El Independiente. Source: by the authors based on Municipalidad de El Agustino, 2008

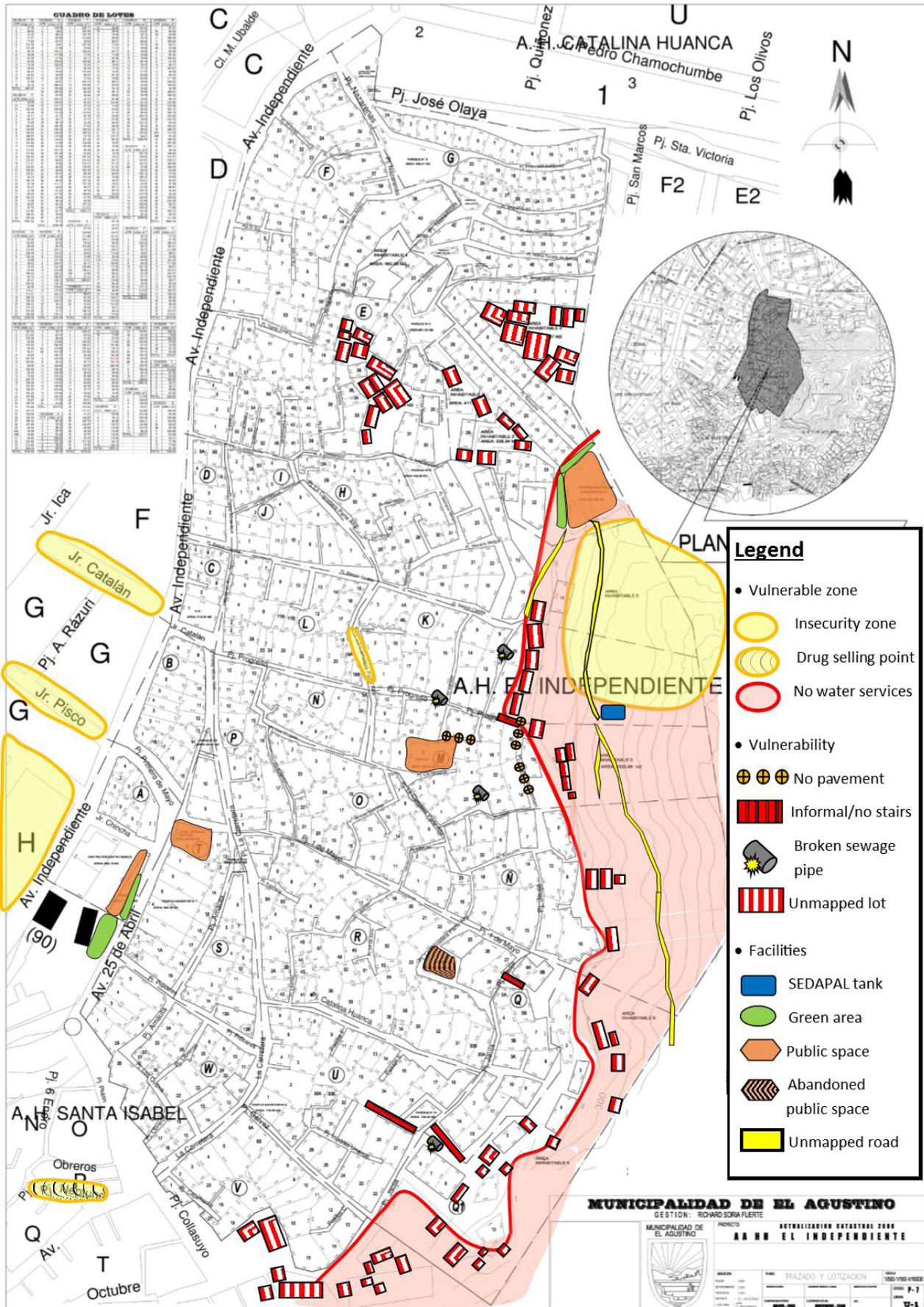


Figure 4. Vulnerability map of Zone M in El Independiente. Source: by the authors

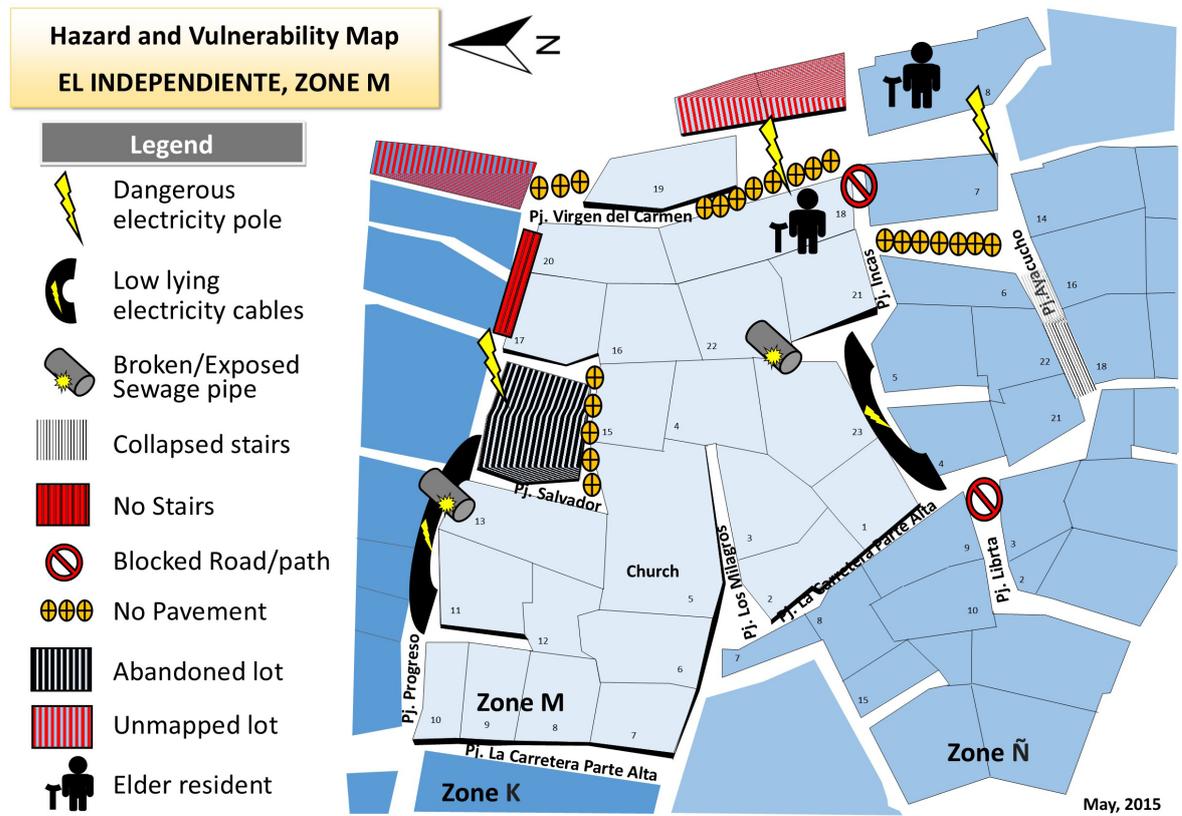
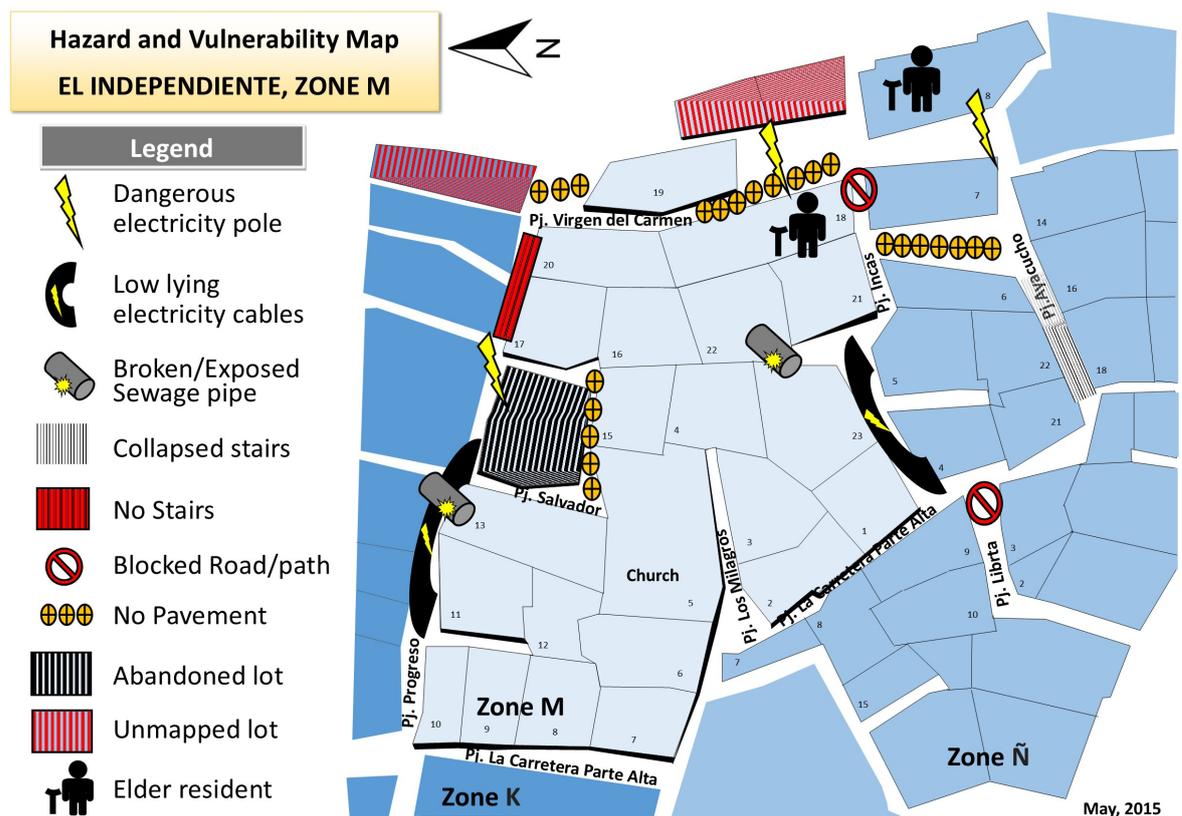


Figure 5. Capacity map of Zone M in El Independiente. Source: by the authors



One of the main obstacles to effectively reducing everyday risk in the area was the lack of a sense of community. In addition to different priorities regarding risks and issues, the original strong sense of community has fluctuated over time due to the breakdown in joint community and government initiatives such as the MI-ADES project, as well as mistrust between residents due to drug related issues and crime (See Figure 1 for historical change in sense of community). In addition, as people started to own and consolidate their own houses and properties, the frequency with which neighbours helped each other reduced and the community became more individualistic (see Appendix 8). Uneven living conditions between the bottom and the top part of the hill in terms of services, accessibility and quality of housing have all contributed to this low sense of community. Participation in community-led initiatives in the area today such as the Red de Mujeres women's group has also decreased over time and is less popular when compared with similar groups that had been active prior to the 90's. This, coupled with administered invisibility by the municipal and national governments (as well as government run organisations such as SEDAPAL), has led to a production and reproduction of everyday risk and social injustices amongst the population of El Agustino.

4.3 Applying the framework of EJ

Water justice

The production and reproduction of risks in El Independiente is a clear manifestation of environmental injustice. The issue of water, which serves as a causal factor for many health risks, clearly exemplifies unjust distribution, misrecognition, and lack of participation. Additionally, SEDAPAL's inaction on residents requests for meter system, 24 hour water access, and repair of water pipes buttresses this. Water is distributed unequally amongst residents of Metropolitan Lima in terms of quality, quantity, and price, with residents living in poorer districts being charged exorbitantly for limited services. This is despite the fact that hills in El Agustino are located close to SEDAPAL's water supply plant, La Atarjea.

Risks and EJ

Recognition

As demonstrated by the risk table (see Table 1), the misrecognition of residents' priorities, such as access to clean water and issues related to health and crime, is an obstacle to overcoming the everyday risks faced by the residents in El Agustino. Each actor has a different perception of the risks and key issues in the area.

Even in circumstances where actors have similar perceptions and priorities regarding risk, their modes of intervention are not complimentary. For example, the municipality perceives drug addiction as a risk in the area; however, they have not initiated any drug awareness programs, youth activities, or improvement in the quality of education – measures which the community consider necessary for reducing drug abuse. Therefore, misrecognition of risks and vulnerable groups constitute factors that produce and reproduce risks.

Distribution

In addition, the varying categorization of risks and modes of intervention reinforces the maldistribution of investments aimed at tackling risks (see Figure 8). The majority of governmental investments are targeted towards cumulative and latent risks that can impact the wider areas of El Agustino and Lima, such as TB and housing collapse, rather than towards everyday risk which occurs at the household and individual level, such as crime. Hence, given that everyday risk occurs on a daily basis, these risks become a part of the normal life for residents. This creates a situation of "risk acceptance", which further hinders the efforts of authorities and residents at overcoming risks.

Figure 8. Risk category and government interventions in El Agustino. Source: by the authors

Risk category and government intervention in El Agustino

	Everyday risk	Cumulative risk	Latent risk
Physical Risks	Accidents (falling off stairs etc.)	Poor sanitation/hygiene	Landslides
		Diseases including TB and HIV	Earthquakes
			Spread of water borne diseases e.g. Dengue due to poor sanitation/improper storage of water.
Social Risks	Crime	Drug addiction	Relocation
	Domestic violence	Isolation	
	Theft	Lack of guidance	
Government intervention		♦ Health centre ♦ Health Promotion	♦ Retention wall

Participation

The ideas of misrecognition and maldistribution further demonstrate that a participatory approach to risk prevention is lacking in the area. For example, the UNDP and environmental promoters tried to tackle air and water pollution, as well as the danger from landslides, by reforesting a large area along the Rio Rimac. This reforestation project around the riverbanks had also brought the added benefit of decreased crime rates in the area, since areas that were previously derelict and zones for criminal activity and drug abuse were transformed into areas of socialization and communal interaction. However, the finished project was severely compromised by the Metropolitan Lima authority, which destroyed half of the reforested area of the Parque Rio Rimac, in order to construct retention walls. This resulted in decreased enthusiasm and disillusionment amongst participants of the reforestation project, as well as instigated the return of drug addicts and traffickers to the area. This is an example of how community initiatives are undervalued and disregarded by the authorities, and how the lack of a participatory decision making processes on large scale projects can have damaging effects on the communities to which it is supposed to help.

Images 12 and 13. Water quality in El Independiente (12) and Miraflores (13). Source: by the authors

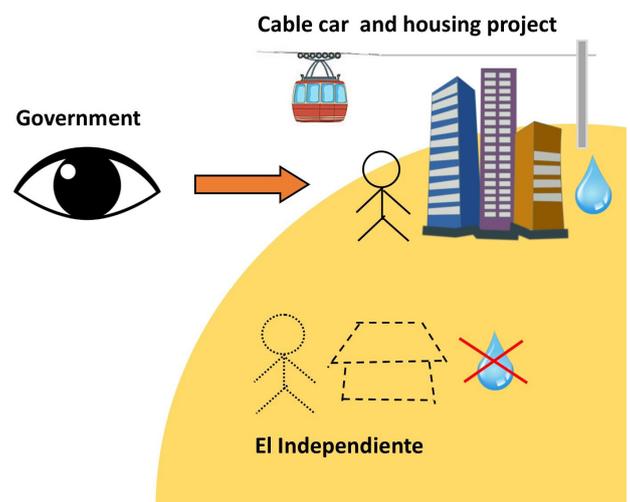


Nixon's concepts and EJ

Issues related to risks also fall under the domain of administered invisibility, slow violence and the disease of gigantism. While prior to the Fujimori regime, El Agustinos population could be regarded as more visible to the authorities, the current situation is one where the area and land itself is becoming increasingly desirable and visible to the authorities due to its strategic central location, yet the people living there have simultaneously become increasingly invisible (see Figure 9). Services are rudimentary or non-existent, and locally led initiatives lack the publicity and technical expertise to attract sustained attention from local and city authorities. Finally, the constant promises by the municipal and central authorities that services will arrive “next year”, means that motivation to fix infrastructure problems through civil society organisations are seem as unnecessary or even undesirable (despite the fact that these improvement promises have been made continuously for nearly 3 decades now) (Robles, 2015). When residents were asked why damaged infrastructure such as collapsed staircases continued to remain in those states, they responded by saying that they did not attempt to fix the infrastructure themselves as SEDAPAL had promised to undertake the construction in the following year as part of effort to install new water pipes. This again exemplifies a form of slow violence towards the residents.

The government has instead turned its focus on large scale development projects (Peru21, 2015), which can be seen as a form of slow violence towards the inhabitants (Nixon, 2011). As Nixon (2011:58) describes it: “communities, under the banner of development, are physically unsettled and imaginatively removed, evacuated from place and time and thus uncoupled from the idea of both a national future and a national memory”.

Figure 9. Applying the theoretical framework to El Independiente. Source: by the authors based on Nixon (2011)



Fact File: Cable car and housing project

In 2012 the district municipality and the Ministry of Housing, Construction and Sanitation developed a project to link the hills of the district of El Agustino via a cable car and a residential complex of 8 thousand apartments. These apartments were meant to benefit the low-income residents of its hills and terraces, with the goal of reducing the overcrowding prevalent in these areas (Andina, 2012). The mayor at the time, Salcedo intended that the project would contribute towards improving the quality of life of the residents of El Agustino by supplementing these apartments with infrastructure, leisure and green recreational areas, a police station, tourism development and access to newly built transport infrastructure in the city. A change in mayor however, meant that no aspect of the project has commenced to date, despite being given the legal go-ahead (See appendix 12 for details).

Images 14. 3D image of housing and cable car project



5. Strategies

5.1 Production of information

Following our diagnosis of risk in El Agustino, we have identified that community solidarity and visibility are our main entry points for designing effective strategies to diminish the community's everyday risks, whilst also shedding light on their living conditions towards ultimately attracting institutional attention. In order to increase vis-

ibility, rebuild the sense of community and strengthen the network between the residents, the strategies we have identified rely on the enhancement of community organisation initiatives (such as Red de Mujeres) through the production of information. This is significant because the act of producing information is in itself a form of collective action and an evidence of the level of organisation within the community. As process which could also culminate in a decreases in the levels of mistrust and lack of solidarity amongst the community. This strategy serves as a first step towards achieving EJ by as it involves an improvement in recognition of the community through increased visibility, distribution of resources and investment according to residents' needs and participation of the community in the necessary decision-making processes.

Collection of Evidence

The production of information involves the collection of evidence and creation of maps. Community residents and SEA will carry out the collection of evidence. This would involve collecting water bills, taking pictures and video footage of the issues, as well as documenting the stories of the residents, detailing the everyday risks they face. The purpose of this is to have tangible evidence of the risks and injustices being faced by residents of the area, which will enable them better attract attention from the wider public, governmental authorities, and other institutions. This evidence can also serve as their "voice". It would be a clear and graphic account of the risks and injustices the community has lived with for decades.

Capacity and Vulnerability Mapping

The maps created as part of the information production stage should include: a vulnerability map showing the risks to which the residents are exposed; and a capacity map showing which skills the residents can make use of in case of an emergency. As previously noted, this initiative is inspired by the methodologies of Red de Mujeres, who would therefore be a vital part of the strategy and would provide the expertise required the mapping exercises. Community leaders are to act as the entry point to each community in El Agustino and will promote residents participation throughout the mapping process. The residents themselves will participate by sharing their knowledge and insights about the conditions of their community and living environment, putting forth their skills and identify the vulnerabilities. The creation of these maps as part of the information production stage allows the community to accurately identify where the issues of concern are and what needs to be changed. This mapping will increase the community's visibility not only to the authorities at multiple levels (municipal, metropolitan, etc.), but also within the community, as they will be highlighting the vari-

ety of skills and potentials they possess as a group. This co-production of information will also improve community networks and trust by ensuring that existing civil society organisations are more familiar with each other's objectives and expertise. The timeframe for the production of information would be between 6 to 12 months, as it will involve detailed identification, prioritising, and organisation of all the risks and issues the actors want to focus on. This stage can be further developed on by organising and sharing the information produced at roundtable sessions with other institutional actors, in order to instigate their action. Hence, the production of information is a significant step towards increasing visibility and community sense. It is therefore vital for breaking the existing risk cycles in El Agustino.

Limitations

Given the potentials for the success of this strategy, some possible obstacles to its implementation could be: First, community participation may be an issue, as some residents may not be willing to collaborate. However, the possibility exists to reduce this limitation by utilizing community leaders as an entry point into communities and a body of influence towards increased resident participation. Second, there could be the possibility of biased presentation of gathered evidence. The individual biases of information collectors may influence the validity of evidences collected. Thus, certain bits of evidences may be accorded priority, highlighting some risks, issues, and stories whilst possibly ignoring others.

6. Conclusion

This research aimed at understanding the everyday risks faced by local residents in the hilly area of El Agustino, specifically El Independiente. This was achieved by analysing the problems in their historical context alongside the use of an informed conceptual framework. It embodies a strategy aimed at increasing visibility and recognition thereby allowing a platform for visualizing the perceptions of risks and injustices experienced by the residents of El Independiente.

6.1 El Agustino and Beyond

El Agustino demonstrates a case of rapid urbanisation in the Global South with a number of socially constructed risks, directly linked to the distribution of water and lack of other services to the area. We have identified that environmental injustices manifest in El Agustino through centralised approaches and institutional attitudes, which enforce the characteristics of slow violence and in turn hinders community coping mechanisms.

Owing to its central location in Lima, El Agustino exists as one of the first informal settlements in the city to become desirable for large scale redevelopment. As such, it is experiencing 'slow violence' as the city's commercial borders expand. Therefore, the happenings this area may be strong indicators of what may happen in the coming decades to other peripheral areas (such as José Carlos Mariategui) as the city develops further. Especially considering that, they too may develop into desirable yet neglected cities. El Agustino's condition is the product of a neoliberal approach of the Peruvian government and the urbanisation pressures of metropolitan Lima, which disregards the needs of vulnerable groups in poorer districts. Moreover, a maldistribution of investments exists, failing to meet the needs of those who require such investments the most and instead concentrating on development projects that respond to the needs of a future wave of wealthier residents.

However, sequel to our interview session with the newly elected mayor of El Agustino, there is some level of optimism and hope for a change. Richard Soria was elected mayor in December 2014. Being from the political party Peru Patria Segura he is eager to enact change in the district (See Appendix 11). In addition, the mayor's perception of risk in El Agustino and El Independiente in particular seems to align with that of the residents (Soria, 2015). It is essential that public and private bodies recognise and include residents in decision-making processes when tackling risks else, the underlying issues in El Agustino will continually remain unresolved

6.2 Recommendations for future study

In terms of developing flexible strategies that can be applied to other areas of the district and Lima as a whole, we recommend that subsequent research teams broadens the research area beyond just El Independiente to include other areas of El Agustino. Despite being left with little choice due to the limited time frame and details of work necessary, potential for expansion within the specifically targeted strategies from this research should be given consideration. This should involve, both expansion of theoretical knowledge and physical scope of implementation, as the perception of risk in El Agustino is linked to the historical, socio-economical, and spatial context of broader Metropolitan Lima.

We also recommend in depth research on the works of Red de Mujeres and Environmental Promoters since their works have over the years, proved significant beneficial to the local community. By looking in detail at their research methods and strategies, we can learn from their existing knowledge and perhaps suggest additional measures to strengthen their capacities.

References

- Andina (2012). Construir un conjunto habitacional de interés social en El Agustino. [online] Available at: <http://www.andina.com.pe/agencia/noticia-construiran-conjunto-habitacional-interes-social-el-agustino-440611.aspx>
- Alarcón, J.C; Pacheco, C.F. and Rodríguez, I. (2015). Sedapal and Water lecture. cLima Sin Riesgo. 30th April. Lima.
- America Solidaria (2011) *Safe spaces for children in Lima* [online] Available at: <http://www.americasolidaria.org/en/proyectos/abriendo-espacios-para-ninos-y-jovenes-en-lima/> [Accessed 04 June 2015].
- City Population.(2007). *El Agustino*. Available: <http://www.citypopulation.de/php/peru.php?cityid=150111>. [Accessed 4/06/2015]
- Collier, D.(1976) *Squatters and Oligarchs, Authoritarian Rule and Policy Change in Peru*, John Hopkins University Press, London.
- Lobo, S. (1981) *'A House of My Own: Social Organization in the Squatter Settlements of Lima, Peru'*. University of Arizona Press.
- Matos Mar, J (1977). *Las barriadas de Lima, 1957*. Lima: Instituto de Estudios Peruanos.
- Matos Mar, J (1968). *Urbanización y barriadas en América del Sur (Serie Urbanización, migraciones y cambios en la sociedad peruano)*. Lima.
- Melendez, Y. (2015) Interview. 30th April. Lima
- Nixon, R. (2011). *Slow Violence, Neoliberalism, and the Environmental Picaresque. Slow Violence and the Environmentalism of the Poor*. pp.46-67.
- Nixon, R. (2011). *Unimagined communities: Megadams, Monumental Modernity, and Developmental Refugees. Slow Violence and the Environmentalism of the Poor*. pp.151-174.
- PAHO (2014) More than 190 thousand residents of El Agustino will benefit the Centre for Prevention and Health Promotion [Online] WHO. Available at: http://www.paho.org/per/index.php?option=com_content&view=article&id=2638%3Aamas-190-mil-pobladores-agustino-beneficiados-centro-prevencion-promocion-salud&Itemid=900 [Accessed 31/3/2015]
- Peru21. (2013). *Construcción de Teleférico de Lima se inicia en tres meses*. Available: <http://peru21.pe/opinion/construccion-teleferico-lima-se-inicia-tres-meses-2133252>. [Accessed 4/06/2015].
- Robles, C. (2015) Interview. 10th May. Lima
- Schonwalder, G. (1998) 'Local Politics and the Peruvian Left: The Case of El Agustino.', *Latin American Research Review*, 33 (2) pp.73-102
- SEDAPAL. (2010). *Anuario Estadístico 2009*. Gerencia de Desarrollo e Investigación, Equipo Planeamiento Operativo y Financiero; Lima, 11.03.2010.
- Somers, S. Svara, J. (2009) 'Assessing and Managing Environmental Risk: Connecting Local Government Management with Emergency Management'. *Public Administration Review*, (1) 2. 181-193.
- Soria, R. (2015). Interview. 6th May. Lima.
- Wiley L. (2006) *Ciudad y patrones de asentamiento. Estructura urbana y tipologización para el caso de Lima*. *Revista eura* (Vol. XXXII, No 95), pp. 37-59.
- Young, I.M. (1990). *Justice and the Politics of Difference*. Princeton University Press

Appendices

Appendix 1. Focus groups

The purpose of the focus groups was to collect information from the residents in order to gain a better understanding of the living conditions in El Agustino from a resident perspective.

Focus group with women

Note

One man was present during the women's focus group, which may have affected the conversation and prevent some women from talking about certain topics.

Residents reported that 20 years ago, El Agustino used to have better living conditions as well as more solidarity between the neighbours; however, the situation has deteriorated over time.

One of the issues reported several time is the absence of parents from home because of work. The children are left alone, which creates an environment prone to school dropout, crime, drugs, etc.

Housing

The newcomers of El Agustino settle in the areas located on the hills, and are not represented on maps. The new houses are built with poor quality materials, which exacerbate physical risk.

During the elections, the municipality gives land titles to people who have settled on the hills, in order to get votes and expand political influence. However, these certificates do not give access to basic services, as are not recognised by organisations such as SEDAPAL. The Junta Directiva is aware of this issue.

Services - Water and electricity

Newcomers that have settled on the hills and are not reported on maps have no access to basic services such as water and electricity, nor accessibility infrastructures such as concrete stairs.

Electricity prices range from 10 to 60 soles per month. Neighbours have arranged in order to buy and sell electricity to each other, as some residents are connected to the service and others are not. However, this creates further financial pressure on the residents buying electricity from their neighbours, as the latter often charge prices higher than should be.

The SEDAPAL charge for water varies between 36 and 70 soles per month, depending on the location of the household: charges tend to increase when water is serviced up the hill. Water bills are fixed, yet the water supply is not continuous (average of 2 hours of water per day) with some regular interruptions. A resident reported that SEDAPAL sometimes overcharges water consumption, without explanation. If a complaint is made, SEDAPAL tends to cut the water service, which creates further difficulties for the residents to keep up with payments.

Regarding storage, residents tend to collect water in buckets during the daily hours of water service. Some residents reported that water fetching activities is a daily task, especially for the residents living up the hills.

Water is a health issue in the sense that it is stored in containers and attracts mosquitoes, which in turn is enhancing the growing case of Dengue fever.

Drugs, violence and crime

Drug addiction is a current problem of El Agustino, as the proportion of drug addicts and drug dealers is reported to be high by the residents. This is also fostered by the absence of supportive programs for social change, rehabilitation of users and low levels of police surveillance.

Some residents reported that drug addicts rob target and rob neighborhoods different from theirs, in order to keep up their drug addiction. This is especially the case in the hilly area, where street lighting is minimal and is therefore more prone to crime.

A woman from Arequipa reported a personal story during the focus group: her daughter's boyfriend was a drug addict who was beating and threatening to kill the daughter and she, the mother. The mother therefore wanted to send her daughter away in order to protect her, but could not do so because of lack of resources. She is today unsure of where her daughter is, and fears that she may have fallen into drugs too.

Another lady named Quina also reported a case of domestic violence, as she used to live with an abusive husband. However, she managed to separate from him by hiding for 5 years, thanks to the help of some friends.

b. Focus group with children

Note:

The focus group reunited about 15 children. 9 of them have both parents working. 9 of them live in the hill and wish they lived in the flat area. 8 children report being

happy about their living conditions, despite mentioning many issues. One girl told that she fell down the stairs which damaged her brain, impairing her ability to communicate, learn and follow through with classes in school.

School and Education

The children mentioned two schools, but they were not indicated on the map. This may be because these schools may be located in another district that our map did not include.

Children usually go to school till the age of 15, at which point they often drop out. This is because they do not study the requisite subjects for that stage of their education. School hours run from 7-8 am to 3 pm.

Recreational spaces

Girls in the focus group reported that they do not have proper access to playing spaces. Therefore, they often played in front of their houses, or in parks, located quite far, distance of which prevented them from going there frequently. Although they regret the lack of recreational spaces, the children reported that they feel comfortable and safe playing in the narrow staircases and paths of El Agustino, as opposed to road where they can be harmed by vehicles (Mototaxis, cars, etc.)

Drugs, theft, violence, and crime

The children mentioned that robberies and mug attacks happen quite often, at any time of the day. They also highlighted the existence of the Cueva de Catalina Huanca, a cave where drug addicts reunite to do drugs. The children reported that they sometimes prefer to remain indoors, especially at night, in order to avoid violence.

Hopes and wishes

The children especially mentioned that they would like to have more parks (7 children) and more trees (9 children). All of them would like to have electricity and public lighting, as they associate the presence of robbers with the lack of light at night. One child mentioned that he would like to live in the flat part of El Agustino.

In the future, they aspire to be teachers, priests, veterinarians, humanitarian workers, police officers, and doctors.

c. Focus group with youth

Jonathan 23: does not work, takes care of the house. Work makes him tired and his father works for him.

Rolan 21: has to go out daily to source for work. He has a wife and a daughter.

Kevin 19: works in a textile company, wakes up at 6

Victor Hugo

Angelo Jesus 12: Does not work but goes to school. He finishes the class at 11 in the morning, he does not know what he wants to do yet, but he definitely wants to study.

Girl: She attends high school and wants to get university education in order to become a police officer later.

They have 2 hours of water per day, which is not potable. Someone from SEDAPAL comes every day to open and close the tap from the tank.

When we asked them who suffers the most from the lack of water they reply that all the families do. They keep water in some small tanks in their houses until the next scheduled time for water access. It is a daily routine to fill in the tanks.

They all have a toilet and sewage system.

Delinquency:

It can be encountered everywhere, not only in the cave above the hill of El Agustino. They are used to living with it, as such, is no place they particularly avoid in El Agustino, and they just make sure to be careful. They have friends doing drugs, and they say that it is very addictive: if someone starts, it is very likely that it will continue over time, not necessarily everyday (although some of them do), but on a regularly basis. They are of the opinion that the more the drug users take drugs, the more they steal.

Cocaine and marijuana are expensive, therefore they do paco (pasta de cocaine), which constitutes of a mix of kerosene, various solvents and residues from cocaine. It is highly addictive, a dose costs about 1 or 2 soles, compared to 10 soles for a dose of cocaine. The people doing drugs are not only from El Agustino but come from all over the place.

Which areas have value to you?

Areas where we can gather, where we can play (La Capilla San Salvador for example). There are a few recreational areas (although not many), but some of them are far, and if they do not have one close by, they do not necessarily go to the other recreational areas because the district is segregated: "cada una su zona" (each person their own zone). It is a question of trust. Down the hill, they do not really use the communal local. They avoid the Catalan and the Pisco streets down the hill because there are "pandillas" (gangs).

Future:

Jonathan wants a normal and calm future. But then, he says that if you do not work for your future, you can't have a future. For now he takes care of his house while his parents work (father for sure, not sure about the mum).

They say they want to study, succeed in life, and learn a job. One of them wants to work in engineering systems and the other in business. One of them says he can see himself living in El Agustino for the rest of his life. One of them says that his dad did not take great opportunities in life and that he does not want to reproduce the same thing. He wants to be a good person in life. The girl wants to be police officers because of the growing occurrence of delinquency in El Agustino. She feels insecure in the area.

How do you imagine El Agustino in 20 years?

One says that it may be worse as; if no actions are taken, things will intensify- "there is a lot of corruption, and you cannot achieve anything things will stay the same".

What is lacking according to you in El Agustino?

We are lacking security, and they say that it depends on the "pueblo", but they also say that they do not talk with the neighbours. It is a dilemma because if they want more security, they need to unite with the neighbours for coordinated action, but they do not trust the neighbours.

What are you scared of?

One says that he is scared of death, because he does not know how it will be like. They also say that they fear the lack of security, because there is no one guarding the streets. They are scared about not having money for the family (especially the one who has a daughter and a wife). TB is also a concern, although they say that they have the 'posta'. They do not know anyone with TB, but the people who have TB recognise each other because they meet at the 'posta'.

Image 1 and 2. Focus group with youth. Source: by the authors



Appendix 2. Fieldwork Activities

Date	Activity	Actor	Purpose
Thursday 30th April 2015	Interviews	Yomar Melendez	The purpose of these interviews were to identify the different perceptions of risk
		Ricardo Conde	
		Junta Directiva El Independiente	
Sunday 3rd May 2015	Focus Groups	Kids	The purpose of these focus groups was to identify risks specially
		Youth	
		Adults	
	Transect Walk		The purpose of these transect walk was to map vulnerabilities
Tuesday 5th May 2015	Interviews	GODISA	The purpose of these interviews were to identify the different perceptions of risk
		Red de Mujeres	
Thursday 7th May 2015	Interview	Mayor of El Agustino	The purpose of this interview was to have a better insight of the dynamics of the district
	Transect Walk		The purpose of these transect walk was to map capacities
Friday 8th of May 2015	Interview	WHO/PAHO	The purpose of this interview was to identify the different perceptions of risk
	Workshop	Community El Independiente	The purpose of this workshop was to identify risk in the map and discuss about possible solutions to overcome risk
Saturday 9th May 2015	Interview	Junta Directiva El Independiente	The purpose of this interview was to find out the perception about community sense
	Community shared Pachamanca	Community El Independiente	The community shared with us their traditional food called Pachamanca
	Movie Night Inside Out	Community El Independiente	As part of our devolution day we shared videos of the work we have done in the community and part of our research and encouraged reclamation of community activity

Appendix 3: Interview UNDP and environmental promoters near Rimac River

Date: 11 May 2015

Interviewee: UNDP and environmental promoters

UNDP gives funding ONLY to civil society organisations.

- The forestation in the river bank of EA, have 30 environmental promoters (all women) who joined the UNDP after leaving their respective NGOs. These promoters had official training regarding the environment and had the skills to train other potential environmental promoters.
- This project aims to mitigate risk of pollution. They have planted tara trees. They form a micro-enterprise to sell compost. This project was based on ancestral knowledge and also technical expertise. The UNDP built swamps to make sure the water was less polluted. With the creation of swamps, they attracted fish, which means it is a sign that this system is working effectively.
- Before this project, the land was a dumping site and was not tree-friendly. They had to treat the land first to plant trees. The water they were using at first was so polluted that it was killing all the trees.
- Many of the women got skin diseases, stomach issues and respiratory diseases from the water. The benefit of the project is the increase of green spaces, to decrease crime rate and to mitigate risk
- This project does not include any local NGO's like SEA, as this is a project funded by UNDP, which only works with civil society organisations. The environmentalists either work with UNDP or local NGOs but never both.
- The Parque Rio Rimac project destroyed half of the land that was reforested. The current Mayor said he will allocate land for reforestation, but this has not happened yet. They have received little collaboration from the community and the leader, which is why the project is not as successful as initially intended.
- They wanted to reforest the hill to mitigate risk but, once again, they don't have support from the community and the provision for water for irrigation is more complicated
- They believe this project can be replicated in other areas without any problems but for this to happen they need community participation and collaboration.
- They are planning to increase environmental knowledge for kids to make them more aware and want to build an environmental center where children can learn more about this issue.

- Environmental promoters said they have capacity to do plantation on the hill area as well.

Image 3 and 4. Environmental promoters and their activities. Source: Environmental promoters, 2011



Appendix 4. Surveys: questionnaire and results

During our fieldwork, we conducted quantitative surveys to analyse different perception of risks. We asked participants to rank the importance of risks from 1 to 10. We conducted with three groups at two focus group sessions as well as in our interview session with la Junta Directiva and 5 individuals. The results are analysed separately.

Results of the the survey according to the different groups: Adults, Youth and Junta Directiva

Figure 2 represents the different issues related to risk as recognised by the residents of El Independiente. This is a mix of risks itself and factors that contribute to those risks.

- For the groups, we interviewed adults (but only one person participated which is not very relevant), youth and the members of the Junta. Perceptions of risks varied a lot. Illumination and health though seemed to most prominent issue. The Junta is more concerned about the tenure and economic insecurity compared to other respondents who

Figure 1. Survey format

Ejercicio sobre riesgos

1. Por favor, podría clasificar cuáles piensa que son los mayores problemas en El Agustino (del 1 al 10 en orden de prioridad) :

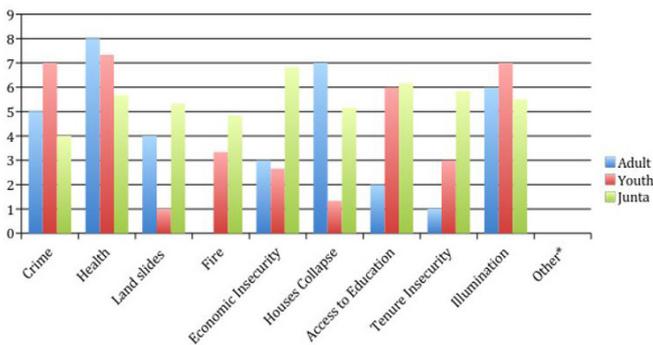
	Clasificación	Mejoró?	Empeoró?	Sin cambios?
a. Crimen				
b. Salud				
c. Deslizamientos de tierra				
d. Incendios				
e. Inseguridad económica				
f. Colapso vivienda				
g. Falta de acceso a la educación				
h. Inseguridad en la tenencia de la tierra				
i. Iluminación en las calles				

2. ¿Existen otros riesgos que no estén mencionados?

3. ¿Cuánta ayuda han recibido?

1 2 3 4 5 6 7 8 9 10
 Poca Mucha

Figure 2. Survey results



were more concerned about crime. The youth do not feel threatened by landslides and house collapse unlike the adults and Junta.

Limitations:

- The surveys have not always been understood the same way and therefore the results might not be as accurate. Some people graded the risks rather than of ranking them.
- Size of the groups were different and not proportionate

Appendix 5. Tuberculosis stigmatization and interventions

On the 12th of March 2014 under the East Lima Health Department, El Agustino became the recipient of a targeted district level health reform (GODISA). The ‘Centre for Prevention and Health Promotion’ was the result of a joint project between the Department of Health (DISA) and the local government, and comprised of seven strategic lines of health care:

- TB Zero plan for tuberculosis and HIV
- Growing with you Agustino (growth and development of child and maternal health)
- Mental Health
- Cancer and Non-communicable Diseases
- Environmental Health (Dengue Prevention)
- GAMEDIC (Guarantee of access to medicines)
- Human Capabilities in Health (Training of Health Personnel)

In addition, the programme was broken down into ‘comprehensive programme areas with itinerant health networks and a universal insurance office including social welfare, designed to protect the welfare of El Agustino residents with comprehensive health care quality whilst strengthening the prevention and control of tuberculosis; the priority disease in Lima’ (PAHO, 2014).

Preceding this was a TB health awareness initiative launched on the 21st of February 2014, supported again by PAHO and the WHO, aimed at coordinating with local authorities to provide education to communities. This resulted in an information fair at a local community center in February 2014 on how to prevent the spread of TB. Directly involved in the event were El Agustino’s mayor as well as the WHO and PAHO director generals.

The specific nature of this programme was an overdue acknowledgement on the part of the national government that tuberculosis in El Agustino was a severe problem, the area experiencing the highest rate in all of Peru (PAHO, 2014). The reason for this is largely circumstantial, with TB described as a social disease, with poverty and malnutrition greatly increasing the chance of catching and spreading the illness. Moreover, a lack of green spaces and high levels of pollution, as well as poor education constitute factors, which worsen the situation and are present in El Agustino. To compound this, the multidrug resistant (MDR) form of TB is on the increase in the area, meaning that sustained treatment over a period of two years rather than

six months is required for recovery. There are however designated health outreach workers assigned to visit those suffering from TB in their homes to try to ensure the first full course of medication is completed so to avoid the onset of MDR TB (PAHO, 2014).

Despite the promise of these initiatives, they are largely viewed as having failed. Our experiences in the field backed up this perception; with many of the residents, we interviewed citing TB as one of the main problems in the area. Despite the resources available, mostly when people contract TB, they are too concerned about people knowing to seek help for fear of being stigmatised and excluded from their social network.

Appendix 6. Kuelap Project

Following the housing collapse of October 9th 2003, in which 30 houses collapsed due to poor quality construction on top of an old mining site, around 100 families were relocated to the temporary relocation camp, El Infiernillo. Many had little choice but to stay there for around 3-4 years, while they waited for the new replacement housing projects, Techo Propio (working class) and Mi Vivienda (middle class) to be completed in the La Polvora area. This was not straightforward however, as not only were the proposed flats smaller, given the constitutional regulation of 56 sqm per family, but also, these housing projects were being implemented at a national level, meaning that people from all over Peru could potentially buy them and migrate to Lima in their place. Partly because of this, many of the displaced residents did not wait for these projects to be completed and either independently relocated or returned to attempt to salvage their previously collapsed houses (Melendez, 2015).

Many others joined forces towards forming their own housing association, known as Kuelap, which now includes 180 families in total. The land occupied by these families had previously been the site of a textile factory, however following the donation of this land to Kuelap by the El Agustino municipal government, collaborations to conduct topographic and risk studies as well as a specific housing plan were developed by multiple actors including SEA, the incumbent mayor and the residents themselves. However, due to a reduction in the pace of the project, and a change of mayor, in recent times plans for building the requisite housing have stalled. This has led to Kuelap installing 80 watch posts on the land for fear of possible invasion by a different group (Melendez, 2015). In response to this, the municipality has stated that 15 is the maximum number of watch posts officially allowed within a given land area, and consequently view Kuelaps excesses as an illegal land invasion. Tension now abounds between leaders of Kuelap and the municipality, with differing views on how the land should be

used. This has also fueled accusations of land trafficking and lack of transparency in fund disbursement, directed at senior officials of Kuelap

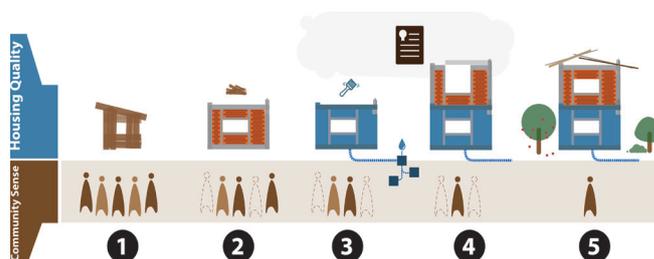
Image 5. Housings constructed in La Poblora. Source: by the authors



Appendix 7. Housing development in El Agustino and change in sense of community

Amongst the early settlers of El Agustino, the sense of community was high. This however gradually became more individualistic over time. Different stages of improvement of housing structure on the hill include: Step 1. Construction with wood, Step 2. Reinforcement with Cement and bricks, Step 3. Consolidation of housing, Step 4: Construction of additional stories upon solid foundations and Step 5: Creation of recreational spaces e.g. green areas. Water, electricity, and sewer services are usually installed during step 3 or 4 after the owners had obtained the certificate of possession (COP). In cases where they have received this or the relevant services, they have to buy the services from their neighbours at a higher price.

Figure 3. Relation between housing quality and community sense. Source: Created by the authors



Appendix 8. Housing quality difference in the top and the bottom of the hill

Figure 4. Housing quality difference in the top and the bottom of the hill. Source: Created by authors



As newcomers can settle in higher part of the hill, there is a gap in quality of housing and services, especially water, between the bottom and top of the hill. As the graphic demonstrates, housings of the bottom of the hill are thus more consolidated and high- raised, whilst houses on higher elevations are clustered within a particular area. Since El Agustinos' housing is self-constructed, it experiences high risk due to difficulty in obtaining certificate of possession, which might explain why only 80% of the houses on the hill have access to services.

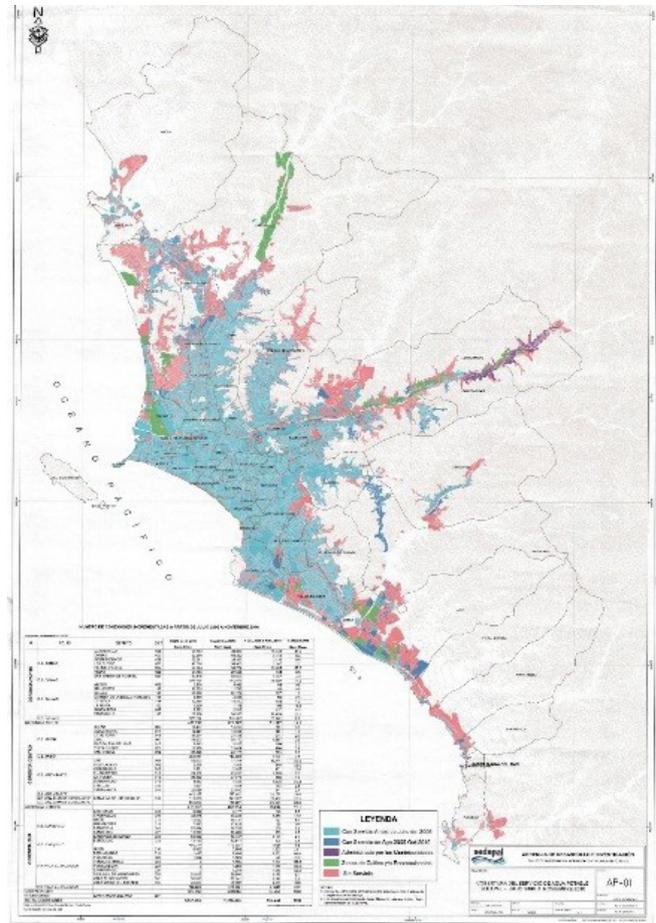
Appendix 9. Water analysis and strategies

As a part of strategies, we proposed the use of utilize water bills to make residents' voices heard. The following is an analysis regarding water bill strategy. The interviews held with la Junta Directiva de El Independiente in which water issues were discussed deepened our understanding and analysis about water access in El Agustino. Through these interviews, we have found that although SEDAPAL states that El Agustino has access to water 24 hours per day as is shown on the map below, it does not illustrate the limitations of this access. The realities of the water issues in the area are in fact far deeper than the map reveals.

The case of El Independiente will be used as an example of water access issues in the hill area of El Agustino. This settlement has 681 formalised lots (Robles, 2015), 49 of which have access to water 12 hours per day and are located on the flat area of the settlement. The remaining 632 lots that are located on the hill have access to water for only 4 hours per day (2 hours in the morning around 6am-8am and 2 hours in the evening). Because of the low quality of water, residents explained that they feel itchy after they bathe. Additionally, 100 lots have no land titles and receive no access to water. These are located in the upper part of the hill.

As can be seen in the chart above (Figure 7), only 6% of lots have access to water 12 hours a day, leaving 94% of lots with either limited access to bad quality water or no access

Figure 5 and 6. SEDAPAL's water coverage. Source: Sedapal, 2010



at all. In addition, the minority 6% that have 12 hours access have a water meter installed and are charged according to their water consumption, as are many other residents from the richer districts of Lima. This is an injustice especially considering that people who only have 4 hours access (81%) are required to pay a fixed rate. Both examples can see in the bills shown below.

Figure 7 and 8. SEDAPAL's Water Bill in El Independiente with fixed rate (8) in Miraflores with water meter (7). Source: SEDAPAL, 2015

sedapal PINASCO CARELLA ALFIO GIUSEPPE
CA DE LA FUENTE, JUAN 362
URB SAN ANTONIO
MIRAFLORES

Suministro N° 2543281-6

www.sedapal.com.pe
Servicio de Agua Potable y Alcantarillado de Lima
Autopista Barrío Prieta 210
El Agustino - Lima
RUC: 20100132338

Sector: 057
OC.: AV ANGAMOS ESTE 1450 SURQUILLO LIMA

INFORMACIÓN GENERAL
Titular de la conexión: PINASCO CARELLA ALFIO GIUSEPPE
Dirección del suministro: CA DE LA FUENTE, JUAN 362 - URB SAN ANTONIO
Distrito: MIRAFLORES
Tipo de facturación: Frecuencia de facturación: Mensual
Tarifa: DOMESTICO
Unidad de Uso: 1
Actividad: PREDIO UNIFAMILIAR

INFORMACIÓN DE PAGO
Fecha de emisión: 04/05/2015
Período de consumo: 04/04/2015 - 02/05/2015
Ref. de cobro: 25432812029
N° de recibo: 06131286-14111201505
Mes facturado: Mayo 2015
Fecha de vencimiento: 28/05/2015

LECTURA DE MEDIDOR
Medidor: E211051309
Anterior: 644
Actual: 655
Consumo (m3): 11

DETALLE DE FACTURACIÓN
Concepto: Volumen de Agua Potable 11.00 m3 11.51
Servicio de Alcantarillado 5.03
Cargo Fijo 4.89
I.G.V. 21.43 x 18% 3.86
Consumo del mes 25.29

Importe total a pagar: S/ *****25.29

EVOLUCIÓN DE SU CONSUMO DE AGUA

Este recibo será cargado en su Cuenta Bancaria

Gracias por la puntualidad en sus pagos

Este recibo adquiere valor solamente si posee certificación de cobro. Su pago no cancela deudas anteriores. CANCELAR SÓLO EN LUGARES AUTORIZADOS. EN NINGUN CASO AL MENSAJERO.

MENSAJES
MEDIDA EXACTA, PAGO JUSTO: El medidor de agua nos hace conocer con precisión la cantidad de agua que utilizamos, mide nuestros consumos y nos hace pagar lo justo. Aceptar dos recortes de agua origina la desactivación del sistema de cargo en cuenta. Si no está de acuerdo con el monto a debitarse, puede suspenderlo llamando al banco o al 17-3422 Sedapal. Pagar día hábil antes del vencimiento.

In El independiente, residents that have limited access pay around 33 soles per month, while residents with 12 or 24 hours access pay around 25 soles per month. Using this evidence, we can argue that those that have limited access to water are being charged unfairly for a bad quality service. Moreover, those with no access to water face further issues. People are denied access to water because they are supposedly living in an area deemed either unattainable or too risky to receive land titles and services, and hence these people struggle to survive. One of the mechanisms they use in order to get water is to buy it from neighbours that charge them at an accessible rate.

Finally, it is of note that in some cases more than one family resides in one lot of land, therefore the number of people facing water supply issues in El Independiente is highly significant and should be taken into consideration by the institutional authorities.

Appendix 10. Data for water analysis:

Following findings from our interview sessions with la Junta Directiva "There are 700 lots with titles. From these, around 650 have access 3 to 4 hours per day, while 50 have access 12 hours/day" actually the people even claim that when they are supposed to receive access to water 24 hours a day they in reality only receive 12, basically during the day. Water is supplied when a SEDAPAL officer come to the SEDAPAL tank on top of the hill to open the tap every morning and evening for 2 hours each and he comes to close it after 2 hours.

This indicates that facility capacity is sufficient to supply 24 hours water in the area; however, SEDAPAL refuses to do so with excuses of financial difficulty. La Junta Directiva also explained, "There are 100 lots with no certificate of possession and land title, without any access to water" such as the case of Maria Elena a resident who needs to store water in buckets. In order to gain water access, obtaining the certificate of possession is required; however, it does not guarantee that the residents can obtain water as infrastructure installation may take time.

Suggesting that we stick to the official number of formalised lots (681, according to what our Partner communicated to us) and keep the proportion that the Junta Directiva suggests, would mean that 681 lots have access to water 12 hours a day while 49 have no access at all in the area of El Independiente. With respect to the lots without title, their information could be more real/updated than the official one, since they live there. This means 100 lots without any form of access.

We now can do some numerical assumptions, supposing that those 632 lots are paying what is indicated in Jorge's bill from SEDAPAL - the fixed amount in soles for a supposed 15m3/month supply, which is obviously not

sedapal PS CAPILLA LA K-11
A.H CERRO EL INDEPENDIENTE
EL AGUSTINO

Suministro N° 4270619-4

www.sedapal.com.pe
Servicio de Agua Potable y Alcantarillado de Lima
Autopista Barrío Prieta 210
El Agustino - Lima
RUC: 20100132338

Sector: 022
OC.: AV AYLLON, NICOLAS DE 2309 EL AGUSTIN

INFORMACIÓN GENERAL
Titular de la conexión: PS CAPILLA LA K-11 - A.H CERRO EL INDEPE
Dirección del suministro: EL AGUSTINO
Distrito: EL AGUSTINO
Tipo de facturación: ASIGNACION
Frecuencia de facturación: Mensual
Tarifa: DOMESTICO
Unidad de Uso: 1
Actividad: PREDIO UNIFAMILIAR

INFORMACIÓN DE PAGO
Fecha de emisión: 07/01/2015
Período de consumo: 06/12/2014 - 06/01/2015
Ref. de cobro: 42706191916
N° de recibo: 00360577-13211201501
Mes facturado: Enero 2015
Fecha de vencimiento: 27/01/2015

LECTURA DE MEDIDOR
Medidor: Anterior: Actual: Consumo (m3):
Consumo del mes: 33.47

DETALLE DE FACTURACIÓN
Concepto: Volumen de Agua Potable 15.00 m3 16.30
Servicio de Alcantarillado 7.13
Cargo Fijo 4.89
I.G.V. 25.32 x 18% 4.56
Consumo del mes 33.47

Importe total a pagar: S/ *****33.47

EVOLUCIÓN DE SU CONSUMO DE AGUA

Gracias por la puntualidad en sus pagos

Este recibo adquiere valor solamente si posee certificación de cobro. Su pago no cancela deudas anteriores. CANCELAR SÓLO EN LUGARES AUTORIZADOS. EN NINGUN CASO AL MENSAJERO.

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Para las consultas y requerimientos llámanos al 317 8000 de Aquafon

the right amount of water written on the bill, as this would mean the people would be using 500 litres in 4 hours with very often, low pressure.

The water bill from Miraflores indicates that they consume 11m³/month, which means that the household uses 354 litres per day with 24 hours connection. Even if residents in El Independiente uses water tanks to store water two times a day, it is impossible to store 500 litres and use up all that water everyday due to limited capacity of water tanks and

Image 6 and 7. Water tanks at a household in El Independiente. Source: by the authors



their lifestyle (Image below). Even if, they use 80 litres per day, which is equivalent to 5 soles of water per month. This means that residents pay extra 28 soles for 420 litres of water, which they never use. As residents claimed, if the fixed water system lasted for 30 years, each household has paid 10,080 soles extra. If it applies to all 632 households, 6,370,560 soles extra was paid to SEDAPAL by the community.

We then wonder why SEDAPAL cannot use this money to install water meter systems towards making 24 hours connection available to the community. These numbers are an example of how evidences can be used to exemplify water injustices in Lima.

Appendix 11. Interview with Mayor of El Agustino, Richard Soria

Date: 6 May 2015

Interviewee: Mayor of El Agustino Richard Soria

*Started in his position in December 2014, lives near El Independiente.

Question's topic: access to water and sanitation

Mayor's answer: Water is a fundamental right, now the upper area has 2 hours service and in the lower area have 24 hours service.

There was a water system renovation project (Proyecto Integral SEDAPAL) in the upper area that started 8 years ago but was put on hold due to political reasons; however, this municipality is working to continue with this project.

Question's topic: water prices

Mayor's answer: the average water bill 34 soles.

SEDAPAL established a fixed rate for the upper areas since they do not have water meters.

Getting services is difficult due to the geographical position of the settlement; informal settlement keeps growing without any planning.

The project in Laderas is very costly but will have other benefits. Besides from the access to water, it will also influence people lives in a positive way.

The municipality does not want to invest on renovation of pathways because SEDAPAL project will destroy them when it takes place.

To have a water meter residents need to have certificate of possession, normally it costs 75 soles but the municipality EA give them for 15 soles).

Question's topic: Housing (lack of social housing, kuelap project, participatory processes)

Mayor's answer: Kuelap's land belongs to the municipality, the project started after the house collapse on the 9th of October more than 3 years ago.

The project wants to give 80 houses to those that were affected by the collapse, but some of the members of the project have personal interest that diverts the objective of this particular project.

There are tables of dialogue, but there are problems because some of the members of the project are not residents of EA but come from other areas. An urban rehabilitation option was presented to the kuelap committee to continue with the project.

There is a filter being carried out by the ministry of housing to identify which families are eligible to obtain a house within this project.

Question's topic: Physical conditions (housing, robbery, violence, and security, lack of integration between different areas)

Mayor's answer: there has been work done in collaboration with the police to conduct studies about drug consumption and sell points, violence and chicha parties in the upper areas. There is a Plan de Vigilancia (vigilance plan) but it has limitations, the communities do not report many cases of violence and drug consumption. Also, due to the limited personnel the plan is not being successful. There is a lack of compromise from the community to overcome these issues.

There is also a security plan (Plan de Seguridad) by the ministry of justice and the central government that integrates public spaces in order to make the place safe.

The lack of lightening, public space, education, and culture are factors that contribute to the safety conditions of the area.

Youth in EA have lots of talent but do not have a place where they can practice. Mayor wants to build a cultural center in the cerro where young people can practice arts, music, etc. to prevent them from indulging in drugs, alcohol consumption, and violent activities.

Question: Why is EA catching so much attention for new developments?

Mayor's answer: there are many problems: education, health, infrastructure and yet a vision of modernity that hopes to take place in the district, integrating green spaces and housing.

The local government does not have enough financial resources to conduct their own developments. Therefore the ministry of housing conducts developments in the area that will reach different social classes looking to benefit those living upper in the hill.

Appendix 12 Cable car and housing project

In 2012 the district municipality and the Ministry of Housing, Construction and Sanitation developed a comprehensive project: the construction of an expressway linking the hills of the district of El Agustino via a cable car and a residential complex of 8 thousand departments. These apartments were meant to benefit the low-income residents of hills and terraces of Catalina Huanca, Amauta I and II, San Pedro, Cerro El Agustino, Santa Isabel, among others, which translates to about 30 thousand people, with the goal of reducing the overcrowding prevalent in these areas (Andina, 2012). The building would take place across the cerros of El Agustino, and also in the Gran Parque Mirador and Kuelap area. The ex-mayor Victor Salcedo said that the housing complexes would be at least five floors high, with each apartment measuring a minimum of 65sqm, its construction would be supported by the Ministry of Housing through the Mivivienda program.

A great supporter of this project, Salcedo intended the project to increase the quality of life of the residents of El Agustino by supplementing these apartments with pathways, retention walls, a library, skate Park, police station, 150 hectares of green and recreational communal areas and a large tourist development such as the caves of Catalina Huanca with a view across the city. Other benefits meant to accrue to residents from this project include: direct access to the newly built electric train, improved travel time between the neighboring districts of Santa Anita and Ate, the sports area of Amauta Maracana 1km away and the transports lines Metro Line 2 and the Metropolitan. The estimated cost of the development was between 100-150 million nuevos soles with the proposed completion date being January 2014 (Andina, 2012).

One of the risks acknowledged at the time was the instability of the soil for construction; however, this was considered negligible and was not the reason for aborting the project. Instead, despite being signed and ready to start, the change in mayor meant that the project did not start at all, with many of the residents during our fieldwork referring to the development as 'a dream'. Despite the obvious benefits accruable from this projects, it is doubtful that that the project was intended to primarily benefit the poor residents of El Agustino and the surrounding area. One reason for this is that the project feasibility studies seemed not to have made considerations for the fact that the level of poverty experienced by majority of the residents on the hills would mean that they would not have be able to afford using a cable car marketed, priced, and designed with tourism in mind.



4. José Carlos Mariátegui.

Beyond risk: Co-responsibility at the edge of the city

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Abbreviations

AF – Agrupación Familiar (Community Association)

CENEPRED – Centro Nacional de Estimación, Prevención y Reducción de Riesgos de Desastres (National Centre of Assessment, Prevention and Reduction of Risks and Disasters)

COFOPRI – Organismo de la Formalización de la Propiedad Informal (Organisation for the Formalisation of the Informal Property)

COP – Constancia de Posesión (Certificate of [land] Possession)

EDELNOR – Empresa de Distribución Eléctrica de Lima Norte (Electricity Distribution Company of North Lima)

INDECI – Instituto Nacional de Defensa Civil (National Civil Defence Institute)

JCM – José Carlos Mariátegui

MML – Municipalidad Metropolitana de Lima (Metropolitan Municipality of Lima)

NG – Agrupación Familiar Nueva Generación

PB – Agrupación Familiar Portada de Belén

PLAM 2035 – Plan Metropolitano de Desarrollo Urbano Lima y Callao 2035

SEDAPAL – Servicio de Agua Potable y Alcantarillado de Lima (Water and Sanitation Service of Lima)

SJL – District of San Juan de Lurigancho

UNISDR – United Nations Office for Disaster Risk Reduction (Oficina de las Naciones Unidas para la Reducción del Riesgo de Desastres)

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Thank you.

Executive Summary

Physical everyday risk has serious impacts on people's livelihoods, yet they are often overshadowed by larger disasters. In many peripheral areas of Lima, these physical everyday risks and hazards, that lead to frequent injuries, illnesses and property damage, are not adequately addressed by the State, institutions or the community.

Through our research, we sought to explore the differences in perceptions, experiences and responses to physical everyday risk and how they are distributed demographically and spatiotemporally in a peripheral region of Lima- the settlement of José Carlos Mariátegui (JCM). More specifically, we focused on the AFs Nueva Generación, Portada de Belén, U4 and U4a, as these are representative of the parts of JCM with higher exposure to physical everyday risks.

We investigated the underlying causes and drivers of vulnerability and people's ability to cope with, resist and recover from everyday risks. This also gave us an enhanced understanding of the processes leading up to Lima's urban challenges and enabled the development of our transformative strategies.

Our study builds on the research previously undertaken by the DPU, including the other studies undertaken in 2013 and 2014, Learning Lima and Remap Lima, and is linked to the themes of the current DPU led research project - cLIMA sin Riesgo.

Drawing on our results and analysis, we conceptualised existing 'risk traps'. These comprise primary components – structural conditions and socioeconomic position, which constitute drivers of the risk trap and form the environment for the other components- perceptual drivers, behavioural drivers and exacerbating factors.

Through our research and engagements with different actors, we developed a vision for transformation, that is, the creation of co-responsibility between the community, institutions and the State, to move beyond risk and for the production of a socially-just city.

The recommended strategies are designed to disrupt the risk traps, leading to socio-environmental transformation. The first part of our strategy is consolidation, which needs to be complemented by the valuing and controlling of the edge of the city, and further supported by the redirecting of finances. The keystone of our strategy is the building of bridges within the community as well as between the community and other actors. The combination of these actions that take place across a range of scales would result in transitional and transformative change at a local and subsequently wider scale.

Finally, we proposed topics for future research, from the exploration of collective investments by households, communities, institutions and the State for risk reduction, to more nuanced perceptions and roles of men, women, and collectives (e.g. AF Federation) for a concerted vision.

1. Introduction

1.1 Objectives

This study focuses on understanding how people living in the settlement of José Carlos Mariátegui (JCM) experience physical everyday risk. It also uncovers the range of hazards and risks, responses to this, as well as the underlying socioeconomic, institutional and structural conditions within the study area. Following this, the development of an environmental action plan, in collaboration with the local community and other organisations, identifies entry points and strategies for transformative change.

Our study builds on the research previously undertaken by the DPU, including the other studies undertaken in 2013 and 2014, Learning Lima and Remap Lima, and it is linked to the themes of the current DPU led research project - cLIMA sin Riesgo.

Location of JCM. Source: Google Maps



Overlooking José Carlos Mariátegui. Photograph by Faye Sit



JCM is representative of many high-risk peripheral areas in Lima and is intrinsically linked to broader urban processes, hence studying JCM provides a window to Lima's urban challenges as well as those faced by other metropolitan areas.

1.2 Area of Study

JCM is situated in an arid, steep sided group of valleys in the northern periphery of San Juan de Lurigancho (SJL). SJL is the most populous district in Peru, with a current population exceeding one million (INEI, 2014). Settlement of JCM started in the 1990's and continues to this day, typically in the absence of formal land tenure and access to basic services.

1.3 Focus on Physical Everyday Risk

The impacts of physical everyday risks, such as those due to lack of basic services are often overshadowed by intensive risks such as earthquakes. However, they can have greater overall impact and are linked to wider socioeconomic vulnerability (refer to Section 2). Thus, exploring everyday risks provides not only an understanding of how everyday risk can be addressed but also offers a view to understanding broader socio-environmental patterns.

CENCA (the local NGO supporting our study) and the community have further corroborated the importance of the physical aspects of everyday risk.

2. Conceptual Framework

2.1 Risk, Hazard and Vulnerability

We commence our investigation by conceptualisation risk, hazard and vulnerability. Risk is commonly conceived as the probability of harmful consequences or expected losses (for example, injuries, disruption of economic activity or property and environment damage) resulting from interactions between natural or human-induced hazards and vulnerable conditions (UNISDR, 2004), and is represented by the non-arithmetic equation:

$$\text{Risk} = \text{Hazard} \times \text{Vulnerability}$$

(Wisner et al., 2004: 49)

Vulnerability can be defined as:

"The characteristics of a person or group and their situation that influence their capacity to an-

ticipate, cope with, resist and recover from the impact of a hazard" (Wisner et al., 2004:11).

Hazards can be defined as:

"A potentially damaging physical event, phenomenon or human activity. Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity, frequency and probability." (UNISDR, 2004)

The scale of risk has been conceptualised as a continuum from intensive infrequent events (such as earthquakes), through to extensive events such as small disasters and everyday risks, illustrated in Table 1 (Bull-Kamanga et al., 2003). Our research has adopted this framework and has included, 'small-disasters' within the term 'everyday risk'.

Vulnerability, when combined with hazardous events, results in the production of everyday risk whilst also leading to the creation of other hazards. The hazards associated with everyday risk are include any event that could result in harm – they are numerous, often unnoticed and difficult to mitigate. Therefore, when considering everyday risk, vulnerabilities and hazards are intertwined and in some cases can be indistinguishable.

Therefore, our definition of everyday risk is:

A characteristic or situation, across spatial and temporal scales, that results in harmful consequences (deaths, injuries, disrupted livelihoods or economic activity, or property and environment damage) or inhibits a person's ability to anticipate, cope with, resist and recover from negative impacts of everyday life.

This definition leads us to visualise everyday risk from a broader lens than the simple conceptualisation of $R = H \times V$. The intention is not to call into question or attempt to disapprove the conceptualisation of $R = H \times V$, but rather to open the investigation up to all contributing factors that lead to negative consequences whilst also acknowledging that these factors can be interconnected. This draws the investigation away from being a reductionist and simplistic 'cause and effect' approach that may lead to a superficial diagnosis, such as, one that is focused on individual risks or hazards contained within a spatial or temporal scale, which in turn limits the scope of subsequent transformational strategies.

The definition therefore, directly leads to the consideration of a wide range of risks, hazards, vulnerabilities, coping mechanisms and adaptive strategies, across spatial and temporal scales, and opens the diagnosis to their interaction forming risk traps.

Table 1. Continuum of risk

Nature of Event	Disasters	Small-disasters	Everyday Risk
Frequency	Generally infrequent	Frequent	Everyday
Scale	Large, or has potential to be large (e.g. 10 or more killed, 100 or more seriously injured, need for external assistance)	3–9 persons killed, 10 or more injured	1–2 persons killed, 1–9 injured
Total Impact	Can be catastrophic for particular places and times in most low- and middle-income nations, but generally a low overall contribution to premature death and serious injury	Probably a significant and considerably underestimated contribution to premature death and serious illness or injury	In many urban areas, these remain the main cause of premature death and serious injury

An integrated framework incorporating risk from disasters and “non-disaster” events:

CONTINUUM OF RISK

Large impact for city
Small impact for city

Low frequency
High frequency

2.2 Risk and Poverty Traps

Risk traps are considered as cycles through which bio-physical and socioeconomic risk drivers are intricately linked in a manner that leads to ineffective responses to and recovery from risks, and conditions where risk accumulates in vulnerable localities. This results in unequal risk exposure that contributes to the deprivation of everyday livelihoods in these communities (DPU, 2015) and possible creation of an environment of inertia, resistant to change (Adam et al, 2000).

Risk traps form part of poverty traps, which as Barrientos (2007) explains, illustrate the relationship between vulnerability to risks and poverty / socioeconomic conditions (ibid). Crises, hazards and stress constitute key elements that create and perpetuate poverty, particularly for those already at the limits between average living conditions and poverty (Dercon, 2003).

The conceptual link between poverty traps and risk traps broadens the study to include and highlight the importance of the influence of socioeconomic conditions, from the individual through to the national scale.

The risk trap and poverty trap concepts also guide the consideration of the interaction of risks, hazards, vulnerabilities, coping mechanisms and adaptive strategies, enabling us examine how these interactions could be reinforcing/counteracting and perpetuating one or the other.

2.3 Transformation

Pelling’s (2011) framework for adaptation to climate change categorizes three modes of response resilience, transition and transformation. We have adopted an adapted version of this framework (Hordijk et al. 2014) (refer to Table 2) to define transformation and developed strategies to achieve this. This includes the concept that activities designed for resilience can combine and result in transitional and transformational change (Pelling, 2011:51).

2.4 Periodic Consensus

With the aim of creating transformation, Levy (2007) explains how collective action has to be synergized between different stakeholders who have a well-defined collective vision. However, this synergy needs to be ‘constantly reconstructed and renegotiated’ and Levy terms this as ‘periodic consensus’ (Levy, 2007:6).

Additionally, Healey (1992) asserts that consensus-building is the first step towards achieving communicative rationality (Habermas, 1981), which is a requisite for collective action. Such consensuses can only be periodic and contextual since actors’ evolving interests, perceptions, and contexts (Healey, 1992; Levy, 2007) limit potential moments for consensus. Achieving periodic consensus creates a new and inclusive agenda for action under certain conditions that target inclusiveness, increased participation, and self-organisation (Innes, 2004).

Table 2. Modes of responding to external threats or disturbances. Source: Adapted from Pelling (2011) by Hordijk et al. (2014:133)

	Resilience	Transition	Transformation
Mode	Refining existing practice	Incremental change	Radical change, regime shift
Goal	Functional persistence in a changing environment	Realise full system potential through the exercising of rights in established regime structures	Reconfigure the structures of development
Scope	Change in technology, management practice or organisation	Change in governance practices as rights are exercised; incremental change at individual policy level or in specific geographical area	Reform in overarching political economy, cultural norms or scientific paradigm; local accountability of global capital
Policy focus	"Disaster resilient" building practice	Implementation of legal responsibilities by public and private actors; exercising of rights by citizens; change in rules, not norms and principles	New political discourses

For our conceptual framework, consensus-building is viewed as essential towards achieving transformation since we believe that only agreements that are built through consensus can be truly transformative, especially with regards to everyday risks and social justice. In other words, transformation and the notion of social justice as defined by Fraser (1996) can only be achieved if the new institutional arrangements and 'collective' actions arise from negotiations amongst the various actors in a consensus-building process. Nonetheless, we concede that periodic consensus is a necessary, yet insufficient condition to guarantee transformation, but rather a first step towards it.

3. Primary Research Questions and Overall Methodology

The primary questions that our research set out to answer are:

1. What are the specific conditions that define everyday risk in JCM? What are the spatial and historical profile of these and the structuring factors?
2. What are the risk-coping mechanisms adopted by ordinary men and women, state agencies and private sector in JCM?

3. What transformative strategies could inform an environmental action plan to disrupt risk cycles? At what scale/s and within what timeframes do they need to be conceived, implemented and monitored? Which actors, resources and specific activities should they include?

To answer these questions we carried out three phases of research (pre-fieldwork, fieldwork and post-fieldwork).

In the pre-fieldwork phase, we developed preliminary answers to the primary research questions through a desk-based study of secondary sources guided by our conceptual framework. This was integrated into a hypothesis (see section 4) and provided a framework (a fieldwork plan and fieldwork questions) for testing and developing this hypothesis in the fieldwork phase.

In the fieldwork phase, data (in response to the fieldwork questions) was co-produced and analysed along with members of the JCM community and a range of other actors (see section 5). This allowed for further refining of our hypothesis and the initial shaping of our overall diagnosis of the problematic of everyday risk in JCM. The fieldwork culminated in the production of our initial transformative strategies.

Finally, post-fieldwork, we have synthesised all data into a combined diagnosis of the problematic of everyday risk in JCM (section 6) and recommended transformational strategies aimed at resolving this (section 7).

4. Hypothesis

Our pre-filed trip analysis led to the following hypothesis:

Physical everyday risk is distributed in JCM demographically (specifically related to sex, age and physical disabilities) and spatiotemporally, and is perceived differently by positionality¹. They are perpetuated by risk traps, formed by antagonistic interplays of coping mechanisms, individual socioeconomic position, and structural conditions, evident over a range of scales.

To manage the land and to access basic services, the AFs have developed a mechanism of negotiation that involves agreements within the community and other actors using networked decisions and co-operation. The AFs, therefore, have implemented a model of action understood as a new form of governance (as defined by Swyngedow, 2005). Given their central position between legality and illegality as well as over different institutional scales; from individual to State, the AFs have a pivotal role to play towards the realisation of transformative change, where physical everyday risks, priorities and coping mechanisms are experienced justly, regardless of demographic and spatiotemporal characteristics.

However, transformation can only be achieved through periodic consensus (see section 2.4) between the different stakeholders, leading to the disruption of risk traps. The extent of the transformative outcome will nonetheless depend on the scale of consensuses over time, extent to which such consensuses result in collective actions and, as in the case of JCM, the strategy's ability to transcend the various scales that shape risk traps.

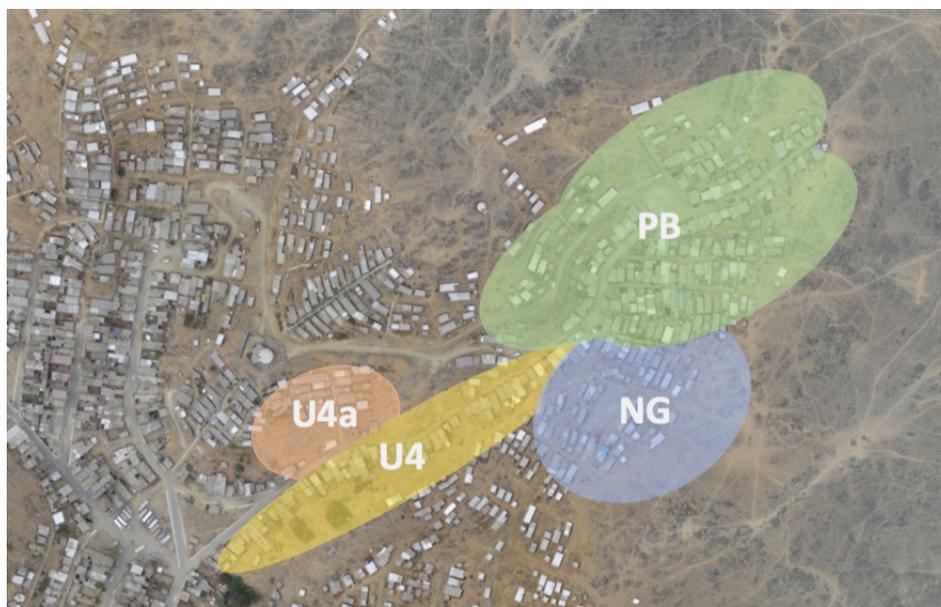
5. Fieldwork

5.1 Fieldwork questions

To test our hypothesis, we developed the following fieldwork questions:

1. What does the community perceive to be key physical everyday risks and hazards in JCM?
2. How does a) gender, b) age, c) physical disabilities, d) when you arrive and where you live, and e) where you arrived from, affect your i) perception of, ii) experience of and iii) coping mechanisms for physical everyday risk?
3. How are risk traps manifested over different scales?
4. How do the AFs interact with different actors within the community (including other AFs) in relation to coping with physical everyday risk?
5. How does the community organise collective action in response to physical everyday risks, if any? What and why are some risks not dealt with?
6. How does socioeconomic position, individually and collectively, affect community experiences and responses to physical everyday risk?
7. How do structural conditions contribute to risk traps?
8. What transformation is required of, within, and outside the AFs to disrupt the risk traps?

Map 1. Location of AFs studied for fieldwork



5.2 Research Strategy: Combining Qualitative & Quantitative Methodologies

To answer our fieldwork questions we implemented a range of activities focused on the AFs Nueva Generación (NG), Portada de Belén (PB), U4 and U4a (refer to Map 1) as these areas exemplify the more high-risk prone parts of JCM.

5.3 Fieldwork activities

Details of the activities undertaken as part of the fieldwork are summarised in table 3.

Appendix A contains a detailed Fieldwork Schedule whilst a detailed output from the fieldwork is in Appendix B-F.

5.4 Limitations

Surveys

Systematic sampling was not possible because many houses were unoccupied when the survey was undertaken. There could also be a bias in the data represented, given that 71% of respondents were women.

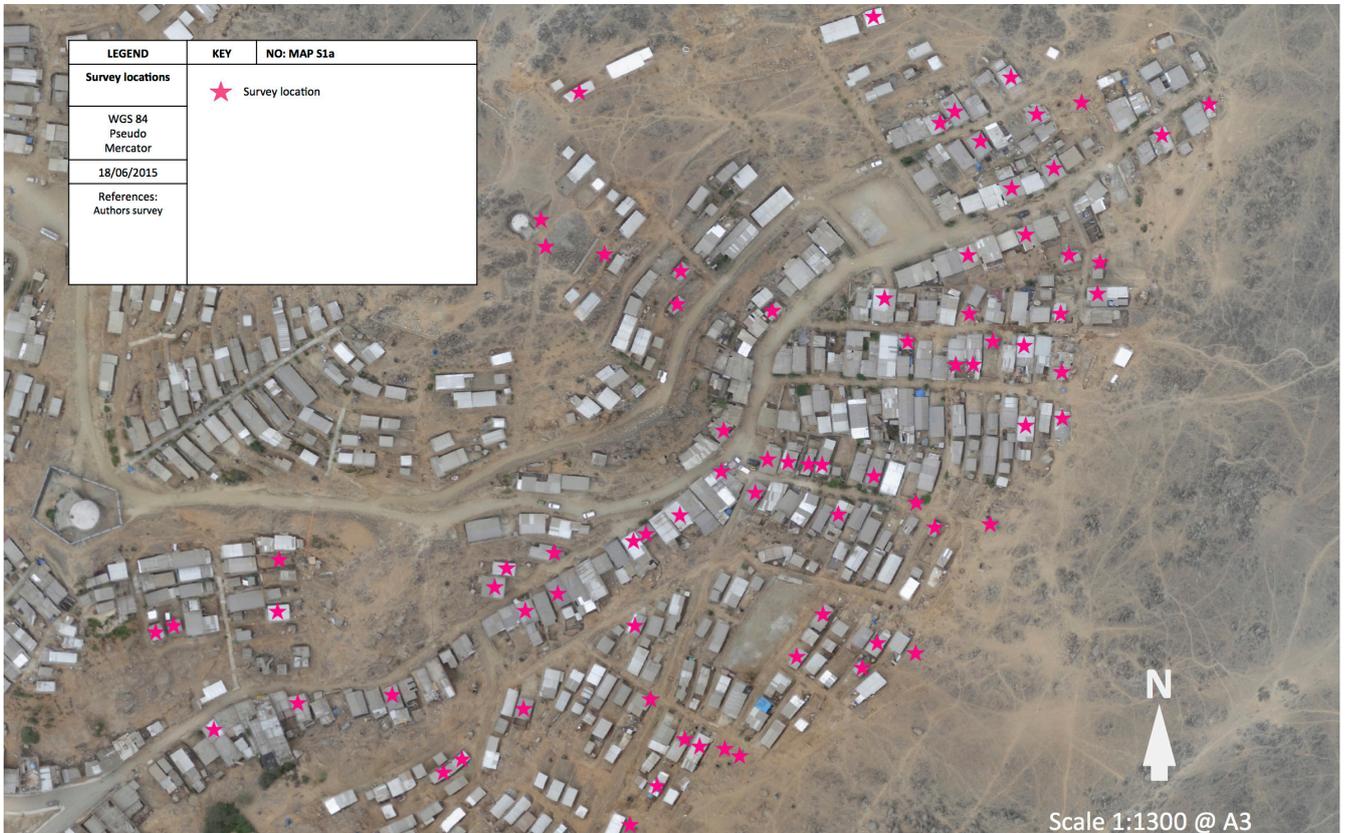
Focus Group & Strategy Workshop

Voluntary attendance meant that those who attended were not entirely representative of our area of study. For example, the majority of participants in the first focus group were from PB.

Table 3. Summary of fieldwork activities

Activity	Details
Surveys	To gather data with a spatial and temporal connection, we implemented geo-referenced surveys with questions about key risks and hazards (Q1*); demographic, spatiotemporal and socioeconomic influences (Q2/6*); and community perceptions of AF (Q4*). Approximately ¼ of households, at total of 76, were surveyed. The geographical coverage of the surveys is shown in Map 2.
Transect walks	Transect walks were carried out in NG, PB, U4, U4a, U5, U6 and U6c to enhance initial understanding of environmental conditions and risks in the area.
Interviews	Interviews were conducted with: <ul style="list-style-type: none"> ● Members of the community <ul style="list-style-type: none"> ○ Perceptions of the risks and hazards (Q1*) ○ Impacts of risks and hazards (Q2*) ○ Opinions on socioeconomic constraints underpinning their livelihoods (Q3/6*) ● An employee of INDECI <ul style="list-style-type: none"> ○ How risk in JCM is understood and responded to (Q3*) ○ Clarification on risk assessment for formalisation (Q3*) ○ A representative from JCM's health centre ○ Information about socioeconomic position of patients and the most common health problems in JCM (Q2/3/6*) ● AF leaders <ul style="list-style-type: none"> ○ Role of AFs, collective action and vision towards the future (Q3/4/5/7*) ○ Insights on expansion in JCM (Q3*) ○ Community dynamics - interactions between the AF leaders and associated members, as well as between different AFs (Q4*)
Focus groups	Focus groups that investigated perceptions, opinions and attitudes towards physical everyday risk and risk reduction were undertaken with: <ul style="list-style-type: none"> ● Community members from area of study <ul style="list-style-type: none"> ○ Perception and identification of key risks and hazards (Q1*) ○ Current responses to risk (Q5*) ● Women in the community <ul style="list-style-type: none"> ○ Same as above, with focus on women (Q2/5/6)
Strategy workshop	A strategy workshop with the community and AF leaders to discuss strategies under four themes: consolidation; house and plot planning; water and sanitation; and mobility. Participants were given the opportunity to provide insights as to what, how and where strategies should be implemented (Q7*).

Map 2. Location of household surveys



Focus group with community.
Photograph by Yin-Hsuan Sung



Focus group with women.
Photograph by Yin-Hsuan Sung



Surveying of community member in JCM.
Photograph by Yin-Hsuan Sung



Surveying of community member in JCM.
Photograph by Yin-Hsuan Sung



Participants did not contribute equally to our findings. During the transformation workshop, we observed that certain AF leaders were more participative and assertive.

Strategy workshop with community.
Photograph by Faye Sit



Group photo after strategy workshop.
Photograph by Yin-Hsuan Sung



6. Findings and Diagnosis

In this section, we develop and refine our hypothesis. This starts with defining the risks and risk responses that have been identified. Following this, the concept of risk traps is expanded on and refined. To conclude, criterion for transformational strategies, which will address existing everyday risk, are discussed, including an outline of the roles and perception that the AFs and periodic consensus would require for this purpose.

6.1 Everyday Physical Risks and Hazards

In conjunction with the community members, we identified eight key 'hazards' in JCM as follows:

- Rockslides;
- Collapse of retention walls and pircas;

- Poor air quality caused by dust;
- Poor air ventilation within houses;
- Household fires;
- Steep and slippery slopes;
- Lack of basic services (e.g. water and sanitation);
- Strong winds.

The residents' perceptions of the frequency of these hazards and the resultant risks are shown in maps 3 to 8. These results were gathered from responses to the household survey.

Using the simplistic definition of risk, as defined in section 2.1, these hazards lead directly to everyday physical risks of injury, illness and damage to property when combined with the vulnerability of exposure to them. This simplistic analysis, however, ignores the underlying reasons for the occurrence of these hazards, risks and vulnerabilities. It also ignores how they interact with each other and why they are not successfully mitigated, as set out in section 2.2. Consequently, our diagnosis of these is expanded on in section 6.3.

6.2 Responses to Risk

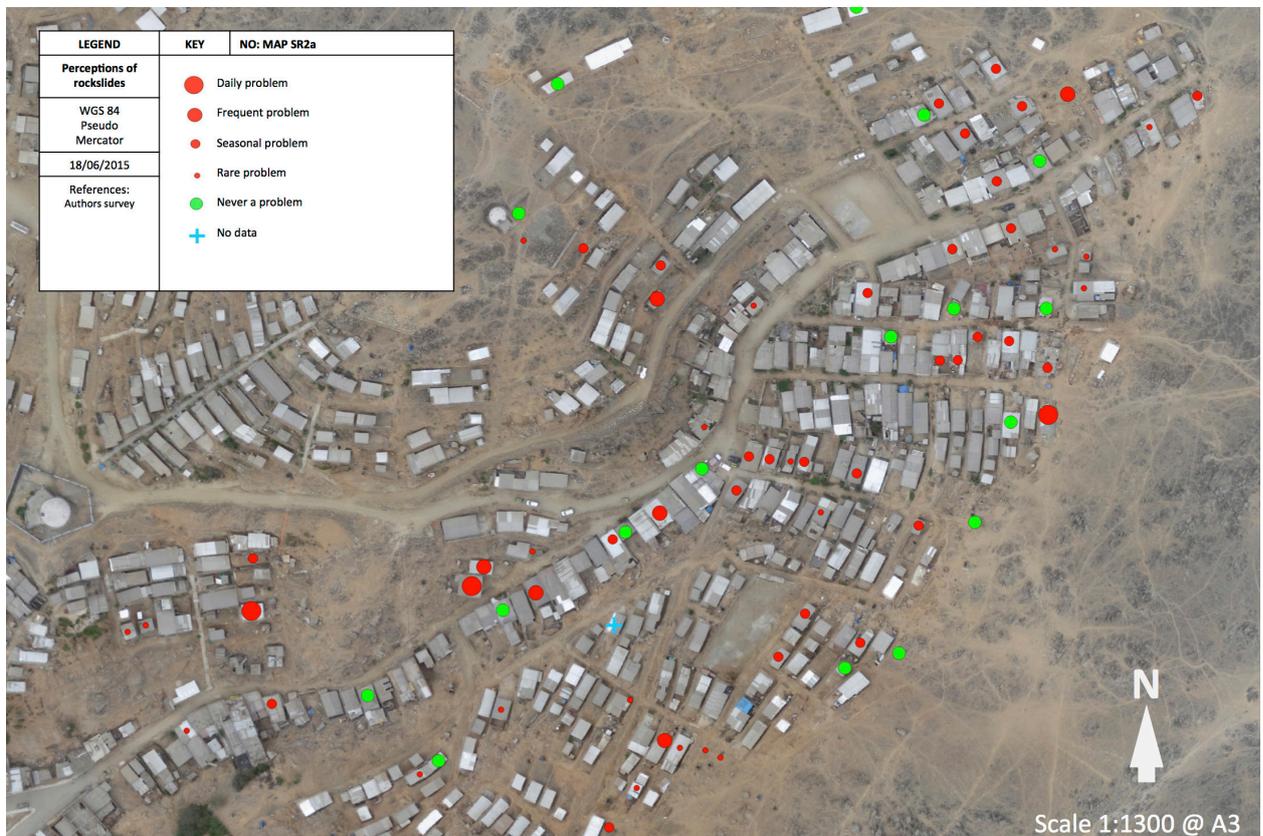
We utilized the risk wheel to analyse the full range of identified responses to risks and hazards.

The responses are located in the risk wheel depending on the type of actor (community or institutional) and the number of people participating in the response (from individual to group action).

Everyday individual practices can be found starting from the bottom right hand side of the wheel. These include improvements or repairs to the house and the various techniques to acquire services, for example, informal electricity connection, the use of hoses to collect water from the neighbours, silos and individual tanks or buckets for water storage. The latter of these activities are carried out in collaboration with neighbours.

The number of community members involved in the responses progressively increase the different responses continuing up the right side of the wheel and in turn leads to higher potential outcomes. These responses are not necessarily carried out on a regular basis and are the result of a united effort of a group of people or of all residents of an AF temporarily sharing similar interests and objectives. Communal work and services such as communal taps and Faenas (when the community work on communal projects are counted, such as) are also ac

Map 3. Perception of the risk from rockslides



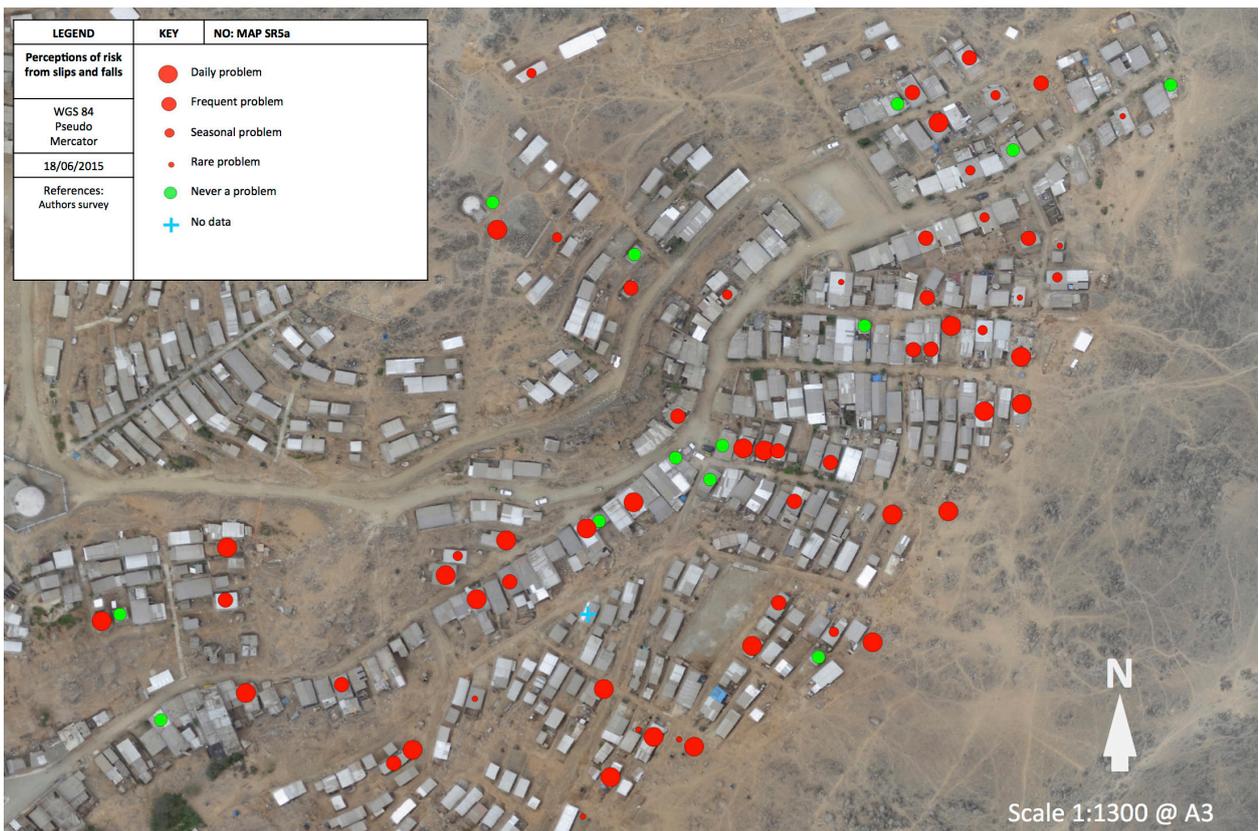
Map 4. Perception of the risk from poor air quality, both in and out of the home



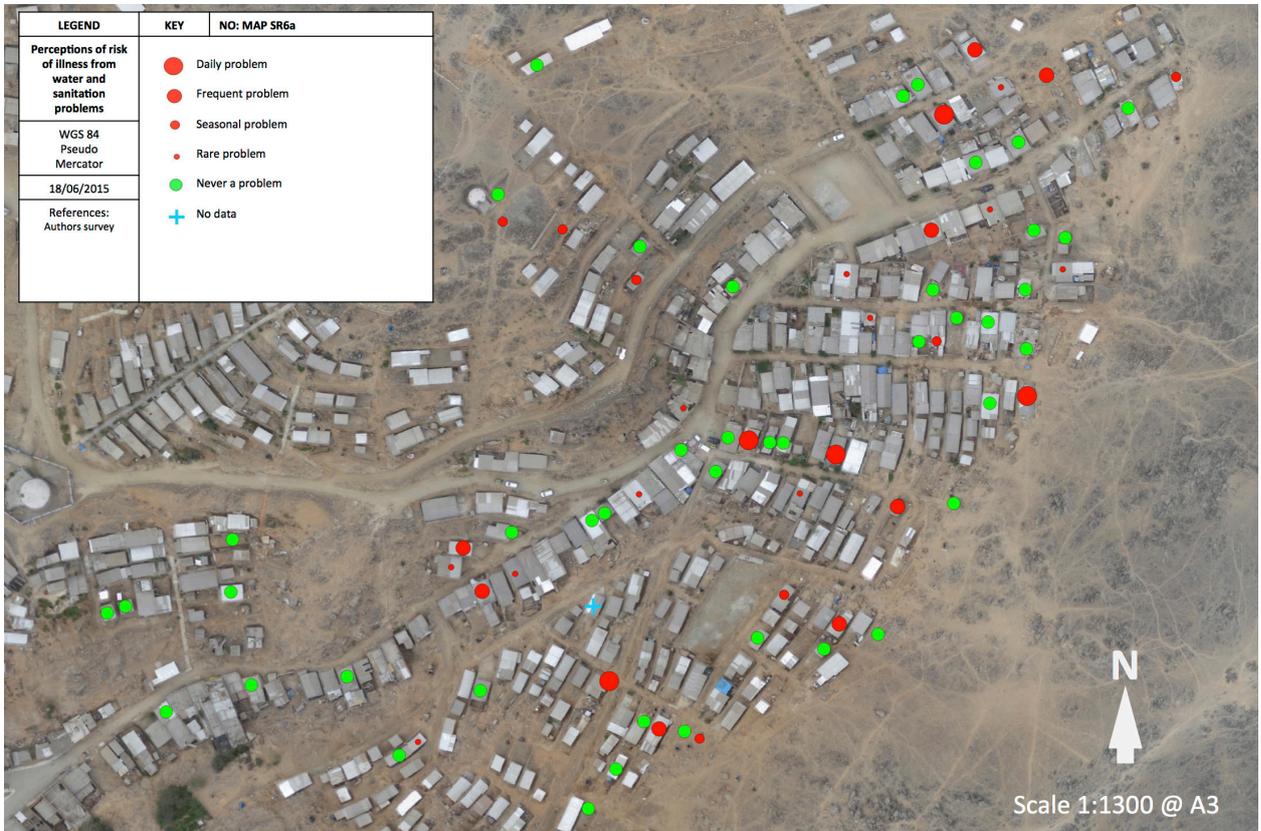
Map 5. Perception of the risk from household fires



Map 6. Perception of the risk from slips and falls



Map 7. Perception of the risk from lack of basic services



Map 8. Perception of the risk from strong winds

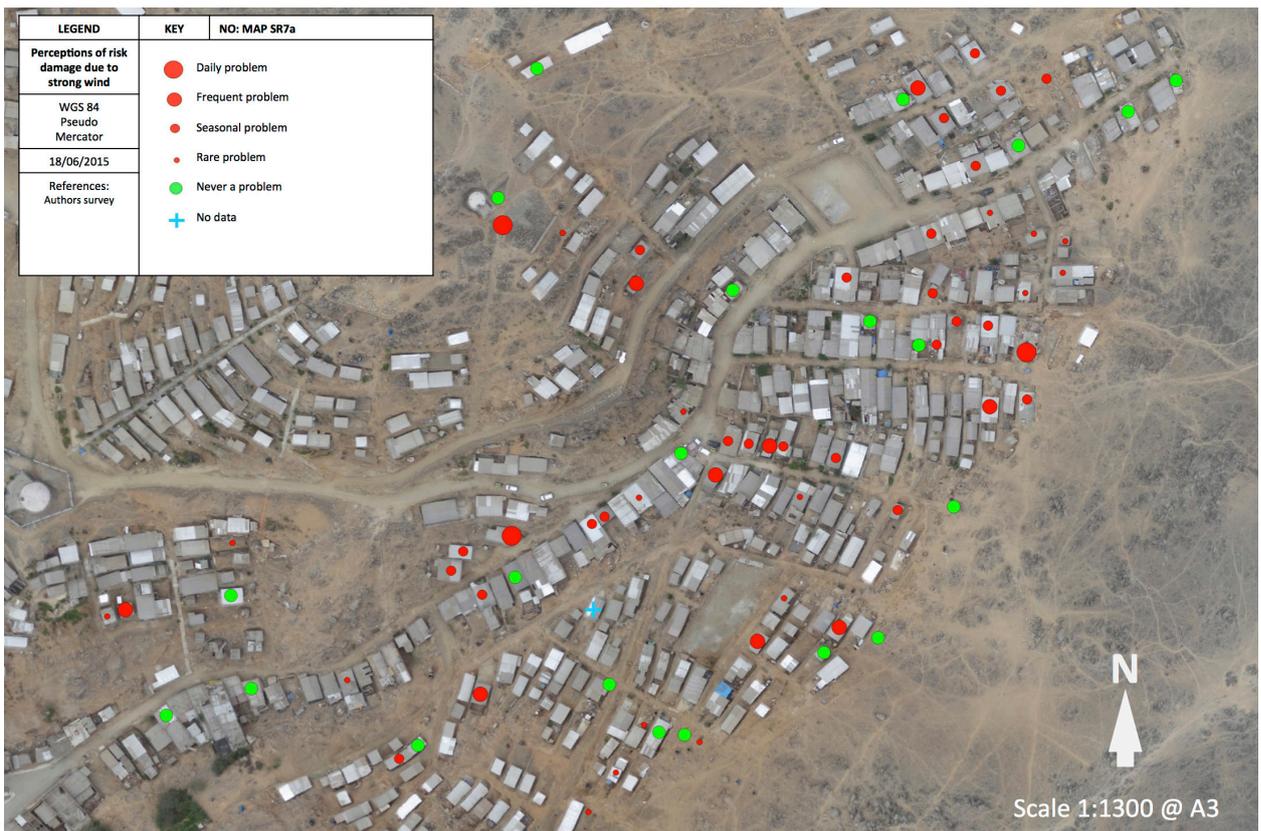
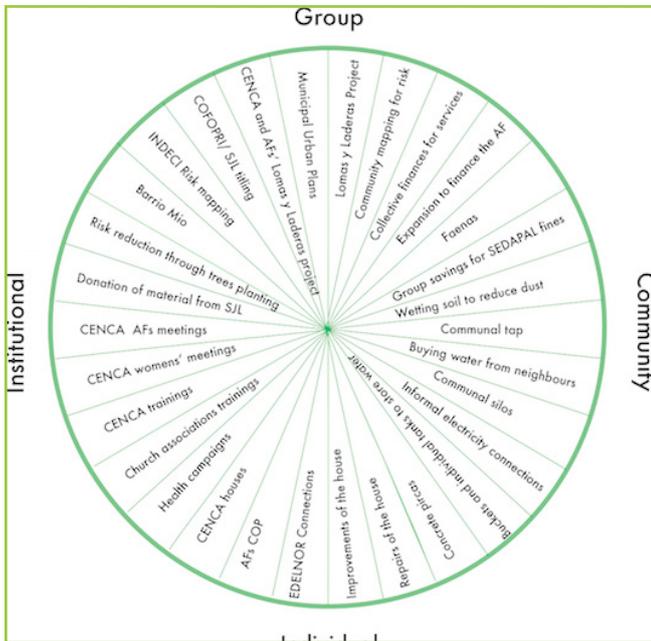


Figure 1. Risk Wheel. Adapted from Allen's (2005) "water supply wheel", cited in Allen et al. (2006).



1 counted for in this category. Other collective responses aim at financing group investments, for example, in PB some residents have paid 2000 soles per household for the installation of wastewater drainage. In addition, the AFs have in some cases, obtained finances through expansion and the subsequent sale of new plots. Finally, on this side of the wheel are activities that involve collaboration between AFs such as the Lomas y Laderas project (see box 1).

On the other side of the wheel, descending from the top to the bottom, we display responsive actions carried out by different institutions that impact on progressively fewer numbers of people, from multiple AFs to individual residents. Among these, important municipal projects are found, for example, the PLAM 2035 from MML, and other collaborative responses such as the setting up of the Lomas y Laderas project by CENCA.

Descending on the left side of the wheel, a number of different institutional responses can be visualized, from the COP provided by COFOPRI or SJL as a step towards provision of basic services, to the risk assessments by

Box 1. Lomas y Laderas Project – A Contest by CENCA in JCM



Community meeting for Lomas y Laderas Project.

Aims:

- To promote the recognition of the environment and physical risk from a risk management and climate change perspective in JCM.
- To generate capabilities and collective initiatives to implement actions for reduction of risk.
- To promote the use of innovative technology for the reduction of physical risk through the implementation of productive green areas

Winners of the contest were PB and NG; both granted 5000 Nuevos Soles to implement this project.

INDECI and physical risk mitigation works and Barrio Mio. However, the impact of these responses from INDECI and Barrio Mio are largely limited to areas that have land titles.

Other responses to reduce risk come from SJL, for example, tree planting and the donation of materials to facilitate connection to basic services.

An important and particularly active actor in JCM, is the NGO CENCA. As well as other responses already noted, they organise different meetings, for example, for AFs leaders, and women and different training and workshops. CENCA's work extends to helping the vulnerable through the denotation of houses. This response also aims to foster collective responses to vulnerability in the community as they select the residents who receive such houses.

Some institutions, such as EDELNOR respond in collaboration with individual households, such as for official electricity connections.

Although the risk wheel displays the full range of actors and scale of action undertaken, it is useful to remark on some problems it highlights. The fragmentation of the different responses is noticeable since very few of the responses include more than one institutional actor nor do many of them (from either institutions or community) address more than one risk. This highlights the problem of lack of coordination of responses. This problem has materialised in the different ways, for example, recently planted trees were being dug up to allow for the installation of underground services.

Also, we can observe from the wheel that rockslides and actions geared towards piped water provision feature prominently and are addressed in collective ways by both the community and institutions. This is in contrast to responses to other risks such as sanitation provision, housing quality and electricity connection, which are responded to on the household or inter-household scale. This constitutes a key finding from our research, as there appears to be barriers that prevent certain risk from being addressed collectively.

The case of sanitation offers an interesting insight into barriers for collective solutions. In various discussions with the residents it was explained that they would rather continue to use shallow silos and wait for a time when they could collectively secure piped sewage connections onto their plots (no matter how long this took), than collectively obtain communal toilets as an improvement on silos and an interim solution. The reasons given for this stance were a reluctance to 'waste' money on communal toilets when piped sewage may be available in the future (even though some residents have been waiting for over 10 years for this), also the high maintenance requirements for communal toilets. This highlights a number of barriers to communal solutions:

1. The view that improved solutions, that offer direct individual benefits, will become available in the future and so it is better to wait rather than invest in interim communal solutions.
2. The perception that communal solutions will be hard to manage.

In addition, our interaction with women in the area revealed that they had the perception that men were less impacted on by the negative effects of using silos and as such, accorded it lower priority.

The community responses are notably reactive in most instances whereas those from CENCA are more proactive and preventative.

The analysis using the risk wheel also highlights potential antagonistic interplays between responses. Among these, we would like to highlight for example, the antagonistic interplay between a) the expansion carried out by the AFs (to increase its financial resources) (achieved through the sale of new plots and to increase collective power) and b.) The impacts this has, including the loss of area for silos construction and increased risks to residents continually exposed to unstable land in the steeper parts of the valley. This also contrasts with projects such as Lomas y Laderas and the planting of trees encouraged by CENCA and SJL, which promote a passive use of the land.

6.3 Risk traps

As evidenced by the continued exposure of the community to the everyday risks, the combined outcome of the responses have been ineffective at mitigating the risks. We believe that this is due to the formation of risk traps, which links back to our hypothesis.

As described in section 2.2 risk traps are considered as cycles through which biophysical and socioeconomic risk drivers are intricately linked in a manner that leads to ineffective responses to and recovery from risks. Drawing together our analysis we have conceptualised risk traps in JCM to be comprised of:

- Primary components:
 - Structural conditions
 - Socioeconomic position
- Secondary components:
 - Perceptual drivers
 - Behavioural drivers
 - Exacerbating factors

The primary components drive the risk traps as causes for vulnerabilities and form the environment for the other secondary components.

Primary components of Risk Traps - Structural and Institutional conditions

Institutional Framework for Housing, Land and Risk

The growing demand for land and housing in Lima as a consequence of rapid population increase, coupled with the lack of social housing policies, has challenged national policies of land titling and provision. Informal practices such as land invasion have thus proliferated the city in order to meet the land and housing needs of low-income citizens. Although these practices have allowed many families to find a physical space in the city, some of these settlers have ended up in risky peripheral areas such as JCM. (Javed et al. 2013 and Arubayi et al. 2014).

In response to this expansion and the growth of human settlements, the state began to formalise settlers and encouraged new arrivals to access land and housing formally. In 1996, the Decree 803 created COFOPRI to carry out a regularised procedure for land titles to low-income citizens.

Over the years, different laws and regulations have defined the requirements for formalisation in Peru. The most recent, Law 28687, declared that settlers who arrived before 2004 can be formalised through a procedure of “saneamiento físico y legal” implemented to regularise titles and rehabilitate land for housing. This procedure involves risk assessments by INDECI from which recommendations towards rehabilitation or denial of formalisation would be made. In addition, it asserts that dwellers, who possess a COP and do not live in immitigable risk areas, have the possibility to obtain connection to basic services.

Even though risk is one of the factors considered in the formalization process, and a large number of dwellers occupying land before 2004 were formalised, there are inconsistencies between the law and reality. The procedure of “saneamiento físico y legal” suggests that the risk in JCM was considered as one that could be mitigated. However, institutions argue that people in JCM for example live in conditions of very high-risk and for this reason cannot continue the formalisation process. Hence, some of these institutions have proposed resettlement as an alternative.

The exposure of citizens to risk and disasters in Peru has recently been addressed by the law 29664/2011 through the creation of the SINAGERD, a national system for the reduction and prevention of risk and its effects. (For more details refer to Appendix G). According to this law, all the principles, guidelines, procedures and policy instruments established as tools for disaster risk management need to be taken into consideration over different government scales and in all actions implemented by the state, including evidently, those related to housing.

In this same direction, law 29869/2012 establishes the resettlement of population living in areas of immitigable risks, as a public necessity and national interest. Indeed, occupation of such areas is prohibited and the provision of basic services are consequently not allowed.

Through our analysis of these legal and institutional conditions and in light of the realities of everyday risk, we conclude that despite the followings: the aim of the State to promote formal access to land, the legal certainty that formalisation gives and the resultant hope of settlers to be formalised, formalisation does not necessarily entail more rights and entitlements for those formalised and more importantly, it does not automatically amount to reduced exposure to conditions of physical everyday risks as residents perceived that it would. Actually, some newcomers are living in the same area as the ones who already have a land title. This shows that formalisation is, therefore, more about political interests of the state or economic interests of individuals than for addressing conditions of risk.

In spite of this conclusion, and all the regulations mentioned above, expansion in high-risk peripheral areas of Lima such as JCM is continuing.

While the intention of written laws is to prevent people from living in high-risk areas, the practicalities of implementation do not make attempts to stop expansion, feasible. Although law 29869/2012 established the resettlement for population living in areas of immitigable risk, the Peruvian State is confronted with the practical implications of such a decision. Land and financial resources for resettlement of those already living in risky areas are not the only concern but also an effective policy to avoid new people occupying the peripheral territories again. This creates a significant blockage for any national level response.

The continued absence of an effective social housing policy coupled with SJL's lack of finances (as described below) means that these settlements continue to be the only option for many low-income families. The incentives caused by legal inconsistencies and grey areas, such as changes in the cut-off date for formalisation and the hope that the law will change again in the future, and the possibility of access to basic services simply with a COP, has further encouraged new settlers to inhabit JCM.

This demand is being met by new practices that result in new risks and exacerbate others. The AFs sell new plots to families and allow plot subdivision. In other cases low-income families access land by buying a plot from land traffickers who exploit the lack of clarity surrounding land ownership and peasants (Jicamarca) rights (Javed et al. 2013; Arubayi et al. 2014). This practice particularly intensifies expansion higher up the quebradas and all the risks that this brings.

Therefore, we conclude that disrupting this part of the risk traps requires changing existing structural and policy frameworks at both national and local scale.

State Finances

Informal discussions with officials from the SJL municipal government uncovered the financial constraints it faces. The provincial funding SJL receives is insufficient to cover the day-to-day running of the district, whilst also; the revenue raised from district level taxation is minimal. There are approximately 1.1m residents and 250,000 households in SJL. Approximately 180,000 households are registered in SJL, yet only 11% (~20,000) pay municipal tax of 65 Nuevos Soles per year. This amounts to a little over 5 Nuevos Soles or £1 per household per year generated for expenditure from district level taxation.

SJL also lacks other financial resources, for example it does not have concessions from mining companies that other districts use to raise funds for or carry out public works.

Therefore, the potential district level expenditure on risk reduction is negligible. Thus, this needs to be addressed if SJL is to play a meaningful role in disrupting the risk traps.

Primary components of Risk Traps - Socioeconomic Position

An individual's socioeconomic position (including demographics and spatiotemporal characteristics within the settlement) can influence many parts of their risk experience

and can also be understood as one possible approximation and dimension of individual's positionality. This includes how, and which, hazards are experienced, reasons for and degree of vulnerability, responses to the risks and the degree of severity of the impacts. This aspect of the risk trap is linked reciprocally to the wider concept of poverty traps, the disruption of one being related to the disruption of the other.

A primary driver for vulnerability

A key finding from our household surveys was the key influence socioeconomic conditions of residents had on their decision to move to JCM. An often-reiterated reason given by respondents for this decision, in the surveys, was the unaffordability of housing (both to buy and to rent) in other parts of Lima. In many cases, their susceptibility to this situation was due to a change in circumstances, for example due to illness or childbearing. This finding illustrates the importance of considering and addressing the root causes of vulnerability. The increasing land and rent prices in the city can thus act as a 'push' for the most vulnerable residents to move to high-risk prone zones in peripheral areas of the city, whilst, the land availability in such areas acts as a 'pull' for other residents who are drawn by the possibility of land 'ownership' in these areas. Both 'push' and 'pull' factors need to be addressed.

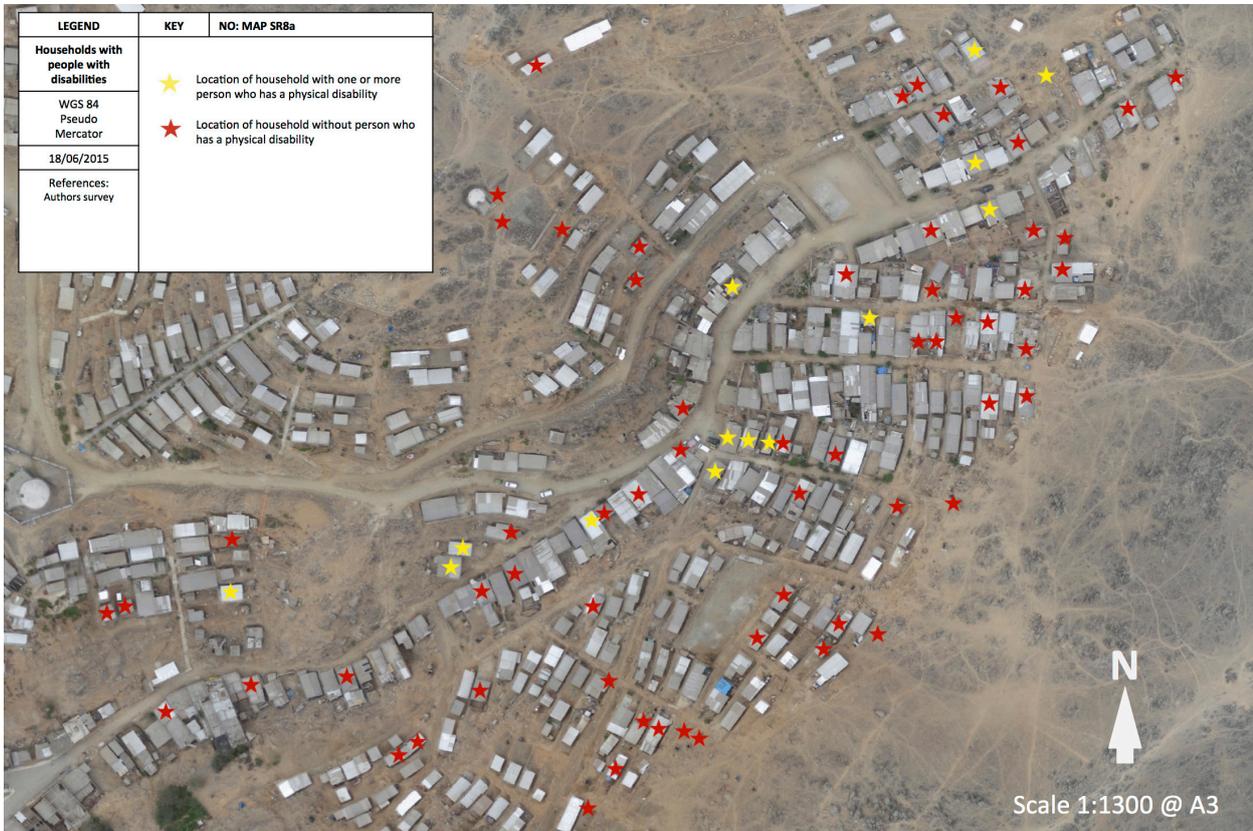
Demographic and Spatiotemporal influence on Vulnerability / Hazard Exposure

Gender, age, physical disability, and spatiotemporal characteristics (where you live and when you arrived in the area) all influence which hazards are experienced and vulnerability.

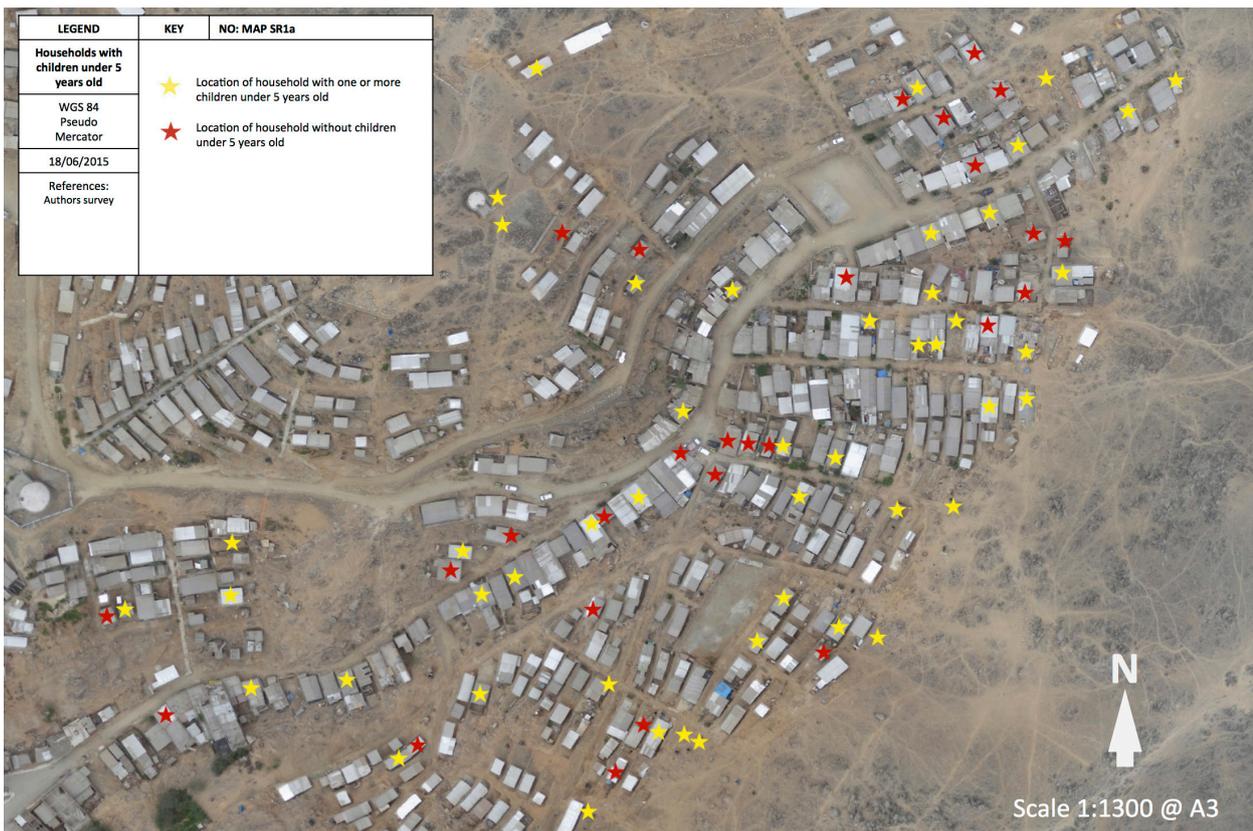
Hazardous slopes and pathways. Photograph by Teresa Belkow



Map 9. Households with people with physical disabilities



Map 10. Households with children



Qualitative accounts illustrate how women experience a number of risks uniquely. For example, pregnancy enhances susceptibility to the risks of injury due to poorly constructed and hazardous pathways. Age and physical disability also have an influence; with young children, the elderly and those with physical disabilities being particularly at risk from slips and falls. This is particularly evident as 63% of households surveyed have children under 5 years old whilst 13% of households surveyed have a member of their household with some form of partial physical mobility or complete mobility disabilities (refer to maps 9 and 10 below).

“I came to live here in 2013. Last year [2014] I was pregnant, and it was very difficult for me to climb up. There is no path, and when the soil is very dry it is very slippery. I was pregnant and I fell down. This happened three or four time during that period. The injuries were not very serious, but in my condition I found the risk was clearly higher for me and my child, and the situation very difficult.” — Resident, Portada de Belén

The results show that the spatiotemporal relationships to risk experience are complex. Nevertheless, there are some clear spatial relationships. A number of risks for those living at higher elevations in the settlements are more severe than

for those lower down. For example, for those on the higher portions of the slope, the risk of injury is increased as they are more affected by the hazardous pathways. Furthermore, as shown in map 11, there is a clear relationship between type of water supply and location, with houses on higher elevations being less likely to have piped water supply than those on lower elevations. This increased risks of deprived piped water supply are well documented (Cairncross, 1989).

However, findings with regard to the temporal dimension are less apparent. For instance, the risk associated with the location of houses is not necessarily determined by arrival date.

In conclusion, the demographic and spatiotemporal influences on vulnerability and hazard exposure need careful consideration when interventions are being planned to assist the most vulnerable as it is not necessarily possible to assess vulnerability on a simple variable, such as date of arrival. As such, vulnerability mapping for each area will be necessary and appropriate. This is crucial because everyday risk tends to be more severely experienced by the most vulnerable and as such, they should be the priority.

Clear and apparent however, is the vulnerability of those living in the higher elevations of the study area and as such, this has been given specific consideration in our strategies.

Map 11. Household water supply

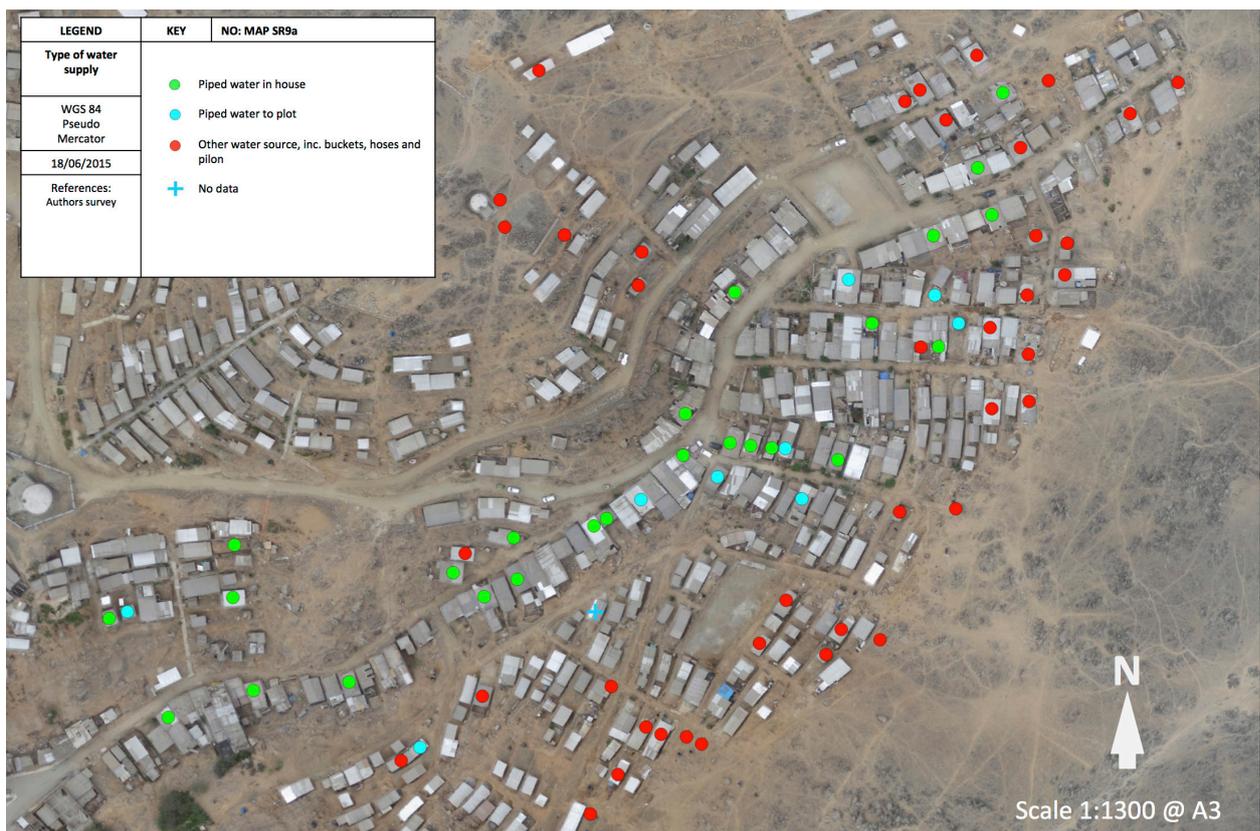
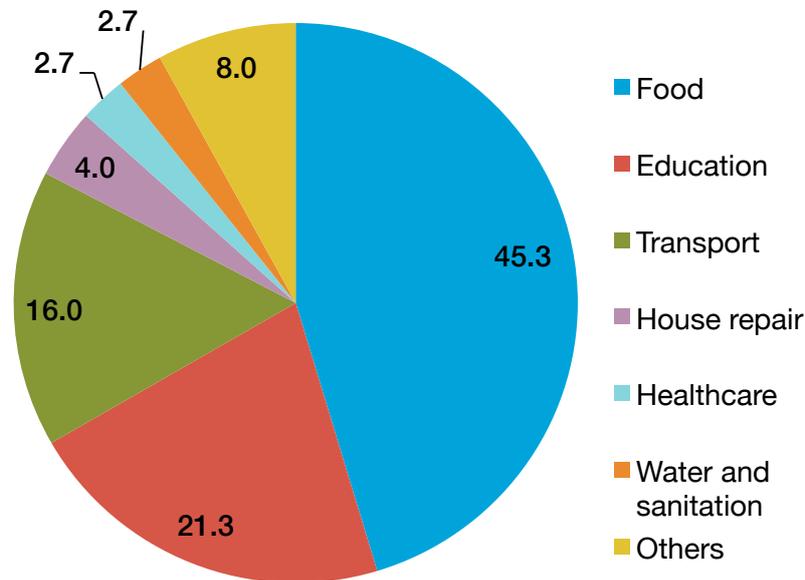


Figure 2. Chart of highest annual investments (% of total respondents)



Limiting ability to respond to risks

A restricted and precarious financial situation may limit an individual's capacity to respond to or mitigate risks, as was the case of residents who could not afford to contribute towards the communal project for wastewater infrastructure in PB and were thus excluded from it.

Our analysis of the main annual expenditure of respondents illustrates the restricted financial position of many residents. As shown in Figure 2, basic needs such as food and transport are a priority, making investment in risk mitigation challenging. Therefore, addressing this should be a focus of the transformative strategies.

Dependency and Vulnerability

The high dependency and child dependency ratios (derived from the formulae below) of 74.3% and 69.2% respectively illustrate a high burden on the productive population of JCM to support the economically dependent. This is a further indicator of the restricted financial situation that limits ability to respond to risk.

$$\text{Dependency ratio} = \frac{(\text{n}^\circ \text{ of people aged } 0-14 + \text{n}^\circ \text{ of people aged } \geq 60)}{\text{No. of people aged } 15-59} \times 100$$

$$\text{Child Dependency ratio} = \frac{\text{No. of people aged } 0-14}{\text{No. of people aged } 15-59} \times 100$$

Note that investments on education and transport are within close range because many respondents took into account transportation costs of sending their children to school in their education investment.

However, dependency can also lead directly to risks and vulnerabilities. On the average, each person with a stable income in JCM is expected to support 3-4 people in the household. Meaning that 3-4 people will be vulnerable to risks associated with financial difficulty if this one income earner has an illness that reduces income over a period of time.

Furthermore, of the 64 households with children, 20.3% have two parents with a stable income. This means that children are potentially left alone without supervision during working hours, which increases their vulnerability to physical everyday risks.

Mitigating these vulnerabilities is challenging and is most likely best approached by promoting and supporting stable employment and corresponding day-care facilities for children.

Investments on Plot & Housing

Our surveys show that the spatiotemporal relationship proposed by Javed et al. (2013:124), which states that plot price increases over time and is higher at lower elevations, in JCM, is more complex than posited. The household survey results do not show a simple correlation or evidence of plots being more expensive in the lower elevations of the quebradas nor is 'date of purchase' an indicator of cost of plot. The scattered location of points in Figures 3 & 4 further illustrates this (N.B. This data is not normalised for plot size).

This illustrates that exposure to risk cannot simply be mitigated by buying a more expensive plot of land, also that the market system for plot sale does not appear to take into account associated everyday risk. This finding further corroborates the generally complex nature of risk mitigation practises in JCM.

Figure 3. Graph of average cost of plot and plot flattening from 1999-2015

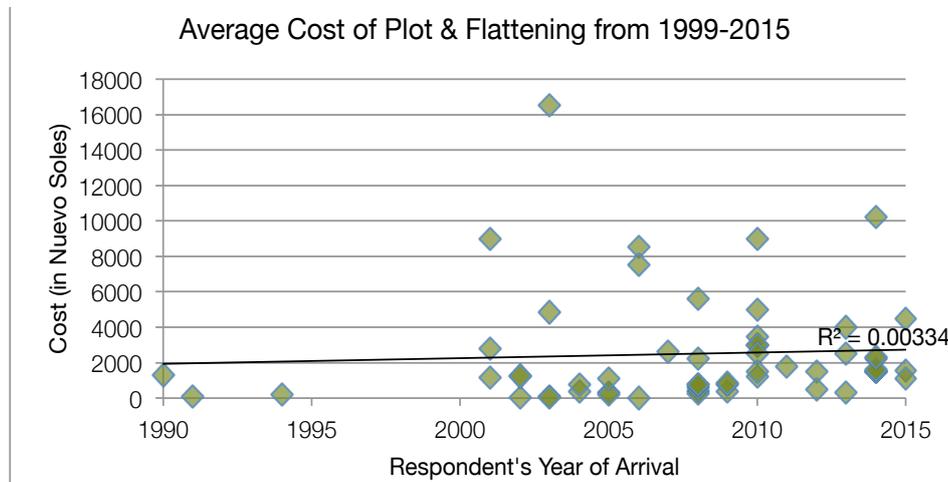
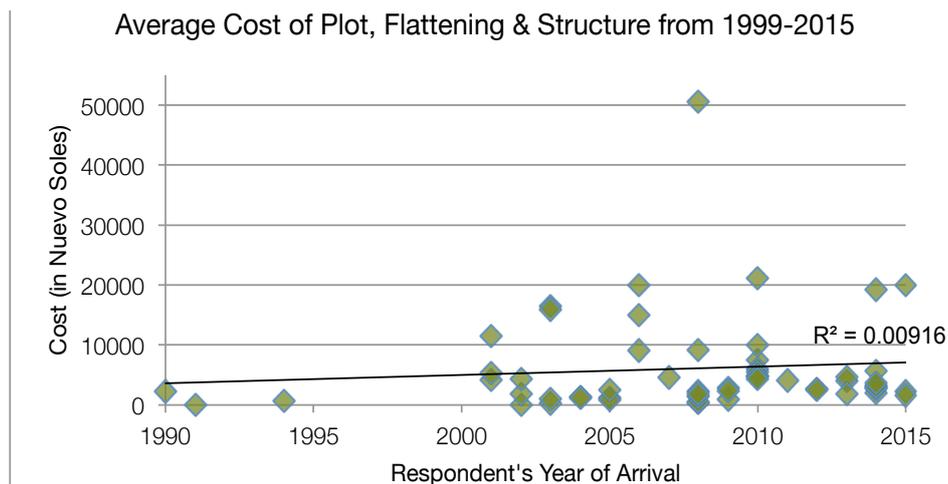


Figure 4. Graph of average cost of plot, plot flattening and structure from 1999-2015



Secondary components - Perceptual drivers

This section describes ways that perception contributes to the risk traps. This is considered under the following concepts:

- Perceptions of risk and effective coping mechanisms
- Fragmented vision
- Short term and individual view

Different perceptions of risk and effective coping mechanisms

We have clustered the ways that different individuals, groups and institutions perceive risks and hazards into four levels. These levels are permeable and individual perception might oscillate between these levels over time. Whilst each level of perception contributes to the risk traps in its

own way, there is also the overall tendency for different perceptions to lead to inertia in decision making if consensus cannot be reached, given the fact that risks are viewed differently. These different levels demonstrate the complexity in risk perception.

Internalisation – In this case, the risk or hazard is simply viewed as a part of everyday life. The far-fetched nature of the possibility for efficient mitigation leads to its internalization. Risk is consequently perceived as a normal condition. This perception was observed with regard to respiratory diseases, as 66% of parents of URTI (or upper respiratory tract infections, incidence affected the age group 0-11 years based on medical data) patients whom we interviewed, appeared to be less concerned about this health risk.

Perceived and passively accepted – Some risks and hazards are perceived as such but they are simply accepted without an active response to mitigate them.

An example of this is the damage to buildings caused by wind and the associated health impacts from living in these damaged houses. Residents respond typically to this by simply repairing the damage when time and resources permit, without an attempt to mitigate it in the future.

"My husband is worried about tremors of the ground and I am worried about the safety of my children. My daughter fell down [on the hill]. I think more about my children, whereas he's more worried about major hazards." Resident, Portada de Belen

Q: When do you plan on carrying out the next improvement works on your house?

"When I have the money. I work for myself, so my job and my income are very unstable." Resident, Nueva Generacion

Perceived but actively accepted – In this case risks and hazards are perceived and acknowledged but their impacts are considered to be offset by their benefits. An example of this is the risk of fires and injuries from informal electrical installations, considered to be offset by the benefits of having electrical supply (this finding was from an interview with a resident in Nuevo Paraíso).

Perceived and actively addressed – Risks and hazards can be perceived and acknowledged as detrimental and actions taken to mitigate them. There are a range of scales that were observed for this theme, ranging from individual to institutions. There are also many possible actions, as detailed in the 'risk wheel' (refer to Section 6.2).

Man repairing house. Photograph by Laura Castellani



Different perception according to positionality:

Demographic relationships in risk and hazard perception – There are a number of trends and relationships between demographic characteristics and risk and hazard perception. For example, 83% of women we surveyed view rockslides as a problem, compared to 59% of men. See Appendix D.2 for more details on the focus group carried out for women.

Spatial relationships in risk and hazard perception – Maps 3 to 8 illustrate the spatial distributions of perception of risk based on the household survey. As shown, there does not appear to be spatial or temporal trend in perception for each individual risk or hazard. However, there is spatial consistency in the perception of certain risks, for example, the risk of household fires is consistently perceived as rare and those from slips and falls are commonly perceived as frequent or daily problems.

Fragmented vision

Members of the community conceive different and sometimes times contradictory visions for JCM. These result from differences in socioeconomic position, perceptions of risk and coping mechanisms, and clientelism. This had led to delayed or unimplemented responses to risk. For example, the Lomas y Laderas project (that offers many benefits) does not attract great support and so was not implemented in other areas of JCM.

The PLAM 2035 is an urban plan for the development of Lima and Callao to 2035. Though not being implemented currently, it gives an insight into the mind-set of institutional actors on responses to risk. For example:

- It views large/ episodic disasters such as large rockslides and earthquakes as the key risks.
- It proposes resettlement of residents from high-risk and informal areas.
- It envisages organisation and planning of the peripheral areas.

For more details on the PLAM 2035 refer to appendix H. These provisions, contrast greatly with the realities of life in JCM. A coordinated vision between residents and institutions, is thus needed towards ensuring that all groups work towards the same goal, and in the most effective way.

Short term and individual view

The tendency to adopt a short-term and individualistic viewpoint when considering possible responses to risk was noted in many residents. An example is the sanitation provision as described in section 6.2. We argue that this view is linked to socioeconomic constraints experienced

by the residents. It is crucial to address this, as without it possible solutions that could significant impacts on residents are negated and a proactive stance is abated.

Secondary components - Behavioural drivers

The behaviour aspects of the risk traps are:

- Clientelism and assistentialism
- Reactive and unplanned approach
- Space and capability to act

Clientelism and assistentialism

The highly fragmented political engagement operating in JCM leads to a clientelistic relationship between the community and the State, where public resources and concessions are provided to specific groups to meet the needs of both the political party and the beneficiaries. The highly stratified nature of Lima's society enables the persistence of power imbalances between communities and the State (Graziano, 1976). This culminates in assistentialism, where the community depends on the assistance of the institutions and other actors.

Consequently, community organisation is weakened and undermined by clientelism and assistentialism, which in turn could lead to the 'urbanisation of hope', whereby communities simply wait for possible future State interventions rather than actively engaging in the actualisation of such change. In addition, this could lead to short-term, individual and reactive viewpoint.

Reactive and unplanned approach

We observed that both institutions and individual actors exhibit a reactive rather than proactive approach to planning. This is linked to their perceptions of risk, clientelism, short-term and individual views. It lead to risk accumulation if given that they are not responded to before impacts from other risks occur, thus constituting a key aspect of the existing risk traps. Additionally, this could lead to ineffective or antagonistic responses due to the absence of coordination. For example, the removal of trees planted help stabilise the ground and prevent rockslides and dust in order to allow the installation of underground services.

Space and capability to act

Groups do not always have the space and capability to act towards the effectively reduction of their exposure to hazards. For example, individuals living in the higher areas require collective action to improve pathways and thus reduce the risks of injury from slips and falls. However, recent arrivals to the area explained that the works to im-

prove the areas tend to be focused on the lower areas and so do not mitigate risks within their locality.

Secondary components - Exacerbating factors

The factors that exacerbate the risk traps are:

- Dependency on expansion
- Antagonistic interplays of coping mechanisms, hazards and risk
- Inconsistent Institutional response

Dependency on expansion

Expansion of settlements as part of the coping mechanism to provide finance for AF-funded activities, including those that address risk, is still on-going in the study area. This dependence on expansion has a number of associated impacts. It is an example of an antagonistic interplay (as further described below), which adds to problems related to fragmented visions and can act as an on-going incentive for more citizens to seek land and housing in these areas given that it presents settling in this area as a viable option.

Antagonistic interplays of coping mechanisms, hazards and risk

We also observed antagonistic interplays of responses, devised to address specific risks, but in turn lead to other risks or undermine the impacts of other responses. For example, the formation of AFs and the increases in the numbers of residents to gain basic services leads to expansion of the settlements and thus exposure to associated risks (this was also corroborated by Javed et al., 2013). Other examples include land being taken up for new housing at the expense of having space for sanitation, the dependency on expansion for financing the AF activities as well as the mobility problems that were caused when drainage trenches were excavate for new sewage connections but not installed. Addressing these interplays is therefore evidently necessary to disrupt the risk traps, as is ensuring that new ones do not occur.

Inconsistent Institutional response

There are instances of institutional response to risk being inconsistent with requirements for addressing the risk of the most vulnerable groups. A vivid example is the situation of health service provision in JCM. According to the interview with a representative of JCM's health centre, people without a COP or proof of formal connection to basic services are required to pay for services, whereas those who own the aforementioned documents are entitled to free treatment. If they are unable to pay, they

have to travel to a hospital within SJL, potentially meaning the more vulnerable groups face higher barriers to receiving medical attention than less vulnerable. This again is important, as everyday risk tends to be more severely felt by the most vulnerable and as such, they should be given priority.

Conclusions

To conclude on the concept of risk traps, it is evident that the everyday risks are created and perpetuated by a complex web of interconnected factors that transcend from the individual to the national scale. Therefore, disrupting them will require actions across a similar breadth.

6.4 Disrupting the risk traps

The following sections consider two possible entry points for this, they include: *collect action and periodic consensus* and *the role of the AFs*.

Periodic Consensuses and Collective Action

Past, and potential precedents for periodic consensus and collective action have been identified, for example:

The planned Lomas y Laderas project (see Box 1) and AF federation (see Box 2).

Individual households combining finances for projects, including the current project in PB where residents have collectively paid for wastewater infrastructure.

Historically, the formation of the AFs to facilitate community organisation and collectively secure basic services.

However, historically these have not always been sustained, as is the case with some AFs whose effectiveness and co-operation have reduced following success in securing some basic services. Furthermore, these actions have not been completely inclusive. For example, the investment towards the provision of wastewater infrastructure in PB was approximately 2000 Nuevos Soles per household, and those who could not afford this amount were excluded.

Box 2. AF Federation



Team JCM 2015 witnessing an AF Federation meeting.
Photograph by Punnat Punsri

The AF Federation was initially founded in May 2013 by the AFs: Nueva Generación, Quebrada Verde, Ampliación Manzana U4 and Portada de Belén. Different AFs from the Upper Parts of JCM such as 26 de enero, Las Lomas, Ampliación T1A and T2, and Corazón de Jesús, later added.

The purpose of the AF Federation is to establish a collective organisation to help protect the territory from land trafficking and designate a portion of the area to the conservation of the lomas and slopes.

In March 2015, Team JCM 2015 witnessed the election of the President and other Representatives.

Therefore, whilst there is the prospect for change (possibly transformative change) through periodic consensus and the opportunity for it to occur in present circumstances; efforts need to be concerted to ensure its sustenance. Moreover, understanding collective action and not solely periodic consensus, upon which these actions should be built in line with our conceptual framework, constituted important discoveries from our fieldtrip and enriched our final strategies.

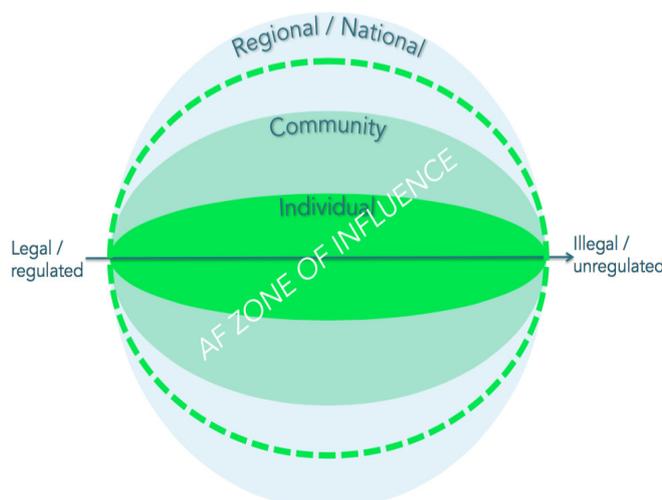
The Role of the AFs

The AFs position between formality/legality and informality/illegality whilst also transcending scales from the individual to the municipal (as illustrated in Figure 5) positions them as pivotal actors in JCM's everyday risk experience. However, this position has led to both benefits and negative impacts for the communities. Their influence and effectiveness changes over time (as noted in discussions with CENCA) and varies between AFs. For example, positive responses to the question "Does the AF consider you risk?" varied between 56% and 80% between the various AFs.

This position can also lead to lack of transparency in finance handling and decision-making, for example some allegations of small-scale corruption were made during interviews.

Therefore, the extent to which the future role of the AFs can be effectively utilised towards the attainment of a transformative change will depend on how well these negative impacts are addressed.

Figure 5. The Position of the AF



7. Strategies

This section sets out the transformative strategies that were developed in conjunction with the community and other actors (see Appendix E). Visioning was used as a starting point for the strategies; this is described in section 7.1. Following this the strategy and associated environmental action plan are given.

7.1 Vision for Transformation

In order to make the action plan for transformative change, a vision of what transformation 'looks like' was developed. This was achieved by considering the status quo inspired by the findings and diagnosis, and then by envisioning how a future transformed JCM could look like through the lens of our concept of transformation, as set out in section 2.3. By comparing the status quo and transformative change scenarios, we identified key issues and drivers for change whilst aiming for novel insights (Meinert, 2014). These have been organised these into viable framework

Scenario 1: Status Quo

Ongoing deepening of the risk traps resulting in continued and even increased exposure to risk for existing and future settlers. This translates to the "[ongoing decline in ability to act, adapt and plan for everyday risk] from the combined effects of repeated losses, injuries, mental distress or communicable disease" (Sverdlik, 2011:147).

Scenario 2: Transformative Change

Our vision for transformation is the creation of co-responsibility between the community, institutions and the State. This entails periodic consensus and defined rights and responsibilities (see Figure 6) in mitigating risks, manag-

Figure 6. Co-responsibility for Transformation



ing land use and finances across different scales of actors at critical moments in time that builds on previous actions and established relationships. It is thus key towards achieving a concerted view over scales thereby disrupting many elements of the risk traps.

Transformation will therefore culminate in physical everyday risks being minimised and the just distribution of residual risks, regardless of demographic and spatiotemporal characteristics - transcending from the community through to the city-scale. It will also change wider situations, through co-responsibility, including the 'right to the city' - *moving beyond risk*

7.2 Co-responsibility at the Edge of the City

The actions in our strategy aim to create co-responsibility, which is "the result, and not the starting point" (Carlson and Berkes, 2005:65). These actions are over a wide range of scales that build resilience (improving people's ability to cope with, resist and recover from risks) and result in transitional and transformational change at a local scale and subsequently wider transformation (this is building on Pelling's framework of resilience, transition and transformation: Pelling, 2011:51).

Furthermore, co-responsibility through collaborative arrangements (or the co-management of land and resources, see Section 7.2.4) are contingent on factors exogenous to the community - the key factors identified by Ostrom (1990) are recognition and rights, security of tenure, and financial and technical support. When com-

bined and coordinated with other actions across different spatial and temporal scales, they have the potential to achieve transformative change that transcends from the community to the State and over time.

Our framework of transformation towards co-responsibility results in many actions, providing multiple entry points to disrupt risk traps. Many of these actions have been proposed and already being implemented by a range of actors, the aim of the strategy is to bring all of these together in a coordinated vision. With this aim, our strategy is composed of four parts (see Figure 7), consolidation, valuing and controlling the edge, redirecting of finances and building of bridges within the community, and between the community and other actors.

There are many possible actions for each part, the tables below include a selection of actions that are considered most pertinent for the areas studied in JCM, but are not exhaustive.

Consolidation

The actions within the first theme are largely focused on improving the physical environment and are divided into three parts (see Table 4): improving mobility, improving access to basic services, and improving housing and plot planning. These actions contribute directly to a reduction in risk exposure, as well as improved health and living standards, and thus reduce the socioeconomic vulnerability component of the risk traps.

Valuing and Controlling the Edge

Controlling the edge of the territory and valuing it (see Table 5) beyond its use for housing is vital to stopping expansion, and the associated risks. Our main proposal for this is giving the AFs the right to collectively manage land use, under the condition that their expansion is stopped. This could also serve as an incentive for a less fragmented vision at inter-AF level.

Another important aspect of this strategy is the creation of green and open spaces in an effort to build a sense of community and responsibility towards JCM and the city, and give non-housing value to the territory. This aspect has already been initiated by the Lomas y Laderas project.

These actions can be reinforced by the regularisation and recognition of the AFs as well as the continued mapping exercises for land use planning and future risk mitigation.

All of these actions combine to combat land trafficking and so address the implications of the institutional and structural conditions. However, illegal land trafficking needs to be dealt with at the municipal, city or national scale.

Figure 7. Overview of transformative strategy

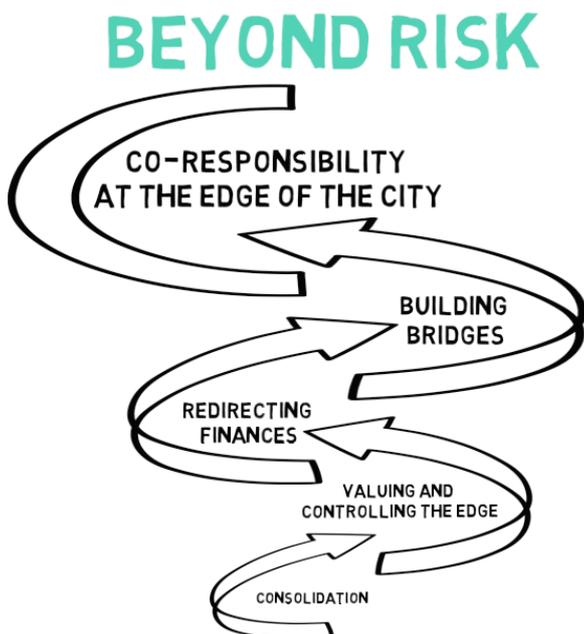
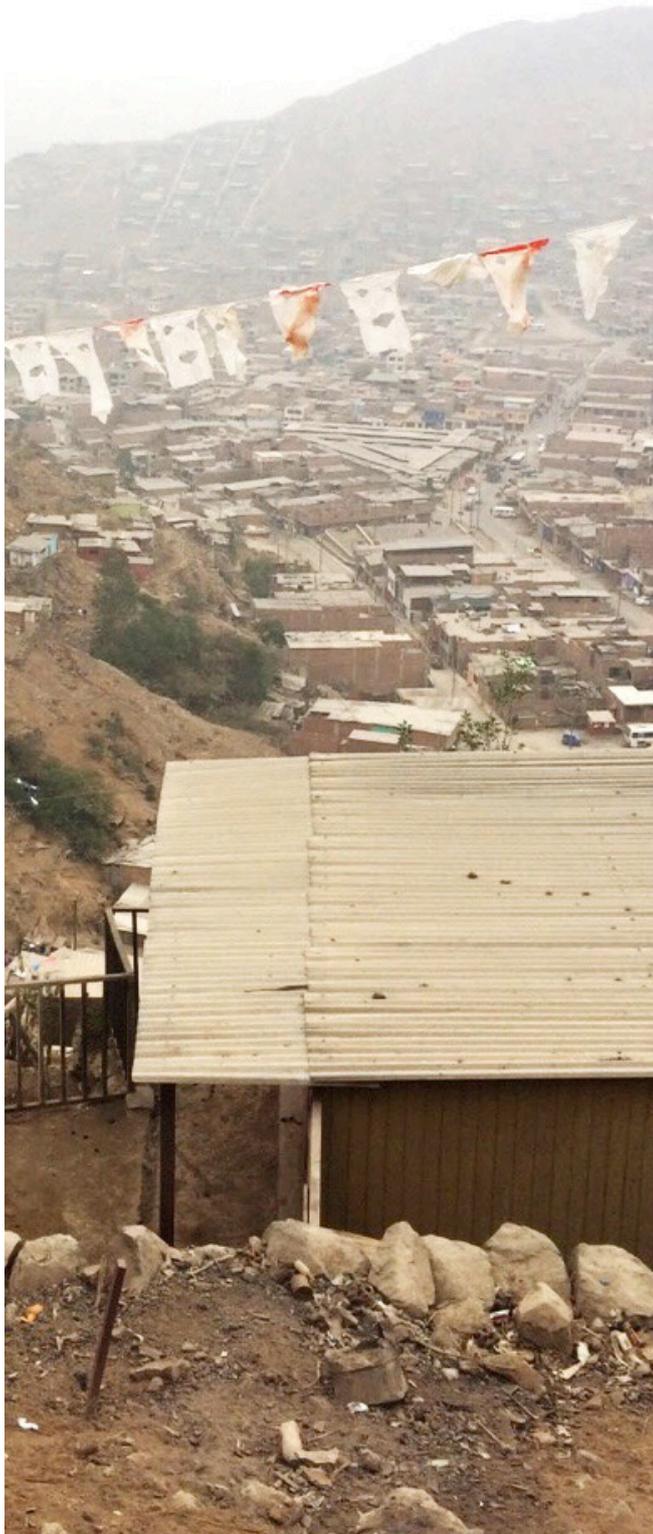


Table 4. Actions for Consolidation strategy

Scale	Action	Actors	Aims	Time Frame	Indicators and actor responsible for monitoring
Mobility					
State & Institutions & Community	Improve stairs and pathways especially at the top of settlements	Responsible: SJL, AF; Involved: NGOs, Community Funding: SJL & AF	Reduced risk of slips and falls for most vulnerable and reduced travel times	Short term	Percentage of households with “improved” access routes Responsible: AF
State & Institutions & Community	Improve roads condition	Responsible: SJL & AF; Involved: NGOs, Community Funding: SJL & AF	Improved vehicular and pedestrian access and reduced travel times	Medium term	Percentage of improved roads Responsible: AF
Basic services					
Community	Construct communal toilets with defined maintenance regime	Responsible: AF; Involved: Institutions, NGOs, Community Funding: AF	Reduced illness, improved living standards esp. access to sanitation	Short term	Number of people that are not using silos Responsible: AF
Individual	Implement eco-sanitation solutions for individual households	Responsible: Individuals, AF; Involved: Institutions, NGOs Funding: Individual	Reduced illness, improved living standards esp. access to sanitation	Short term	Number of people that are not using silos Responsible: AF
Community & Individual	Implement wastewater reuse for irrigation and toilets for individual households	Responsible: AF; Involved: Institutions, NGOs, Community Funding: AF & Individual	More efficient water use and improved access to potable water	Short term	Number of houses using water reuse technologies Responsible: AF
Housing and plot planning					
Individual	Implement programme to improve the quality of housing construction	Responsible: Individual, NGO; Involved: Institutions Funding: For programme - NGO For improvements: - Individual	Improved health and living standards	Medium term	Number of houses with improved quality of housing construction Responsible: AF
Individual	Implement programme to improve the house and on plot planning	Responsible: Individual, Involved: NGO, Institutions Funding: For programme - NGO For improvements: - Individual	Improved health and living standards	Medium term	Number of houses with improved on plot and house planning Responsible: AF
<i>Time frame: Short term – 0 to 1 year, Medium term – 1 to 3 years, Long term 3 to 10 years</i>					

At the edge of the city (JCM), Photograph by Punnat Punsri



Redirecting Finances

Redirecting financing (see Table 6) is critical to the strategy, as it would provide individuals, community members and other actors with funds to embark on projects that would help reduce or mitigate their risks, such as improved infrastructure, as well as improve wellbeing and living standards. This addresses the structural constraint of limited finance and the socioeconomic vulnerability. Relatedly, an equally important step and action is participatory budgeting. Enhanced transparency and coordination through financial monitoring groups would strengthen the relationship between the community and the municipality, resulting in greater citizenship.

Providing alternative finance streams through support for business start-ups, and community infrastructure will address existing reliance on expansion as a source of finance. We also recommend the creation of saving groups or revolving funds, as a form of empowerment (combating the “ability to act constraint” that some groups face). This would also serve to fund both communal and individual risk reduction projects.

Building bridges

The keystone of our strategy is building bridges within the community and between the community and other actors. Allowing communication, creating mutual trust and co-management of the territory. These bridges could allow for an exchange that, in the light of various interests, stimulate the different actors to agree on a ‘collective intent’, rather than a ‘collection of individual motives’.

First, through the implementation of mobile cabinets, where representatives from the municipality engage with the community on the ground, as well as technical tables

Box 3. Case of co-management of water in Caracas

Discussing the tensions between rights-based and market-orientated approaches to water supply, Allen et al. 2006 explain that in the case of “simultaneously responsible consumers and empowered citizens” (Allen et al. 2006:347) in Caracas, co-responsibilities of the actors demonstrated the importance of the exercise of rights and duties towards the creation of responsible citizens, going beyond technical service delivery, foster collective engagement to create ‘responsible citizens’.

or forums (see Box 3 for example as used in Caracas: Allen et al., 2006) where representatives from all actor groups come together to plan and monitor collective actions for risk mitigation. This would in turn change the State / community interaction and create new institutionalised channels of communication.

At the AF and community level, the creation of AF federations will further consolidate efforts for infrastructural improvements as well as services and landscape management. This could be done alongside capacity building towards vulnerability mapping and mapping exercises with external actors.

Table 5. Actions for Valuing and Controlling the Edge strategy

Scale	Action	Actors	Aims	Time Frame	Indicators and actor responsible for monitoring
State & Institutions and Community	Giving AFs the right to manage land use	Responsible: SJL & AFs; Involved: National Government; Funding: N/A	<ul style="list-style-type: none"> - Consolidation without construction of new houses beyond the current 'edge' and in high-risk areas (e.g. reducing community exposure to rockslides) - Transparency in communal management and monitoring of land - Combat land trafficking 	Medium term	No signs of new expansion beyond the existing built territorial boundaries of the AF Responsible: AF
State & Institutions and Community	Creation of green and open spaces	Responsible: AFs & Community; Involved: SJL; Funding: SJL	<ul style="list-style-type: none"> - Valuing the edge of the territory without housing - Reduced rockslides - Building 'sense of community' and responsibility towards city 	Short term	<ul style="list-style-type: none"> - Acreage of green & open spaces per person (particularly in high-risk areas) - Number of households affected by rockslides Responsible: AF
State & Institutions and Community	Regularisation and certification of AF leadership and AF maps	Responsible: SJL; Involved: NGOs, AFs, Community; Funding: N/A	<ul style="list-style-type: none"> - Stop expansion - Combat land trafficking 	Short term	Formal recognition of AFs and official certification of maps Responsible: SJL
State & Institutions and Community	Support Lomas y Laderas project - Lomas and urban agriculture and efficient water use and collection (fog catchers / rain harvesting etc.)	Responsible: NGOs & SJL; Involved: Community; Funding: SJL	<ul style="list-style-type: none"> - Valuing the edge of the territory without housing - Promotion of green & open spaces, and urban agriculture - Water reuse and recycling 	Medium term	Acreage of green & open spaces per person, percentage of vegetation/ agriculture cover, and total area of Lomas Responsible: NGO
State & Institutions and Community	Periodic mapping of territory	Responsible: AF; Involved: SJL, NGOs, Community; Funding: SJL	<ul style="list-style-type: none"> - Enhanced visibility and transparency of maps and boundaries - Active community participation - Stop expansion - Combat land trafficking 	Short term	Frequency of cartographic and informative updates Responsible: SJL

Time frame: Short term – 0 to 1 year, Medium term – 1 to 3 years, Long term 3 to 10 years

This would simultaneously result in the reorganisation of faenas to benefit all members of the community, as well as the creation of opportunities for the activation of agency and participation in planning, decision making and risk reduction.

It is essential that AF estatutos (by-laws) ensure inclusiveness of vulnerable groups and acknowledge partnerships and collective actions with the State, the municipality, institutions, other AFs and the community. This is important to guarantee that the community members visualize the existing notion of 'inabilities to act' and rectify this accordingly.

Table 6. Actions for Redirecting Finances strategy

Scale	Action	Actors	Aims	Time Frame	Indicators and actor responsible for monitoring
State & Municipality	Action	Responsible: National Gov. & SJL; Involved: NGOs, AF, individual; Funding: N/A	- Finance for communal and individual risk reduction projects - Integrate the most vulnerable into SJL - Quality of housing improved	Medium term	Implementation of proposal Responsible: AF
State & Municipality	Use finance from national program - 'Bono para reforzar viviendas vulnerables a sismos' for general infrastructure improvements	Responsible: SJL; Involved: Nat. Gov., NGOs, AF, individual; Funding: N/A	Finance for communal and individual risk reduction projects	Medium term	Implementation of proposal Responsible: AF
Municipality & Community	Raise finance from municipal level concessions on non-mining activities	Responsible: SJL,AFs; Involved: Institutions, NGOs, other reps. Funding: SJL & AF	- Transparency and coordination of financing - Building community/municipality relationship - Fostering citizenship	Medium term	- Number of meetings and attendees per year - Compliance to agreements Responsible: SJL
Municipality & Community	Set up financial monitoring group	Responsible: SJL; Involved: National Gov., Individuals; Funding: N/A	Labour for risk reduction projects.	Short term	- Implementation of proposal - No. of taxpayers working Responsible: SJL
Municipality & Community	Establish system to allow working instead of paying municipal tax	Responsible: SJL; Involved: AF, Community; Funding: N/A	Transparency and coordination of financing	Short term	Number of projects proposed by each AF Responsible: SJL
Community	Monitoring of degree of participation in participatory budgeting	Responsible: NGO; Involved: Community; Funding: N/A	Finance for communal and individual risk reduction projects	Short term	- Implementation of proposal - Number of participants Responsible: NGO
Municipality & Community	Set up saving groups / revolving funds	Responsible: SJL, NGOs; Involved: AF, Community; Funding: SJL	Finance communal and individual risk reduction projects	Long term	-Number of jobs in new business /Start-ups supported Responsible: SJL

Time frame: Short term – 0 to 1 year, Medium term – 1 to 3 years, Long term 3 to 10 years

Table 7. Actions for Building Bridges strategy

Scale	Action	Actors	Aims	Time Frame	Indicators and actor responsible for monitoring
State & Institutions	Establish mobile cabinets	Responsible: SJL; Involved: NGOs, AFs, Community; Funding: SJL	- Continual engagement between community and SJL leading to non-clientelistic relationship - Women have space to act on risk - Inclusiveness of vulnerable groups	Short Term	- Regularity of walks and engagement - Satisfaction level of community Responsible: SJL
Municipality & Community	Technical tables / forums in the community	Responsible: SJL; Involved: AFs, Institutions, NGOs, other representatives; Funding: SJL	- Continual engagement between community and SJL leading to non-clientelistic relationship - Women have space to act on risk - Increased knowledge and capacity to respond to risk for all participants - Transparency in decision making	Short Term	- Number of meetings and attendees per year - Compliance to agreements Responsible: SJL
Community	AF federations	Responsible: AFs; Involved: Community; Funding: AF	- Stronger representation and increased visibility for parts of JCM - Increased knowledge and capacity to respond to risk through knowledge sharing	Short Term	- Number of joint initiatives for mobility, infrastructure & services Responsible: AF
Community	Vulnerability mapping and reorganisation of the focus of the faenas for this most vulnerable	Responsible: AF; Involved: NGOs, Community; Funding: AF	Support for most vulnerable	Short term	- Extent of vulnerability mapping carried out - Number of projects targeting those identified as most vulnerable Responsible: AF
Municipality & Community	Combined mapping and capacity building (including periodic mapping) between SJL and AF	Responsible: SJL; Involved: NGOs, AF, Community; Funding: SJL	- Relationship built between SJL and all of communities - Community participation, including vulnerable groups	Medium term	- Number of workshops - Men to women ratio participants Responsible: SJL
Municipality & Community	Checking / updating AF estatutos (by-laws) to ensure they focus on the most vulnerable and include new relationships e.g AF federation and with SJL	Responsible: AF; Involved: SJL, NGOs, Community; Funding: N/A	- Relationship built between SJL and all of communities - Community focus on vulnerable groups	Medium term	- Number of estatutos checked and updated Responsible: NGO

Time frame: Short term – 0 to 1 year, Medium term – 1 to 3 years, Long term 3 to 10 years

The combination of these will address many of the aspects of the risk traps related to clientelism and assistentialism, reactive and unplanned approach and the perceptual drivers.

7.3 Right to the City

Moving beyond risk, co-responsibility contributes to the production of a socially just space, where inhabitants have equitable access to land-use and basic services, fair share of responsibility towards the management of resources, as well as a dignified life (Purcell, 2002). This builds upon Lefebvre's work that describes the 'right to the city' as the right of every citizen to participate in the production of urban spaces regardless of socioeconomic status – encompassing socially constructed everyday relations and political decisions (Costes, 2010), potentially leading to urban democracy through a series of participative processes (Purcell, 2002; Harvey, 2010).

Institutionalising the right to the city can lead to a change in the overarching political economy, cultural norms, and hence, achieve transformative change (Pelling 2011:51).

8. Discussion and Limitations of Strategies

8.1 Role of AFs

As identified, AFs have a central role in the implementation of our strategies. Therefore, success of these strategies will be heavily dependent on the integrity and effectiveness of the AFs – in coordinating actions and partnerships, as well as managing land and finances. The effectiveness of the strategies is also contingent on the AFs' abilities to include everyone in decision-

making processes, including members of more vulnerable groups. Nevertheless, our studies show that the community and the AFs are ready to work together to implement and monitor the strategies. This is evident from the initiation of the AF Federation which took place in April this year (2015).

8.2 Structural Conditions at National Scale

Based on our definition of risk traps, there are aspects of the risk traps that are at the national scale. Addressing the structural conditions at this scale is therefore necessary. These include addressing tensions between risk management policy and realistic practice. For example, while some institutions view resettlement as the only solution, current housing and land use policies are ineffective at providing adequate housing. Clarifying national policies and improving coordination between the State institutions would help eliminate legal grey areas, such as the speculation that Law 28687 will be changed again (see Appendix G).

9. Conclusion

Physical everyday risks in JCM have serious impacts on the community's lives. However, it is often overshadowed by big disasters such as earthquakes, resulting in limited attention of it by institutions and the State.

Our preliminary research led us to explore the key facets of physical everyday risk and how they are distributed demographically and spatiotemporally. Our fieldwork and further secondary research provided us with a nuanced understanding of physical everyday perception, experience, and responses from a range of actors, as well as its causes. The findings were critical to

Plaza de Armas. Photograph from enlima.com.



our diagnosis of the drivers of risk traps – primarily the structural conditions and socioeconomic positionality, which form the environment for the other components.

From our analysis, we concluded that the strategies to create transformative change should be focused on achieving a situation where there is co-responsibility between the community and the State and institutions. Beyond disrupting the risk traps, co-responsibility at the edge of the city can foster a more socially-just city.

Further research can be done to deepen the understanding of physical everyday risk in peripheral and marginalised areas. These include studies on:

- The relationship between socioeconomic positionality and household investments for risk reduction
- Institutional and State finances / funding for everyday risk reduction
- Women's role in the community and the nuances of this on individual and collective coping mechanisms
- A richer understanding of men's perspectives and experiences for a concerted vision between both genders.
- Assessment of the effectiveness of the AF federation and collective actions, such as the Lomas y Laderas project.
- Avenues for scaling up these strategies to the city-scale and to other metropolitan areas with similar challenges

View over JCM. Photograph by Teresa Belkow



References

- Adam, B., Beck, U. & Loon, J. (2000) *The Risk Society and Beyond*. London: SAGE.
- Allen, A., Davila, J. D. & Hofmann, P. (2006) *The Peri-urban Water Poor: Citizens or Consumers?* *Environment & Urbanization*.18(2). pp. 333-351.
- Arubayi, D. et al. (2014) José Carlos Mariátegui. Clearing the Fog: Investigating Environmental Injustice in José Carlos Mariátegui. In: Allen, A., Lambert, R. (eds.) *Environmental Justice in Lima: Co-learning for Action*. DPU, the Bartlett, University College London. London. pp. 76-107.
- Barrientos, A. (2007) *Does Vulnerability Create Poverty Traps?*. Institute of Development Studies (IDS) at the University of Sussex. Brighton.
- Bearzatto, S. (2014) *Cultivating the Edge. The Current Process of Expansion of the Marginal Barrios of Lima: A Sustainable Vision for José Carlos Mariátegui in San Juan de Lurigancho*. Msc Thesis in Human Settlements. University of Leuven, Leuven.
- Bull-Kamanga, L. et al. (2003) *From Everyday Hazards to Disasters: The Accumulation of Risk in Urban Areas*. *Environment and Urbanization*, 15(1). pp.193-204.
- Cairncross, S. (1989) *Water Supply and the Urban Poor*. In: Cairncross, S., Hardoy, J. E. Satterthwaite, D. (eds.) *Poor Die Young : Housing and Health in the Third World Cities*. London: Earthscan. pp. 109-126.
- Carlsson, L., & Berkes, F. (2005) *Co-Management: Concepts and Methodological Implications*. *Journal of Environmental Management*. 75(1). pp. 65-76.
- COFOPRI (2015) *Sistema de Formalización/ Diagnóstico y Saneamiento Integral*. [Online] Lima: COFOPRI. Available from: [Http://Www.Cofopri.Gob.Pe/Index.Aspx?Flag=En12](http://www.cofopri.gob.pe/index.aspx?flag=en12) [Accessed: 03 June 2015]
- Costes, L. (2010) *Le Droit à la Ville de Henri Lefebvre: Quel Héritage Politique et Scientifique?*. *Espace et Sociétés*. 1 (140-141). pp. 177-191.
- Dercon, S. (2003) *Poverty Traps and Development: the Equity-Efficiency Trade off Revisited*, Mimeo. Oxford: Oxford University Press.
- DPU (2015) *Disrupting Urban "Risk Traps": Bridging Finance and Knowledge for Climate Resilient Planning in Lima*. [Online] London, Available at:[Http://www.bartlett.ucl.ac.uk/dpu/news/disrupting-urban-risk-traps-climate-resilient-planning-lima](http://www.bartlett.ucl.ac.uk/dpu/news/disrupting-urban-risk-traps-climate-resilient-planning-lima) [Accessed: 30 May 2015].
- Elbers, C. J., Gunning, W. & Kinsey, B. (2003) *Growth and Risk*. Discussion Paper TI 2003-068/2. Tinbergen: Tinbergen Institute
- Foth, M. ed. 2008. *Handbook of research on urban informatics : the practice and promise of the real-time city*. New York: Hershey.
- Fraser, N. 1996. *Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation*. The Tanner Lectures on Human Values, Stanford University, pp. 1-67.
- Friendly, A. (2013) *The Right to the City: Theory and Practice in Brazil*. *Planning Theory & Practice*. pp. 158-179.
- Graziano, L. (1976) *A Conceptual Framework for the Study of Clientelistic Behavior*. *Eur J Political Res*. 4(2). pp. 149-174.
- Habermas, J. (1981) *Theorie des Kommunikativen Handelns*. Frankfurt am Main: Suhrkamp.
- Harvey, D. (2010) *The Right to the City*. In *Social Justice and the City*. University of Georgia Press. pp. 315-331.
- Healey, P. (1992) *Planning through Debate: The Communicative Turn in Planning*. *The Town Planning Review*. 63 (2). pp.143-162.
- Hordijk, M., Sara, L.M. & Sutherland, C. (2014) *Resilience, Transition or Transformation? A Comparative Analysis of Changing Water Governance Systems in Four Southern Cities*. *Environment and Urbanization*, 26(1), pp.130-146.
- INEI (2014) *Población y Vivienda*. Available at: <http://www.inei.gob.pe/estadisticas/indice-tematico/poblacion-y-vivienda/> [Accessed 30 May 2015]
- Innes, J. E. (2004) *Consensus Building: Clarifications for the Critics*. *Planning Theory*. 3 (1). pp. 5-20.
- IUCN (1996) *Resolutions and Recommendations*. World Conservation Congress. Montreal (Canada). 13-23 October, 1996. *Before and after the Crisis*. Working Paper. [Online] Jakarta: SMERU. Available at: <http://iucn.org/wcc/resolutions/resrecen.pdf> [Accessed 04 June 2015].
- Javed, A. et al. (2013) José Carlos Mariátegui. *Between the City and the Sky: Consolidation without Expansion*. In: Allen, A., Lambert, R. (eds.) *Risk and Urban Development: Present Outlooks, Possible Futures*. DPU, the Bartlett, University College London. London. pp. 112-180.
- Levy, C. (2007) *Defining Collective Strategic Action Led by Civil Society. The Case of CLIFF, India*. 8th N-AERUS Conference. DPU, the Bartlett, University College London. London. pp. 1-29.
- Meinert, S. (2014). *Field manual - Scenario Building*. [Online] Brussels: Etui. Available from:http://www.etui.org/content/download/13953/114820/file/2014_Scenario_Building_DEF.pdf [Accessed: 21 June 2015]

- Ostrom, E. (1990) *Governing the Commons: the Evolution of Institutions for Collective Action*. New York: Cambridge University Press. pp.270.
- Pelling, M. (2011) *Adaptation to Climate Change: From Resilience to Transformation*. London: Routledge
- Perú. Ley No. 29869. Ley de Reasentamiento Poblacional Para Zonas de Muy Alto Riesgo No Mitigable 2012. Lima. Congreso de la República.
- Perú. Decreto No. 048-2011-PCM. Decreto Supremo que Aprueba el Reglamento de la Ley No. 29664, que Crea el Sistema Nacional de Gestión del Riesgo de Desastres (SINAGERD) . Lima. Presidencia del Consejo de Ministros.
- Perú. Ley No. 29664. Ley que Crea el Sistema Nacional de Gestión del Riesgo de Desastres (SINAGERD) 2011. Lima. Congreso de la República.
- Perú. Ley No. 28687. Ley de Desarrollo y Complementaria de Formalización de la Propiedad Informal. Acceso al Suelo y Dotación de Servicios Básicos 2004. Lima. Congreso de la República
- Perú. Decreto Legislativo No. 803. Ley de Promoción del Acceso a la Propiedad Formal 1996. Lima. Congreso de la República.
- Purcell, M. (2002) Excavating Lefebvre: the Right to the City and its Urban Politics of the Inhabitant. *Geojournal*. 58(2/3). pp. 99-108.
- Rose, G. 1997. Situating knowledges: positionality, reflexivity and other tactics. *Progress in Human Geography*, 21, pp. 305–20
- Singleton, S. (1998) *Constructing Cooperation: The Evolution of Institutions of Co-management*. Ann Arbor: University of Michigan Press
- Sverdlik, A. (2011) Ill-Health and Poverty: A Literature Review on Health in Informal Settlements. *Environment and Urbanization*. 23(1). pp.123-155.
- Swyngedouw, E. (2005. Governance innovation and the citizen: The Janus face of governance-beyond-the-state. *Urban Studies*, 42(11), pp.1991–2006.
- Suryahadi, A. & Sumarto, S. (2001) The Chronic Poor, the Transient Poor, and the Vulnerable in Indonesia.
- Wisner, B. et Al. (2004) *At Risk: Natural Hazards, People's Vulnerability and Disasters* 2nd Ed., London: Routledge.
- World Bank (1999) Report from the International Workshop on Community-Based Natural Resource Management (CBNRM). [Online] Washington, DC. May 1998. Available at: [Http://Info.Worldbank.Org/Etools/Docs/Library/97605/Conatrem/Conatrem/Documents/May98Workshop_Report.pdf](http://Info.Worldbank.Org/Etools/Docs/Library/97605/Conatrem/Conatrem/Documents/May98Workshop_Report.pdf). [Accessed 04 June 2015].
- UNISDR (2004) Terminology: Basic Terms of Disaster Risk Reduction. Available from: <http://www.unisdr.org/2004/wcdr-dialogue/terminology.htm> [Accessed 30 May 2015].

NOTES TO CHAPTER 5

1. This term has been traditionally introduced as a feminist critique to an assumed objectivity of science and urges researchers to acknowledge their position within their knowledge production (Rose, 1997). However, we use this term in a broader sense, namely to explain how a person's perception is dependent upon its position within an overarching social, economic and cultural structure as defined in Foth (2008). Whereas the

concept of positionality in our field research stays vague since the complexities underlying an individual position can only be approximated, we believe that it is important to conceptually maintain this level of complexity, which ultimately defines individual experiences and perceptions. For example, positionality related to gender roles influences women's and men's perceptions differently.

Appendices

A. Field Trip Schedule

Table A1.1: Field trip schedule with aims and objectives

Date	Time	Format	Activities	Objectives
26 April (Sun)	All day	City tour	Tour	To gain a general overview of Lima, particularly three of the six main areas of study
27 April (Mon)	09:30-14:00	Presentation	Presentation with partners and panel discussions	To obtain feedback from the panel and external partners as a guidance towards revising our pre-field research focus
	17:00-21:00	Meeting with community and their leaders	Attended meeting as an observer	To gain a better understanding about community affairs, particularly the aims and objectives of AF federations
28 April (Tue)	All day	Fieldwork	Transect walks	To enhance initial understanding of environmental conditions, risks and access routes in JCM
29 April (Wed)	09:00-10:30	Conference	Attended talk by Alberta Ibanez (Technical coordinator of PLAM)	Main topic: <ul style="list-style-type: none"> Understanding risk
	10:30-13:00	Conference	Attended talk by Linda Zilbert (Risk expert from INDEC)	Main topic: <ul style="list-style-type: none"> Defining and mapping risk
30 April (Thu)	09:00-13:00	Conference	Attended talks by Carlos Franco Pacheco (advisor to the IMP) and Josue Cespedes Alarcon (SEDAPAL)	Main topics: <ul style="list-style-type: none"> Water as a human right SEDAPAL water provision plan for Lima
1 May (Fri)	All day	Fieldwork	Household surveys and interviews with members of the community	To obtain primary geo-referenced data about household expenditure, housing conditions, perception of physical everyday risks, and perception of AFs
2 May (Sat)	All day	Group work	Preparation for first focus group	-
3 May (Sun)	09:00-13:00	Fieldwork	Focus group	To investigate perceptions, opinions and attitudes towards physical everyday risk and risk reduction

	14:00-17:00		Household surveys and interviews with members of the community	To obtain primary geo-referenced data about household expenditure, housing conditions, perception of physical everyday risks, and perception of AFs
4 May (Mon)	14:00-17:00	Group work	Preparation for female focus group	-
5 May (Tue)	09:00-17:00	Fieldwork	Household surveys and interviews with members of the community	To obtain primary geo-referenced data about household expenditure, housing conditions, perception of physical everyday risks, and perception of AFs
	17:00-19:00		Female focus group	To investigate women's experiences of risk, current responses and collective action
6 May (Wed)	09:00-13:00	Conference	Attended talk by Cecilia Esteves	Main topic: <ul style="list-style-type: none"> Real estate market in Lima
7 May (Thu)	All day	Group work	Preparation for strategy workshop	-
8 May (Fri)	All day	Group work	Preparation for strategy workshop	-
9 May (Sat)	All day	Group work	Preparation for strategy workshop	-
10 May (Sun)	09:00-13:00	Fieldwork	Strategy workshop	To discuss, refine and innovate strategies under four themes: consolidation; housing and plot planning; water and sanitation; and mobility
11 May (Mon)	09:00-17:00	Group work	Preparation for final presentation and video	-
12 May (Tue)	All day	Final presentation	Presentation to guests from communities and institutions	Presentation of our findings, analysis along with opportunities explored during final Sunday workshop with the community Open up space for discussion among all stakeholders present

B. Transect Walk

B.1 Transect Walk Map

Map B1.1: Map of transect walk locations

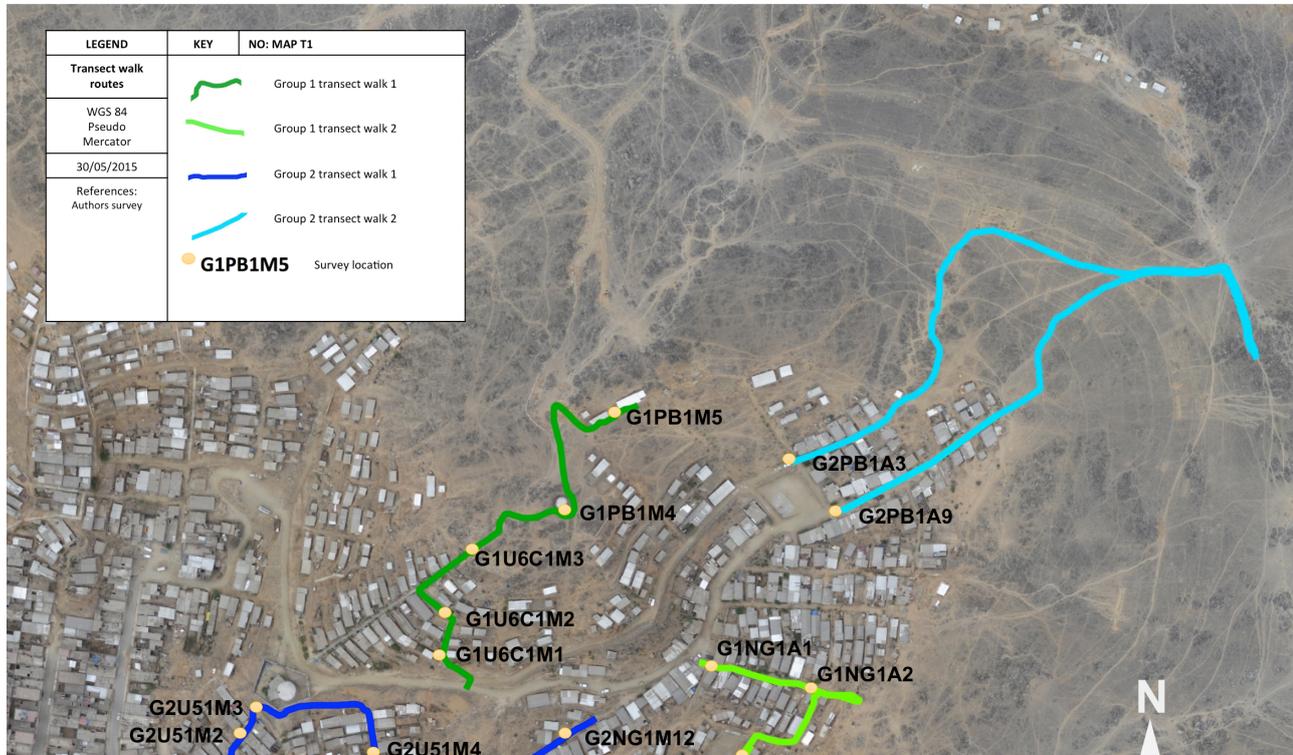


Table B2.1: Observations from Transect Walk 1 by Group 1

Reference	G1U6C1M1	G1U6C1M2	G1U6C1M3	G1PB1M4	G1PB1M5
Distance between steps	Starting point	15-20m	20-25m	25-30m	15-20m
Variance (topography)	Steep slopes; rocky terrain	More terraces; larger rocks; less steep than previous reference point	Top of a hill; flattened land (for collective purposes)	Top of a hill; not very steep	Almost top of a hill; steep but already flattened through land traffickers' organisations
Density: demographic	250 families occupying entire settlement, averaging 5 people per household	250 families occupying entire settlement, averaging 5 people per household	N/A (no houses because there is no more room for further expansion within the AF)	Low density because area is under expansion	Uninhabited
Density: physical	Fully consolidated as all plots are occupied	Fully consolidated as all plots are occupied	Still low but under expansion to the perimeter	Scattered houses (land from PB is encroached by land traffickers)	In process of occupation
Date of settlement	2001	2012	2013	2014	2014-2015
Size of plots	≈ 7x5m	≈ 5x10m	N/A	N/A	≈ 7x5m
Housing conditions	Wooden structures; tin roofs; cemented pircas; concrete platforms; houses locked when unoccupied - ventilation a big problem since there are no windows (e.g. poor air conditions when cooking)	Mostly wooden houses; tin roofs - more windows but these cannot be opened so ventilation is still a problem	-	Wooden shacks	Much larger plots; larger wooden structures; pre-fabricated
Water provision	14 families do not have water connections so require use of buckets to obtain water from elsewhere	Most houses are not connected to water network	-	SEDAPAL tank - provides water to PB and NG households via connections	Houses that are inhabited have tanks; land traffickers open roads so water trucks and water vendors can access the area; storage capacity is higher than average
Sanitation access	Silos (at times sheltered, sometimes shared by 4 families)	Shower area; silos far way - problematic at night because lights are only available inside houses so injuries as a result of darkness is common (informant expresses this as a major concern because she has a daughter)	-	-	Silos
Self-water management	Pipe to openly discharge wastewater from households or roofs (typically on plants)	Redirect water - this can be considered as hazardous as it results in slippery staircases	-	-	-
Vegetation	Trees provided by the municipality's afforestation process	Forestation of collective pathways; small individual gardens	-	-	Forestation on border with PB (kept by faenas)
Conditions of roads/paths/stairs	Precarious staircases, but these have been improved by 150 community members (faenas) so currently less steep and wider steps - but still gets very slippery when it rains	Improvised; improved pedestrian pathways	Very precarious	Spontaneous	Improved through machines and explosives
Accessibility of roads/paths/stairs	Roads cannot be extended further because someone claimed to have owned the plot; solid waste management meant staircases enabled access to the main road; roads facilitate cars but not trucks	Connection to roads but only through pedestrian pathways	Difficult - steps are very basic, precarious and unstable	Poor accessibility	Medium accessibility

Retaining walls	Some have cement while others are formed merely from a pile of stones	Formed from slightly looser and larger rocks	Under construction through faenas (improved)	Few individual pircas	Individual retaining walls that are sub-contracted
Collective facilities	-	Small open space is being flattened	Intend to have a 'children's-play' area but this requires land clearing/flattening and breakdown of rocks - this area under construction is the only open space in the whole settlement	Only SEDAPAL tank	Only plots
Signs of small disasters	People are fearful of seismic activity as retaining walls are not strong enough to withstand them (informant experienced two signs of significant activity since moved in); loose small stones; strong winds are experienced approximately three times a year (roofs can fly)	Fires are common because of informal electricity connections (not sure if lives are lost but certainly major property damage); diarrhea a big problem amongst children especially the youngest	Really large boulders; holes in the ground	Lots of litter; rockslides - rocks are constantly removed and land is constantly flattened	Loose rocks
Other observations	Informant moved in during 2012 due to family problems about inheritance; old settlers moved in since 2001 (these typically have services if paid for it) while new settlers moved in from 2012 onwards; 24 families have land titles (no one has COP); there have been constant promises of forthcoming services (every Thursday), but usually nothing is done; municipality visits the area via trucks three times a week	People attempt to manually reduce rocks, but some remain because very large boulders cannot be moved in the absence of technology - these disrupt mobility; most houses are built after 2012; inadequate conditions of safety (e.g. steep slopes) Informant works as a tailor in SJL and no longer lives with her partner - she doesn't remember that she wasn't granted a COP (been informed of false regulations regarding age and the applicability of land possession)	Rocks are broken down to construct terraces elsewhere (e.g. small rocks are used for pircas); shortage of money results in collective areas being claimed (hence present dilemma of whether to continue the construction of the open space for exemplification)	Land traffickers area - point of observation between PB and land traffickers settlement	People inhabiting the area can pay for labour

Table B2.2: Observations from Transect Walk 2 by Group 1

Reference	G1NG1A1	G1NG1A2	G1NG1A3
Distance between steps	Starting point	20m	15m
Variance (topography)	Slope but not steep	Very steep slopes	Typical steep slopes
Density: demographic	Small size families (mostly couples/individuals)	Young families with lots of children	Young families with lots of children (and siblings/cousins)
Density: physical	Fully consolidated	Half consolidated/half uninhabited	Not fully built up so not all plots are occupied
Date of settlement	1999-2000	2014	After 2008
Size of plots	≈ 5x7m	≈ 6x12m	≈ 6x10m
Housing conditions	Mixture of wooden houses and those made from bricks; improved concrete floors	Prefabricated	Wooden houses; improved concrete floors
Water provision	Connected to pipes but not the main network	-	Jalar (pulling water from other houses, e.g. 10m down); water stored in buckets
Sanitation access	Connected to pipes but not the main network	-	-
Self-water management	Some instances of rainwater harvesting	-	-
Vegetation	Individual gardening and greening in plots (sourced by political candidates)	-	Trees along main staircases
Conditions of roads/paths/stairs	Improved roads that are wide enough for motorised access	Spontaneous pathways; precarious staircases	Very precarious staircases
Accessibility of roads/paths/stairs	Good accessibility - can be accessed by all types of cars up to this point	No accessibility by car	Limited accessibility; flat side path
Retaining walls	Consolidated but not concrete	Consolidated but not concrete; stone pircas	Consolidated but not concrete; more basic structures
Collective facilities	Meeting and information point	-	Close proximity to football field
Signs of small disasters	Staircases a risk especially when it rains; erosion as a result of people getting rid of water from houses	Injuries from poor accessibility; gastrointestinal diseases (particularly affecting young population) due to inadequate water and sanitation	Risk of injuries from poor accessibility and slippery terrain

Table B2.3: Observations from Transect Walk 1 by Group 2

Reference	G2U51M1	G2U51M2	G2U51M3	G2U51M4	G2U51M5
AF	U5	U5	U5	U5	Not defined
Distance between stops	0	30	20	20	50
Variance (topography)	-	Steep steps	Steep steps	Steep steps	Flat area by road
Density: demographic	6	8	4	-	-
Density: physical	Dense; two-storey building	One-storey houses; built-up	One-storey houses; built-up	One-storey houses and two-storey floor; built-up	Space between AFs; U6C a little more dense than U5
Date of settlement	1990's	2002	2002	-	-
Size of plots	120 sq m each plot	15m x 16m	15m x 16m	15m x 16m	U6C ≈ 10m x 8m
Housing conditions	Brick wall; concrete floor; concrete roof	Wooden / plastic walls; concrete floor; metal roof	Wooden / plastic walls; concrete floor; metal roof	Wooden / plastic walls; concrete floor; metal roof	Wooden / plastic walls; metal roof
Water provision	Yes, inside the house	Yes, inside the house	Yes, inside the house; since 2010; NS 35 per month	Yes, inside the house	-
Sanitation access	Toilet in the house	Yes, inside the house	Yes, inside the house	-	-
Surface-water management	Don't collect surface water	Don't collect surface water	Don't collect surface water	Don't collect surface water	Not visible
Vegetation	No space to grow plants; small plant on a balcony / window	Small plants; grow apples	More plants as we go up	More plants	Some individual plants
Conditions of roads/paths/stairs	Tarmac roads; neighbourhood made steps in 2009	Concrete steps	Concrete steps	Paths get improvised by water tank but a lot of people seem to use it	Formed road; concrete steps; improvised paths
Accessibility of roads/paths/stairs	1h 30min to the centre of Lima	Steep steps	Steep steps	Steep steps	Road for cars
Retaining walls	Concrete foundation; improvised	Mortared pirca	Concrete foundations	Pirca	Pirca
Collective facilities	The bus stop ('main square' in JCM) is meant to be a park; bus companies pay to use the space?	The bus stop ('main square' in JCM) is meant to be a park; bus companies pay to use the space?	The bus stop ('main square' in JCM) is meant to be a park; bus companies pay to use the space?	-	-
Signs of small disasters	Everyone has crackings (wall) since the earthquake of 2007	Some small rocks falling	Landslide nearby; fear that water tank could fall during a landslide	Small unstable rocks	Unstable rocks
Other observations	Respiratory problems with children in the winter; ground gets muddy every winter; roof storage	U15: 12 families; water / rain causes landslides; in 2013 the neighbours right hand and left hand are different	Two shops left hand have land title (under Fujimori) while those right hand have only COP; during the earthquake in 2007 the pirca fell down; children sick due to climate	-	The road and evacuation area is between AFs; trees planted around the retaining walls

Table B2.4: Observations from Transect Walk 2 by Group 2

Reference	G2U4A1M6	G2U4A1M7	G2NG1M12	G2PB1A3	G2PB1A9
AF	U4A	U4A	Nueva Generación	Portada de Belén	By football pitch
Distance between stops	-	30	-	-	-
Variance (topography)	-	Just as steep	Steep steps	Steep staircase	-
Density: demographic	5	-	≈ 4-6	3	-
Density: physical	One-storey houses; built-up	-	Built-up, one-storey house	-	-
Date of settlement	2012	2006	2002	2013	-
Size of plots	6m x 12m	6m x 12m	20m x 20m	8m x 16m	-
Housing conditions	Wooden / brick walls; concrete floor; metal floor; some windows with glass	Similar but with some completely wooden houses; steps to first floor; houses towards the bottom are very basic / only wooden	Brick wall; concrete floor; concrete roof	Wood wall; concrete floor; tin roof	-
Water provision	Yes, inside the house; NS 10 to 12 per month	Yes, inside the house	Yes, inside the house	No; water from neighbours; two soles per month	-
Sanitation access	Inside the house	Inside the house	Inside the house	2m deep pit latrine	-
Surface-water management	They collect rainwater for toilet and plants in winter	Some houses harvest rainwater	Collecting rainwater; to put it on the ground	-	-
Vegetation	Plants in plots only (more on lower steps); some in evacuation area	-	-	Very little; small bushes	-
Conditions of roads/paths/stairs	Concrete steps; improvised steps	Concrete steps; improvised steps	Path very bad but some improvement	Very improvised; holes in the road	-
Accessibility of roads/paths/stairs	20min to get to school	Path in front of the house	-	Bad road accessibility; 20min to walk to the bus; 25 min to clinic	-
Retaining walls	Pirca	Concrete foundation; pirca (built in 2012)	-	Pirca fell down in 2012	-
Collective facilities	Local community hall	-	-	Football pitch	-
Signs of small disasters	Pirca fell in winter 2014; these rocks damaged the house (holes in the walls)	Small earthquake, which damaged walls; no fires	Pirca falling down is a problem	Rain seeps into house; rockslides in the upper parts	They (children) have fallen down; They saw a truck making the road and it knocked down stones that damaged houses; an old woman 'Abuela Verde' lives in the slopes and she fell down
Other observations	U4A has 29 plots; they have ducks and chicken; made pirca in 2000 – there is a project to make pirca concrete but they have no money; they build the steps in concrete for street lighting; they have electricity in 2012; steps in concrete stop between last house and road, therefore they sweep water on dusty paths to make	No titles; problem with young people from other AFs drinking alcohol and smoking but the leader spoke to them and they did not come back; soup kitchen but not enough money; young people from other AFs go into houses and steal things	Informant came for a church mission and has stayed; evangelistic pastor (Assemblies of God Church); church at top of hill (30 members, self-financed and own faenas) – evangelist community lives in the area around the church; NG's biggest problem is water and sanitation; no titles in the area; houses on the road have water and	Last faena built roads by hand; informant doesn't know what the AF do with the money; sometimes they don't have water, due to maintenance of pilon; first house on the road has water; 3000 soles for engineer to put in water pipe (not SEDAPAL) – hence, residents dug trenches; 3000 soles for new plot – she bought her plot for 250	Both parents work and so children are left on their own
	concrete walls for the house because the pirca fell down twice, more problematic in winter; no one has land title here, only CV (?); faenas every two weeks; they are talking about making the steps in the next area wider; informant fears for her children because of steep slopes; concrete walls built by house while the pirca is built by the community		don't have water or sanitation; houses with water give water to other houses every 3-4 days; no fires Informant's mother-in-law is 90 years old: problem with mobility, she can't go down without help; they have to go to the doctor because they won't come here	faenas every 15 days; upper parts of the settlements don't have COP	

C Surveys

C.1 Survey Questionnaire

No.	Question / Pregunta	Response / Respuesta					
I	AF						
II	Plot no. / no. lote						
III	Location / Ubicación	<i>Location allocated by Epicollect</i>					
IV	Type of floor / Piso	Raised floor / Falso piso	Concrete / Concreto	Soil / Tierra	Others / Otros		
V	Type of roof / Techo	Metal / Calamin	Brick / Ladrillo	Rattan / Estera	Wood / Madera	Others / Otros	
VI	Type of walls / Paredes	Metal / Calamina	Brick / Ladrillo	Rattan / Estera	Wood / Madera	Drywall / Drywall	Others / Otros
VII	Type of pirca / Tipo de pirca	Concrete / Concreto	Brick / Ladrillo	Stone and mortar / Piedra y concreto	Drystone / Piedra	Others / Otros	
VIII	Type of access route / Tipo de ruta de acceso	Concrete stairs / Escalera de concreto	Stone stairs / Escalera de piedra	Improvised road / Carretera sin asfaltar	Improvised path / Camino peatonal	Others / Otros	
IX	Condition of the access route / Condiciones de las vías y caminos	Satisfactory / Satisfactoria	In need of improvement / Requieren de mejoras	Dangerous / Peligrosas			
<i>Demographics</i>							
1	Name / Nombre	2 Age / Edad	3 Gender / Género	M <input type="checkbox"/>	F <input type="checkbox"/>		
4	Are you the head of household? / Es Usted el Jefe de Familia?	Yes <input type="checkbox"/> No <input type="checkbox"/>					
5	Where are you from? / Dónde nació?	JCM <input type="checkbox"/> SJL <input type="checkbox"/> Other districts of Lima / Otros distritos de Lima <input type="checkbox"/> Other provinces / Otras <input type="checkbox"/>					
6	Where did you live before moving to this house? / Dónde vivía antes de llegar a JCM?	JCM <input type="checkbox"/> SJL <input type="checkbox"/> Other districts of Lima / Otros distritos de Lima <input type="checkbox"/> Other provinces / Otras <input type="checkbox"/>					
7	When did you arrive? / Cuándo llegó a JCM?	Year (typed in) / Año de llegada:					
8	Why did you come to JCM? / Por qué vino a JCM?	Family connections / Otros familiares vivían aquí <input type="checkbox"/> Job opportunities / Oportunidades laborales <input type="checkbox"/> Land/plot/house availability / Facilidades para obtener un lote <input type="checkbox"/> Others / Otros <input type="checkbox"/>					
9	Do you live here permanently? / Vive Usted aquí de forma permanente?	Yes <input type="checkbox"/> No <input type="checkbox"/>					
10	How many people live in the house? / Cuántas personas viven con Usted en esta casa?	Men / Hombres ___ Women / Mujeres ___ Children / Niños ___					
11	Are any people over 60 years old? / Alguno de ellos es mayor de 60 años?	No. of men / No. de hombres ___ No. of women / No. de mujeres ___					

12	How many children under 13 years old live in the house? / Cuántos niños menores de 13 años viven en la casa?	No. of children / No. de niños _____
13	How many children under 5 years old live in the house? / Cuántos niños menores de 5 años viven en la casa?	No. of children / No. de niños _____
14	Does anyone have a disability? / Alguna de las personas que vive en esta casa se encuentra en situación de discapacidad? / Who / Quién?	Yes / Si <input type="checkbox"/> No <input type="checkbox"/> Adult / Adulto <input type="checkbox"/> Child / Niño <input type="checkbox"/>
		What: Blind / Ciego <input type="checkbox"/> Deaf / Sordo <input type="checkbox"/> Partial physical immobility / Parcialmente inmóvil <input type="checkbox"/> Complete immobility / Inmóvil <input type="checkbox"/>
15	How many people in the house have a stable income? / Cuántas personas en su casa tienen un ingreso estable?	No. of people / No. de personas _____
16	What is your occupation? / En qué trabaja?	Salaried / Empleado <input type="checkbox"/> Self-employed / Independiente <input type="checkbox"/> Casual work / Casualmente <input type="checkbox"/> Unemployed / Desempleado <input type="checkbox"/> Others / Otros <input type="checkbox"/>
17	Where do you work? / Dónde queda su trabajo?	JCM <input type="checkbox"/> SJL <input type="checkbox"/> Other districts of Lima / Otros distritos de Lima <input type="checkbox"/> In house / En la casa <input type="checkbox"/>
<i>Household expenditure and investments</i>		
18	How much did you spend on: 1. Buying plot 2. Flattening plot 3. Structure 4. Access to water 5. Access to sanitation 6. Access to electricity 7. Refurbishment of house Cuánto pagó por: 1. Comprar el lote 2. Aplanar el terreno 3. La estructura de la casa 4. Acceso a agua 5. Acceso a saneamiento 6. Acceso a electricidad 7. Mejoras a su casa	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____
19	How did you pay for these? / Cómo pagó estos gastos?	Savings / Ahorros <input type="checkbox"/> Family loan / Préstamos de su familia <input type="checkbox"/> Money borrowed from someone else / Préstamo de otras personas <input type="checkbox"/> Bank loan / Crédito bancario <input type="checkbox"/> Others / Otros <input type="checkbox"/>
20	From the following list can you say which 3 you spend the most on per month? / De la siguiente lista, puede identificar en qué gasta su dinero mensualmente (escoja tres)?	Education / Educación <input type="checkbox"/> Transport / Transporte <input type="checkbox"/> Food / Alimentos <input type="checkbox"/> Healthcare / Atención médica <input type="checkbox"/> Water / Agua <input type="checkbox"/> Sanitation / Saneamiento Básico <input type="checkbox"/> House repair / Reparaciones de su casa <input type="checkbox"/> Others / Otros <input type="checkbox"/>
21	What is the biggest investment you make on an annual basis? / En cuál de estos aspectos invierte la mayor parte de su dinero al año?	Education / Educación <input type="checkbox"/> Transport / Transporte <input type="checkbox"/> Food / Alimentos <input type="checkbox"/> Healthcare / Atención Médica <input type="checkbox"/>

		Water / Agua <input type="checkbox"/> Sanitation / Saneamiento Básico <input type="checkbox"/> House repair / Reparaciones en su casa <input type="checkbox"/> Others / Otros <input type="checkbox"/>
23	Do you contribute money to the AF? If yes, how much and how frequently? Hace algún tipo de contribución económica a la AF? En caso de ser responder afirmativamente, cuánto y con qué frecuencia?	Yes / Si <input type="checkbox"/> No <input type="checkbox"/> Amount / Cantidad: _____ Frequency / Frecuencia <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Twice a year / Dos veces al año <input type="checkbox"/> Yearly / Anualmente <input type="checkbox"/> Others / Otros <input type="checkbox"/>
24	Do you know what the money is spent on? Sabe Usted en qué gasta el dinero la AF?	Yes / Si <input type="checkbox"/> What / Qué?: _____ No <input type="checkbox"/>
25	Do you participate in AF activities? Participa en alguna de las actividades de la AF?	None / Ninguno <input type="checkbox"/> Meetings / Reuniones <input type="checkbox"/> Faenas <input type="checkbox"/> Others / Otros <input type="checkbox"/>
26	Do these activities/faenas specifically reduce your physical everyday risks? Alguna de estas actividades reduce el riesgo físico cotidiano?	Yes / Si <input type="checkbox"/> How / Como?: _____ No: <input type="checkbox"/>
<i>Housing</i>		
27	Do you have: Cuenta con:	Titulo de Propiedad (TP): <input type="checkbox"/> Certificado de Posesión (COP): <input type="checkbox"/> Constancia de Vivencia (CV): <input type="checkbox"/> None / Ninguno: <input type="checkbox"/> Others / Otros: <input type="checkbox"/>
28	From who? How much did you pay for it? De quien lo obtuvo?	SJL: <input type="checkbox"/> MLM: <input type="checkbox"/> COFOPRI: <input type="checkbox"/>
		AF Leaders / Líderes de las AF: <input type="checkbox"/> Transfer / Transferencia: <input type="checkbox"/> Others / Otros: <input type="checkbox"/>
29	Do you have another house or plot? Tiene Usted otra casa o lote?	In / En: Same AF: <input type="checkbox"/> JCM: <input type="checkbox"/> None: <input type="checkbox"/> Others / Otros: <input type="checkbox"/>
<i>Physical everyday risks</i>		
30	Have you or any of your neighbours any of the following problems? And how frequently? Usted o alguno de sus vecinos ha sufrido de alguno de los siguientes problemas? Qué tan frecuente?	
	Fires / Incendios:	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Illness (due to water and/or sanitation) / Enfermedades (relacionadas con contaminación de agua y falta de saneamiento)	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Rockslides / Caída de rocas	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Wind (property damage) / Daños por vientos fuertes	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Injuries from slips and falls / Accidentes y afectaciones por resbalones y caídas	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/> Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Poor air conditions (inhouse ventilation) / Malas	Yearly / Anualmente <input type="checkbox"/> Quarterly / Trimestralmente <input type="checkbox"/>

	condiciones del aire (al interior de la casa por falta de ventilación)	Monthly / Mensualmente <input type="checkbox"/> Weekly / Semanalmente <input type="checkbox"/> None / Ninguno <input type="checkbox"/>
	Others/Otros	
30	Where do you get water? Tiene Usted acceso a servicio de agua?	Pilon / Pilón: <input type="checkbox"/> Pipe connection / Tubería: i) In house / Está en su casa: <input type="checkbox"/> ii) Outside house, in plot / Fuera de su casa pero en su lote: <input type="checkbox"/> iii) Outside plot / Fuera de su lote: <input type="checkbox"/> Hose / Mangueras: <input type="checkbox"/> Buckets / Baldes: <input type="checkbox"/> Others / Otros: <input type="checkbox"/>
	How much does it cost per month? Aproximadamente cuál es el costo mensual de este servicio?	Price per month / Precio por mes: _____
31	How do you store water? Cómo almacena el agua?	Bucket / Balde: <input type="checkbox"/> Small tank on roof / Pequeño tanque en el techo: <input type="checkbox"/> Small tank on ground / Pequeño Tanque en el lote: <input type="checkbox"/> None / Ninguno: <input type="checkbox"/>
32	What sanitation facilities do you have? How much does it cost per month?	Sewage connection / Desagüe: <input type="checkbox"/> Pit latrines / Letrinas: <input type="checkbox"/> Silos: <input type="checkbox"/> None / Ninguno: <input type="checkbox"/>
	Cuenta su vivienda con desagüe? Aproximadamente cuál es el costo mensual de este servicio?	Price per month / Precio por mes: _____
33	What is your source of electricity? How much does it cost per month?	In house / De su casa: <input type="checkbox"/> Neighbour / De un vecino: <input type="checkbox"/> None / Ninguno: <input type="checkbox"/>
	De dónde viene su conexión	Price per month / Precio por mes: _____
	a la electricidad? Cuánto paga mensualmente por este servicio?	
34	What fuel do you use to cook? Qué se usa para cocinar?	Gas: <input type="checkbox"/> Electricity / Electricidad: <input type="checkbox"/> Charcoal / Carbón de leña: <input type="checkbox"/> Wood / Leña: <input type="checkbox"/> Other / Otros: <input type="checkbox"/>
	How much do you spend per month? En caso de tener gas, cuánto paga al mes?	Price per month / Precio por mes: _____
35	Do you suffer from breathing problems? Sufre usted de algún problema respiratorio?	Yes / Si: <input type="checkbox"/> No: <input type="checkbox"/>
	What do you think is the cause?Cuál cree usted que es la causa?	Poor air quality in-house / Baja calidad de aire al interior de la casa: <input type="checkbox"/> Poor air quality from outdoors / Baja calidad del aire fuera de la casa: <input type="checkbox"/>
<i>Additional questions about AF</i>		
36	Do the AFs take into account your risks? Piensa que las AFS tienen en cuenta sus riesgos?	Yes/ Si: <input type="checkbox"/> No: <input type="checkbox"/>
37	Do you think the AF should continue expanding? Why? Piensa que las AF deben continuar expandiéndose? Por qué?	Yes/ Si: <input type="checkbox"/> No: <input type="checkbox"/> Reason/ Motivo:

C.2 Survey Results Table

Answers in the tables overleaf correspond to the survey questionnaire in Section C.1 of Appendix.

D. Focus Groups

D.1 Focus Group 1: Community Members

Date and time: 3rd May 2015 (Sunday), 09:00-13:00

Participants: Community members from area of study. Participants were identified by gender, date of arrival and house location.

Roles:

1. Main facilitator
2. Observer / time keeper
3. Videographer and photographer

Table D1.1: Plan of focus group

Questions	Resources	What needs to be done
<p>1. Mapping exercise:</p> <ul style="list-style-type: none"> • Name • Age • Gender • Number of people in your house <ul style="list-style-type: none"> ○ Parents/parents-in-law ○ Husband/wife ○ Children ○ Other • Where did you come from? <ul style="list-style-type: none"> ○ Provinces/JCM/SJL/ other parts of Lima/others 	<p>A1 map of JCM</p> <p>Sticky dots in different colours – 4 stickies per person</p> <ul style="list-style-type: none"> * 1990-1999 * 2000-2004 * 2005-2012 * 2013 onwards <p>Red marker for female</p> <p>Blue marker for male</p> <p>Mini survey sheets</p>	<p>When people arrive each will be given a sticky “dot” to locate their house on a printed map: the dot will have a number on it to reference the person, and their gender will be marked by different coloured markers.</p> <p>They will then be asked mini survey questions. Information will be recorded in a form for each person.</p>
<p>2. Questions:</p> <p>During our transect walks, we found that these seem to be some of the risks faced by most of you:</p> <ul style="list-style-type: none"> • Damage to your property due to small household fires • Injuries from slips and falls • Breathing difficulties from poor indoor air quality • Breathing difficulties from poor outdoor air quality • Rockslides • Damage to your house due to strong winds <p>Did we miss out on any risk?</p> <p>Do you have any specific experiences to share?</p> <ul style="list-style-type: none"> • Where? • When? <p>What do you think are the causes?</p> <p>Who has been affected? How many of you and how often do you experience these risks?</p> <p>If we were to identify the three most important risks, what will they be?</p> <ul style="list-style-type: none"> • Does everyone agree? Why not (if no)? • xxx seems the most important, why is that? <p>How to attack the risk trap and where?</p> <ul style="list-style-type: none"> • Do you do it alone/ collectively/ at AF level/ from outside settlement with municipality etc.? 	<p>A0 paper</p> <p>Tape</p> <p>Black markers</p> <p>Big post-its – 1 set</p> <p>Small post-its – three different colours</p> <p>Arrow stickers</p>	<p>Introduction to commonly faced risks observed during transect walks.</p> <p>Question whether there are any important risks missing.</p> <p>Write ‘other’ risks on big post-its and stick on paper and categorise.</p> <p>Write causes on small post-it notes.</p> <p>Participants vote three most important risks: ranking system would require use of three different coloured post-its.</p> <p>Place arrow stickers on risk tree to point out where to attack the risk trap.</p>

Table D1.2: Feedback from the community

Risk / Hazards	Causes	Perceptions	Impacts	Responses
Slips and falls	Slopes; Dangerous paths and roads; Lack or bad condition of route access	Women were more concerned about this risk than men	Injuries	<ul style="list-style-type: none"> • Construction of concrete stairs and roads • Wooden handrail e.g. UB AF
Pirca and retaining wall collapse	Expansion	Women were the ones who were concerned, especially those who arrived between 1997-2004	Damage to property Injuries	<ul style="list-style-type: none"> • Repairs • Repairs • Concrete pircas • Sloping pircas • Low height • Adequate structure
Rockslides	Expansion	Women were more concerned about this risk than men	Damage to property Injuries	<ul style="list-style-type: none"> • Pircas • Retaining Walls
Respiratory problems	Poor indoor air quality: <ul style="list-style-type: none"> • Lack of ventilation • Use of charcoal for cooking Poor outdoor air quality: <ul style="list-style-type: none"> • Dust • Humidity 	Women who arrived in 2009 or after were the most concerned about this risk	Diseases (e.g. asthma) Allergies	<ul style="list-style-type: none"> • Hosing soil to keep sand and dust down • Plant trees
Lack of water and sanitation	Lack of water and sanitation	Both women and men were equally concerned about this risk	Illness (e.g. diarrhea) Children between 0-5, pregnant women, elderly and disabled people are considered the most vulnerable groups Injuries from falling and carrying buckets of waters	<ul style="list-style-type: none"> • Pilón • Improved access • Hoses • Water pumps • Water storage • Tanks • Silos • Boil water • Close buckets and tanks • Water purifier
Fires	Electricity shocks especially when it rains Houses built from wood	Even though it was not seen as a frequent risk, it remains one of the most serious risks due to the lack of water and access/evacuation routes	Damage to property Injuries	<ul style="list-style-type: none"> • Improved connections to electricity
Strong winds		Not perceived as a risk	Damage to property	<ul style="list-style-type: none"> • Roof improvements

Key for scales of coping mechanisms in Table D1.2:

- Individual
- Household
- Collaboration with neighbours within AFs
- External to AFs

Risks were categorised into two groups:

1. Risks related to property damage
2. Risks related to health



D.2 Focus Group 2: Women

Date and time: 5th May 2015 (Tuesday), 17:00-19:00

Participants: 12 women from seven different AFs participated in the discussion.

Question: Do the AFs take into account the different responsibilities and necessities of women when facing risk? Answer: NO

Table D2.1: Feedback on responsibilities and coping mechanisms of men and women

Risk	Women	Men
Rockslides	<ul style="list-style-type: none"> Faenas 	<ul style="list-style-type: none"> Faenas
Lack of water and sanitation	<ul style="list-style-type: none"> Hoses Reducing risk through the refining of silos Management of water 	<ul style="list-style-type: none"> Basic silos
Illness and allergies related to the lack of water and sanitation	<ul style="list-style-type: none"> Taking care of children (0-5 years) with diarrhea 	-
Respiratory problems	<ul style="list-style-type: none"> Taking care of children (0-5 years) 	-
Slips and Falls	<ul style="list-style-type: none"> Faenas 	<ul style="list-style-type: none"> Faenas
Strong Winds	<ul style="list-style-type: none"> Fixing the roof in rare cases 	<ul style="list-style-type: none"> Fixing the roof on Sunday
Fires	<ul style="list-style-type: none"> They help extinguishing it 	<ul style="list-style-type: none"> They help extinguishing it



Photos from women focus group Yin-Hsung Sung.

E Strategy Workshop

E.1 General Information

Date and time: 10th May 2015 (Sunday), 08:00-12:00

Participants: JCM community members and AF leaders.

Purpose:

- To share what we have learnt during our time in Lima
- To work in conjunction with the community to develop a vision and action plan for JCM that transforms how physical everyday risk is currently experienced.

Activities: Participants were given the opportunity to provide insights as to what, how and where improvised strategies should be implemented under four themes: consolidation; house and plot planning; water and sanitation; and mobility.

Table E1.1: Structure of strategy workshop

Section	Description	Additional Comments
Introductory presentation	Presentation on who we are, what we have been doing and diagnosis <ul style="list-style-type: none"> Diagrams were used to present risks we focused on How frequently different people experience different risks 	This includes what we did before Lima, summary of fieldwork and why we did them, as well as results. Risks and hazards presented include: <ul style="list-style-type: none"> Lack of water and sanitation Poor access routes/mobility Rockslides and pirca collapse Poor air quality Strong winds
Presentation of examples of strategies	Once participants were separated into four groups, we presented examples of possible strategies under four key themes: expansion, mobility, basic services and house and plot planning.	We included diagrams and some quotes from our fieldwork to accompany our presentation of strategies.
Strategy workshop	We allowed participants to brainstorm as many as strategies and associated aspects as they could under the aforementioned themes.	Brainstorming includes: <ul style="list-style-type: none"> Existing responses to risk What could be done at four levels – constructions or new practices, maintenance of measures, financing and planning Discussion about how existing and proposed measures could be integrated for future mitigation and adaptation to risk <ul style="list-style-type: none"> Includes possible limitations
Presentation of feedback from the exercises	Each distinct group presented a summary of the discussion and findings to the rest of the participants.	<ul style="list-style-type: none"> Photo-taking Supplied participants with food and drinks thereafter

E.2 Feedback

Figure E2.1: Feedback from Group 1 – improved mobility and access

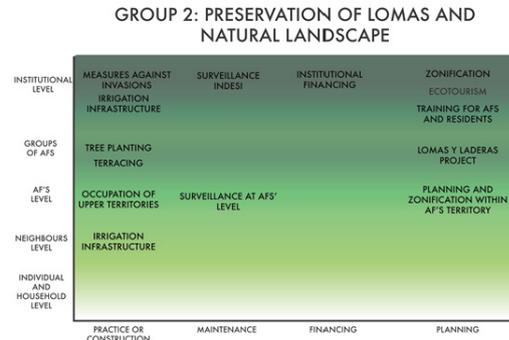


Figure E2.2: Feedback from Group 2 – preservation of Lomas and natural landscape

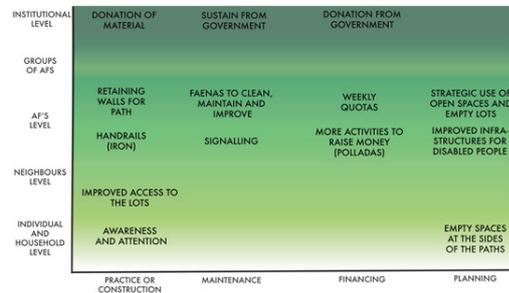


Figure E2.3: Feedback from Group 3 – improved access and quality of basic services

Figure E2.4: Feedback from Group 4 – improved plot and house planning

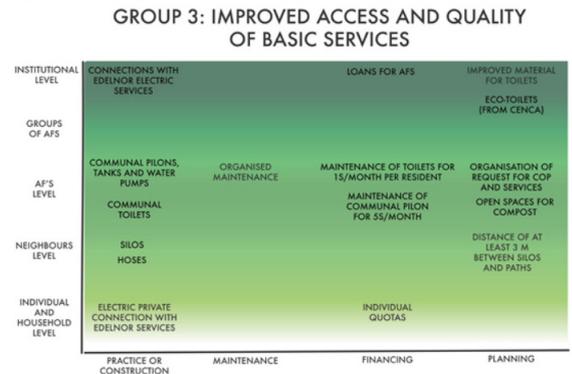
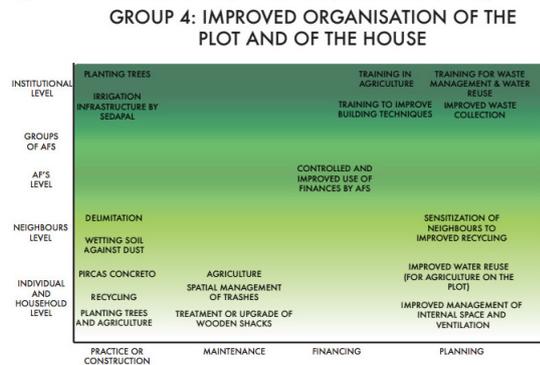


Figure E2.4: Feedback from Group 4 – improved plot and house planning



Photos from strategy workshop by Teresa Belkow and Yin-Hsung Sung.

F. Examples of Interview Transcripts

F.1 Interview with Engineer from INDECI

Date: 3rd May 2015 (Sunday)

Key Points:

- Nueva Generación and Portada de Belén are now in process of formalisation but need to improve their retaining walls.
- Due to a mudslide 'Huayco' in Chosica that resulted in seven deaths, risk management prevention has become more serious as the national government plans to resettle people in risky areas to other areas. In Chosica, the government decided that it would delimitate the areas that are high risk and resettle the population rather than rehabilitating them.
- The mudslide was created under similar geological conditions as in JCM, where torrential rain (\pm 2h of strong rain) could potentially create similar mudslides. 60% of the houses could collapse in case of torrential rain. The most vulnerable groups in this situation are children and elderly people. The authorities and technicians recognised that San Juan de Lurigancho is one of most vulnerable districts of Lima, at risk of rockslides, landslides, pirca collapse and severe property damage.
- In addition, climate change induces stronger rains and changes in rainfall patterns, as well as other alterations in climate (e.g. normally the autumn shouldn't be sunny but it increasingly is). This in turn increases the possibility of mudslides in JCM.
- The state is therefore requesting for 'more reasonability' from the settlement in terms of risk prevention and that 'high risk zones' should not be formalised and not recognised ('stricter'). This restricts previous practices of political clientelism, where previous political candidates gave away land titles during the elections (e.g. Fujimori provided land titles to plots that do not contain houses or shelters).
- The problem with the municipality is a political rather than a technical one. Apart from the fact that the municipality do not have enough financial resources to improve all parts of the settlement that are in need of improvement, investments on infrastructure and facilities are mainly concentrated around commercial areas.
- A building corporation finances the opening of a large access road, where the University of Santo Domingo de Guzmán participates in the capital. This follows the project of a previous mayor, who wanted to build a road connecting all settlements.

Preconised Coping Strategies or Solutions of INDECI:

- Instead of paying technicians for infrastructure improvement, they should keep the money for improvements that would minimise their own risk. People should try to comply with security norms (e.g. having a fire extinguisher or survival kit in every house).

INDECI's 'organización a la población':

- INDECI does organise and educate 'voluntary brigades' to enable people living in high-risk settlements to better understand that they live in an 'emergency zone', and to better deal with risks. For example, these brigades raise awareness of the importance of fire extinguishers or sand buckets, along with emergency exits in case of fires or evacuation zones in case of earthquakes. These brigades are part of bigger framework of 'organización a la población', or organising the population for emergency situations. Part of this organisation's function is to identify people that would act as 'emergency assistants' (who to call in case of emergency). These prevention schemes are designed for any level of formalisation process and are a requirement at any stage. They are organised at S.J.L. municipality level. [*Passive involvement in risk prevention*]

Elevating the Houses to Mitigate the Risk of 'Huaycos':

- Most houses are built at the same level of the street. To maintain some evacuation zones as well as floating areas, they should build houses at slightly higher elevations.
- Even if the population is not under the process of formalisation, they should still have capacity to prevent risk. A large number of entities say that one of the areas that could suffer more damage is S.J.L.

Current Developments at National Level to Prevent Risks (& Disasters):

- The current government's response to cope with risks in 'high risk settlements' is mainly the resettlement of population invading state land as well as stopping and condemning new invasions. These preconised solutions were reiterated after the Huayco in 2015, which prompted an official positioning of various top officials, such as President Humala.
- In JCM, most of the houses are located in the quebradas, where in theory people should not been living there.
- INDECI warns people and raise awareness about the measures that need to be implemented in case of an earthquake

Risk Management in Peru:

- CENEPRED is currently the institution in charge of the management of risk in Peru. They are in charge of the prevention and the correction of risk, while INDECI does the *reactive management*.
- CENEPRED formulates national policies and INDECI implements them in practice (locally).
- Risk = Vulnerability x Hazard

F.2 Interview with representative from Nueva Generación

Date: 5th May 2015 (Tuesday)

Q. Do you remember when the first roads or stairs were built by the AF?
A. We worked with the majority of the neighbours, and with neighbours in PB as well. We built the first road in 2010, along with stairs and a football pitch.

Q. And the pircas?
A. Since we arrived (in 2000) we worked on the pircas. Each household made a pirca.

Q. What about the retaining walls?
A. Together with the football pitch, the retaining walls were built in 2010 by the AFs. The football pitch was also sponsored by "Construyendo Perú".

Q. Have you worked with other AFs?
A. Yes, with PB, specifically for the project "Construyendo Perú" to build stairs and roads.

Q. Have you worked with the municipality? When? What was the reason?
A. Yes, they gave us trees and possibly the institutions will provide services. Barrio Mio always make promises but they break them. Additionally, in 2014 CENCA provided us with some houses from a contest.

Q. How did you get water in NG?
A. Once we finished the roads we gained access to water by tanks - now we have water and sanitation.

Q. What about the "planos trazados"?
A. To have a "plan trazado" it is necessary to hire someone. In the case of NG, the leaders hired someone and in 2015 they finally approved the plano. Since 2001, we had a plano but the problem was that it was not "visado", which means that it was not approved by the municipality. The problem is that without this approval the plano does not have any validity. Once it is approved the distribution they had done is respected.

Q. What is the AF currently working on?
A. Almost all dwellers in NG have water and sanitation. The AF is currently looking for financing to pay for some improvements. For example, when it rains the pircas can collapse. We are afraid of this situation and we are looking towards having more security.

Q. What is the AF doing with regards to risk?
A. Together with PB, NG has recently won the contest Lomas y Laderas. However, each AF is going to work by itself. The main action by the AF is the faena. We are planning to plant trees up in the slopes. No more houses will be built and rather, available space is going to be designated for green spaces as approved in the last meeting of the AF.

G. Institutional & Legal Framework for Housing, Land & Risk in Peru

This is not an exhaustive list of laws and policies, but presents the critical elements of the institutional and legal framework for housing, land, and risk in Peru.

Law No. 29664: SINAGERD (National System for Disaster Risk Management)

In 2011, Peru established a national system for disaster risk management as an inter-institutional, decentralised, and participatory system. The purpose of this system is:

- To identify and reduce risks, hazards and their effects and to avoid the production of new risks
- Prevention of and preparedness for disasters through the implementation of principles, guidelines, procedures and policy instruments for disaster risk management.

Table G1.1: Some important aspects of the national system

Disaster Risk Management	Prevention, reduction and permanent risk and disaster control, and adequate preparation and response to disasters.
National Policy For Risk Disaster	<p>The ensemble of guidelines to:</p> <ul style="list-style-type: none"> i) Avoid and reduce present and future risk disaster; ii) Implement measures for adequate preparation, first response, rehabilitation and rebuilding in case of disaster; iii) Reduce negative consequences of disasters for the population, the economy and the environment. <p>All institutions are responsible for the implementation of the Policy, which requires the fostering of a 'culture of prevention' in order to build the capabilities to integrate risk management with other institutional procedures.</p>
Components & Procedures	<p><u>Components</u></p> <p>Prospective Management: Planned actions to prevent the development of a future risk due to new investments and projects in the territory.</p> <p>Corrective Management: Planned actions to correct and mitigate existing risk.</p> <p>Reactive Management: Measures and actions designated to face disasters due to an imminent hazard or to a materialisation of a risk.</p> <p><u>Procedures</u></p> <p>Risk assessment: To generate the knowledge of hazards and threats, analyse vulnerabilities and establish levels of risk to facilitate the decision making process around disaster risk management.</p> <p>Risk prevention and reductions: Actions to avoid the generation of new risks and reduction of vulnerabilities and existing risks within the sustainable development management framework.</p> <p>Preparation, response and rehabilitation: Adequate responses to an emergency and first response for people affected by a disaster, as well as a rehabilitation of the basic services.</p> <p>Rebuilding: Actions to establish sustainable conditions, reducing disaster risk and ensuring the physical, economic and social recuperation of affected communities.</p>
Actors Involved	<ul style="list-style-type: none"> • President of the Ministries Council • National Disaster Risk Management Council • CENEPRED • INDECI • Local and regional governments • CEPLAN • National police and army • Private institutions • Civil society

This law was later regularised by the *Supreme Decree No. 048-2011 PCM*, by which some definitions were adopted:

- **Vulnerability assessment:** Procedure to assess existing conditions and vulnerability factors: exposure, fragility and resilience of the population.
- **Vulnerability:** Susceptibility of the population, physical structures or the socioeconomic activity to suffer damages due to a threat or hazard.

- Risk disaster: Probability to suffer injuries and damages due to vulnerable conditions and the impact of a hazard.
- Resilience: Capability of people, families, communities, public and private entities and physical structures to assimilate, absorb, adapt to, change, resist and recover from an impact of a hazard or a danger, as well as the ability to learn and recover from past disasters to better respond in the future.

This new approach to risk in Peru suggests that risk has to be taken into consideration in all different government scales and actions implemented by the state, including housing. Institutions therefore need to be coordinated with the aims of the SINAGERD. Moreover, these laws recognise the importance of citizen’s participation and the promotion of a culture of prevention of risk.

Risk and Housing

In this context, *Law 29869/2012* establishes resettlement of a population living in non-mitigable risk areas as a public necessity and national interest. Occupation of non-mitigable high risk areas is therefore prohibited. As a consequence, provision of basic services should not be provided and in case they are, the provider will assume the responsibility.

AIMS	ACTORS
Protect life and public welfare Guarantee rights and interests of people who are settled in a high non-mitigable risk area Protect investments on services and urban equipment Contribute to the sustainability of public investment on social and economic infrastructure Contribute to prevention and risk reduction	CENEPRED INDECI Ministry of Housing- Nuestras Ciudades Programme Local Government

H. Summary of PLAM 2035 by MML

A plan by MML exists, but is currently not being implemented because of a change in administration at the beginning of 2015. The plan contains a specific strategy for the development of JCM, which would act in different sectors and at different scales – including the improvement of housing and mobility within JCM, and its connection to the rest of Lima. It aims to strengthen the relationship between institutions and local communities by delocalising the offices of MML and SJL. The PLAM 2035 takes into consideration the physical risk of rockslides, steep morphology, and plans for the relocation of residents in high-risk areas as well as the utilisation of open spaces for risk mitigation. These measures, along with ecotourism and reforestation, will be implemented particularly at the edge, where expansion and land occupation will be organised to stop land trafficking.

It remains unclear how informal areas will be treated, since the legal framework prevents such interventions in these areas, because they are not considered as formal urban areas in strategies. The PLAM, however, intends to perform specific interventions that would mitigate risk related to important hazards to prevent disasters, while organising the relocation of people.

An interview took place with an urban planner of the PLAM, who confirmed MML’s vision of the impossibility of rehabilitation in JCM. The urban planning team responsible for the PLAM moreover, saw this issue as totally disconnected from urban planning and regards this as a problem of civil order. This is because the occupation of the area was done in an informal and illegal way, and addressing attention to such an issue would only exacerbate the problem of further expansions.



5. **Chuquitanta.** Shifting perceptions of water: A stepping stone towards a better future

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Harvey Rich
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4. Key Findings

- 4.1. Chuquitanta, a place subject to multiple pressures on water and land
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- 4.3. A vicious cycle for a precious resource

5. Strategies for Transformative Change

- 5.1. Strategy One: Enhancing participatory planning: Community Water Board
- 5.2. Strategy Two: Cleaning and Greening: Public Green Infrastructure Partnerships
- 5.3. Strategy Three: Cultural and Ecological Heritage Awareness Programme

6. Conclusions and Future Recommendations

References

Appendices

Acknowledgements

This report provides an in-depth analysis and evaluation of the current situation and future scenarios in Chuquitanta, North Lima, Peru. The aim of this research project was to critically examine the manifestation of everyday risks through a thorough diagnosis of water-related health and environmental issues and how these impact upon local actors. In addition, it aimed to identify the coping mechanisms already in place, to determine the possibilities for scaling-up and to develop transformative strategies that could inform an environmental action plan to disrupt the identified risk cycles. In order to achieve this, the hydrosocial cycle was employed as a conceptual framework for the study. It was used to represent and analyse the socio-ecological nature of water and show the disconnections within the cycle, acknowledging that water is shaped by human activities and institutions in Chuquitanta.

A field-trip was undertaken in April-May 2015 in order to verify, refine and deepen the diagnosis and hypothesis that constructed beforehand, as well as to gather primary data. The research drew attention to how Chuquitanta is indeed a place shaped by multiple urban pressures, where informal occupation and uncontrolled urbanisation plays a central role to the pattern of development. Green areas, agricultural land and cultural sites are also disappearing, while water sources are being degraded. Furthermore, the lack of adequate services such as waste management and water provision to cater for this increasing population, results in a vicious cycle of risks. This is compounded by the fact that there seems to be a poor coordination among different actors and although some share common responsibilities, there is a clear crisis situation in term of environmental sustainability that needs to be addressed in Chuquitanta.

Our recommendations are centred around shifting the current water governance situation and raising awareness on the unique socio-ecological heritage that this area possesses as part of the desert city of Lima. Too often, these aspects seem to have been neglected in the areas' planning and development. In conjunction with local actors, we have therefore constructed three strategies that are central to our environmental action plan. These are: (1) Enhancing participatory planning through a Community Water Board, (2) Cleaning and Greening: Public Green Infrastructure Partnerships and (3) Cultural and Ecological Heritage Awareness Programme.

Executive summary

We would like to take this opportunity to express our deepest appreciation to all those who helped with our research before, during and after the fieldtrip.

We wish to extend a special gratitude to the people we met in Lima, particularly those from Chuquitanta, who were extremely welcoming to us throughout our field research. We are thankful to the staff members of the San Martin de Porres municipality, especially to Viviana Barrera Gonzalez (Chuquitanta municipal co-ordinator), for the valuable information provided by them in their respective fields in addition to the space they provided for workshops in the neighbourhood. We are grateful for their cooperation during the period of our research.

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1. Introduction

1.1 Background

Geographical Context

Chuquitanta is located in San Martin de Porres (SMP), a northern district of metropolitan Lima, along the lower stretch of the River Chillón (see figure 1). The area is home to approximately 125,000 people (Piaggio, 2015) and is one of the few remaining peri-urban areas within close proximity to central Lima. It was once renowned for its pristine river and ancient system of irrigation channels, unspoiled landscape and productive agricultural land (Alvarado, 2015). However, intertwining natural and man-made forces including changing river flows and seasonality, conversion of agricultural land, informal occupation of the floodplain and loss of irrigation channels have altered this area dramatically in recent decades.

Figure 1. Map indicating the position of Chuquitanta with respect to the city of Lima. Source: Google Earth (2015a)



Historical Context

Human settlement in Chuquitanta began around 4000 BC (Raymond, 1981) and has been evolving ever since (see figure 2). Many archaeological sites such as El Paraiso monumental complex and a system of irrigation channels remain in the area (Quilter and Stocker 1983). In 1701, the hacienda (significantly-sized estate) of Chuquitanta was created, which cultivated many agricultural products (Kroeber, 1926).

Pressures to urbanise from within Lima combined with increasing rates of migration, particularly from the Andes towards the capital in search of better living and working conditions, resulted in urban expansion to the North. In 1950, the SMP district municipality was created and in 1969, the Agrarian Reform initiated by the Velasco government marked a crucial turning point for land use in Chuquitanta (Cleaves and Scurrah 1980). A number of the privately-owned Peruvian agricultural land were turned into cooperatives (IRB, 1999) and thus, the land of the hacienda Chuquitanta was divided between approxi-

mately 35 former workers (Waselikowski, 2013). Peruvian-wide, these cooperatives struggled due to unfavourable policies (IRB, 1999).

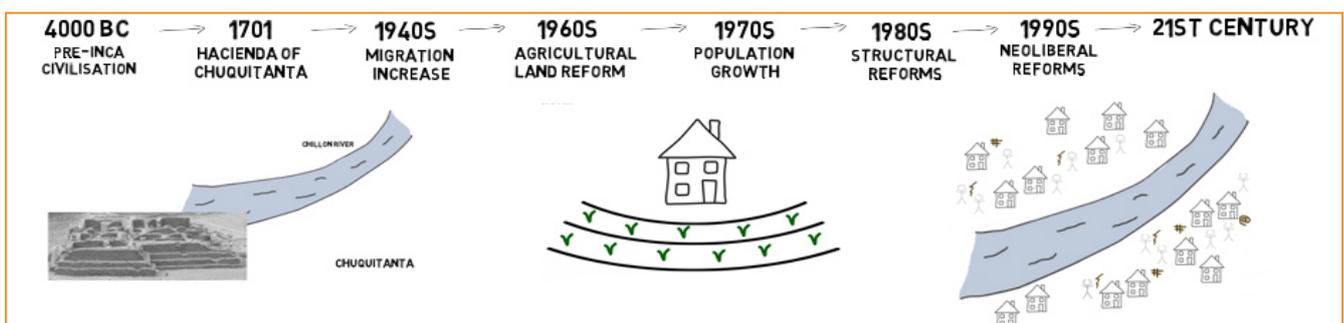
From the 1970s, settlement and population growth continued in Chuquitanta and other parts of Lima, with landowners selling plots to new residents, often through informal markets. Failed policies and structural reforms initiated by the radical-left, drove Peru into socio-economic hardship. In 1977, the Velasco government fell and there was a shift towards market-led strategies. While some mobilised against the liberalisation of the national economy, others dealt with this by dissolving the agricultural cooperatives and turning to private agriculture and further dividing up the land (IRB, 1999). In SMP district municipality, with the continued influx of people, resultant pressures on land, water and basic public services increased. A notable influx of people from the highlands occurred in the 1980s as a result of acts of terrorism by the Sendero Luminoso (The Shining Path), the Peruvian communist party (Chambers, 2005). Ensuing conflicts occurred between farmers and these new residents over issues including property rights, water service distribution and solid waste management.

In the 1990s, Alberto Fujimori was elected as President and Luis Castañeda became Mayor of Lima. Growing conflict between the army and the Sendero Luminoso coupled with the increasingly neoliberal economic approaches reinforced population growth in the Chillón Valley. Despite various initiatives towards legalising and improving the conditions of informal settlements in the 1990s, planning in SMP district municipality was largely neglected (Fernandes, 2011). Ecosystem and cultural heritage degradation thus ensued (Waselikowski, 2013).

Current Situation

Unplanned urbanisation and economic development pressures have continued into the 21st century, leading to unequal access to public services, high levels of informality and

Figure 2. Timeline summarising the key dates, and historical evolution of Chuquitanta. Source: Authors



pressures on cultural and ecological heritage. In Chuquitanta, some groups face high vulnerability through their proximity and exposure to precarious environmental conditions, for example by living or working close to the flood-prone River Chillón and the waste-choked banks of the river and irrigation channels, or by inhaling the dust-saturated air, the formation of which is enhanced by desertification associated with land-use change from agricultural to urban. Additionally, effluents from multiple legal and illegal industries both upstream and in the area, such as paper production and pig farming, negatively impact the area. In a global context, debates surrounding the consequences of urban economic pressures and access to water and sanitation as basic human rights have gained attention and have strong salience in this area (Ioris, 2012). At the local level, Luis Castañeda was recently re-elected as Mayor of Lima and a discordance between policies of the previous and new administrations may follow.

1.2 Research Objectives

The overarching aim of this research was to produce an environmental action plan, through a thorough diagnosis of the current situation in Chuquitanta, with regard to water and land-related issues and to identify how these are manifested in the production of everyday risks experienced by local actors. The research was grounded in a conceptual framework based upon the hydrosocial cycle, which will be presented below, attempting to reveal where and why the cycle is 'disconnected' and how these disconnections produce and reinforce everyday risks.

It also aimed to identify the structuring factors and to incorporate relevant actors involved in this process in order to elucidate how they contribute to the production and reinforcement of everyday risks, as well as the coping mechanisms employed in order to mitigate their effects. Strategies were subsequently created to generate both immediate and future social, environmental, economic and political benefits through sharing coping mechanisms with the potential for scaling-up, conflict solving and innovation and to act as a foundation for future projects.

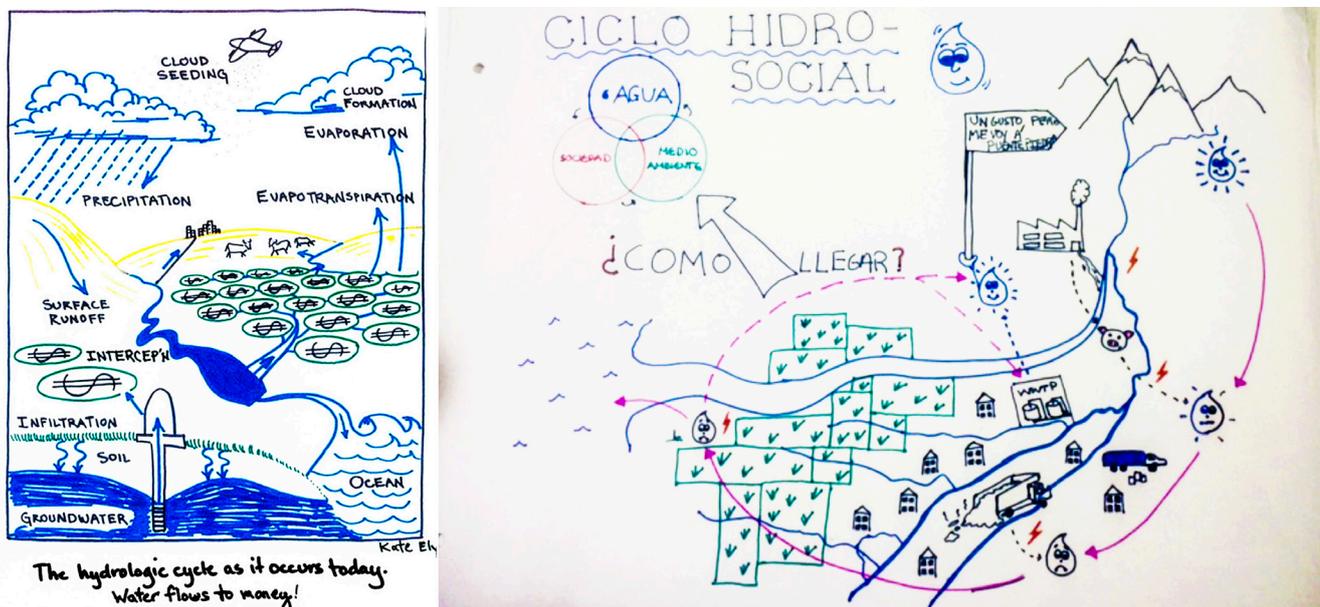
2. Analytical Framework

Conceptual Framework In order to gain a better understanding of the socio-environmental context of Chuquitanta and its connections to the city of Lima, a two-pronged and interconnected conceptual framework was employed, encompassing both the hydrosocial cycle and everyday risk, to facilitate the analysis of the evolving and dynamic situation in the area. These frameworks are centred on water-related issues and how these relate to land and society.

2.1 The Hydrosocial Cycle

The contemporary global water system is being transformed by anthropogenic interventions ranging from climate change to river flow regulations. This necessitates a more integrated study of its complex composition and the

Figure 3. The spatial context of the hydrological cycle (L) (Ely, 2008) and the hydrosocial cycle (R) as it can be represented in Chuquitanta. Source: Authors



interactions, which shape it, in terms of its bio-geophysical and social components (Vörösmarty et al., 2004). Nonetheless, in Chuquitanta the water system is manipulated from a hydrological-cycle perspective (see figure 3). In this respect, water and consequently land; being the entity through which water flows and with which it interacts and shapes, are both seen as commodities, driven and manipulated by economic forces and contrasting power relations (Ely, 2008; Linton and Budds, 2014). These paradigms and practices neglect social and environmental characteristics, leading to disconnections and conflicts between land, water and society, manifesting as everyday risks.

The hydrosocial cycle was identified as an entry point to understand the current context and as a guide towards action and the integration of the three factors - land, water and society - whilst simultaneously building resilience (see figure 4). The hydrosocial cycle recognises that hydrological processes are shaped by human behaviours and institutional activities, that hydrological data and knowledge are subjectively constructed, that water is increasingly recognised as culturally specific and that the material characteristics of water, shape the social fabric (Budds, 2009). It is similarly important to acknowledge the influence of the natural water cycle and its physical variations associated with climatic changes.

By understanding the socio-ecological nature of water and its circulation, the hydrosocial cycle has the potential to reveal problems associated with everyday risks and therefore to propose possibilities for progressive governance of (hydro-) social change through re-thinking the cycle (Blanchon and Graefe, 2012). This may therefore reveal possibilities for transformative change or system

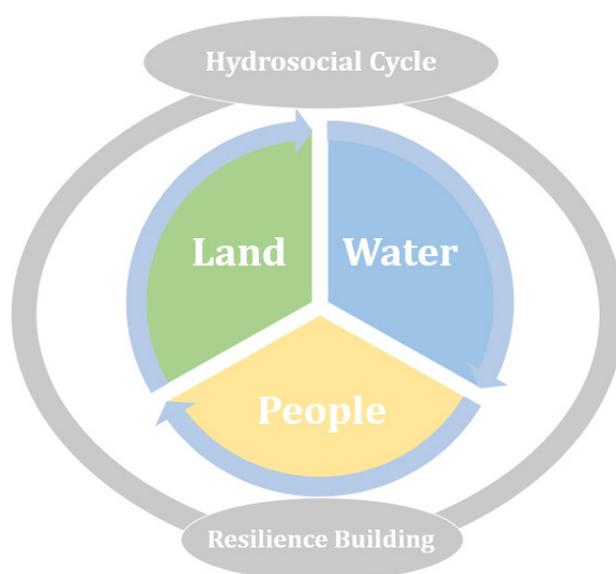
innovation (Meadowcroft and Morin, 2013), through incorporating people and ecosystems into environmental planning and management in Chuquitanta, as well as in wider spatial contexts including the lower Chillón basin, Lima and Peru.

In Chuquitanta, the water-related processes inherent in the hydrosocial cycle create a specific kind of community with specific behaviours and subjectivities (Linton and Budds, 2014). The specificities and ontological meaning of water for communities are themselves the cause of behaviours towards water resources. Therefore, it is important to keep in mind the power relations implicit in the social-hydric relation and the discourses surrounding them (Swyngedouw, 2004). Consequently, the following were considered throughout this research: How do the people of Chuquitanta perceive water? Who wins and who loses from the present hydrosocial cycle of Chuquitanta as well as from its possible future development? This analytical lens facilitated the understanding of everyday risks in the area and their associated production and reproduction.

Everyday Risk

Risk can be conceptualised as the relationship between a hazard and vulnerability, where hazard describes a dangerous occurrence that may cause social and/or environmental damage and vulnerability describes the circumstances of a community or system, which make it susceptible to the damaging effects of hazard (UNISDR, 2009; 5-6). The perceptual nature and physical reality of risk are central to this conceptualisation (Adger, 2006).

Figure 4. The hydrosocial cycle and its fundamental pillars. Source: Authors



As shown in Table 1, risk factors vary across a spectrum from intensive to extensive (Bull-Kamanga et al., 2003). Inter and intra-spatial variation of risk within urban areas is another important aspect of disaster risk studies, introducing a further dimension to the experience and quantification of risk (Dodman et al., 2013).

Despite their significance, many investigations have lacked focus upon issues related to risks associated with everyday occurrences, predominantly in developing countries (Bull-Kamanga et al., 2003). Furthermore, the importance of disaster risk reduction, particularly in terms of overcoming vulnerability and exposure to risk, as well as coping capacities, is often overlooked in urban development planning (Dodman et al., 2013). Every day risk factors therefore represent a form of ‘non-development’ and require effective urban governance in order to foster the accountability of local authorities towards communities and to build upon inherent coping capacities and synergies, leading to increased resilience and reduced everyday risk (Reyes Pando and Lavell, 2012; Dodman et al., 2013).

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In the context of this research, everyday risk was defined as ‘the widespread risk associated with the exposure of populations to persistent hazard conditions, often of a highly localised nature, which can lead to cumulative undesirable manifestations’. This persistence, reoccurrence or the notion of ‘risk cycles’ formed a central part of the research. Our investigation thus sought to identify and analyse these physical everyday risk cycles and traps within Chuquitanta, using the aforementioned hydrosocial cycle to facilitate a focus upon water-related issues.

2.2 Research Framework

Taking into account the background information, research objectives and conceptual framework, a hypothesis and research questions were created to frame the research:

Table 1. Table highlighting the spectrum of disasters and risks. Source: Amended from Dodman et al. (2013)

Nature of Event:	Large disasters:	Small disasters:	Everyday risks:
Frequency	INFREQUENT (50-100 year return periods)	FREQUENT (often seasonal)	EVERYDAY
Scale	Extensive or capacity to be extensive: 10+ people killed 100+ seriously injured	3-9 people killed 10+ injured	1-2 people killed 1-9 injured
Impact upon morbidity & mortality	Potential to be catastrophic for specific places and times	Probably significant and underestimated contribution	Main cause of premature death and serious injury
Intensive or extensive risk	INTENSIVE	EXTENSIVE	
Relationship with Chuquitanta	Tsunami risk from the coast	Seasonal flood risk for the Lower River Chillón, the San Diego flooding of 2001 is an example of this kind of risk (INDC, 2005)	Health risks associated with water pollution due to lack of safe potable water

Hypothesis: “The current disconnection between society, the natural and built environment within the hydrosocial cycle in Chuquitanta is a result of the way in which the area is being rapidly transformed and shaped by urban pressures. This leads to environmental degradation and diminishing water quality, quantity and availability, which disproportionately affects certain groups increasing everyday risks and reinforcing socio-ecological fragmentation. The varying responses to this lack of cohesion from local and national institutions and organisations, in addition to local inhabitants, leads to unplanned actions affecting the development of the area and the creation of conflicts between local and institutional stakeholders. All of these issues inevitably weaken social cohesion and shape perceptions and behaviours, thus reinforcing the creation and reproduction of environmental and health related everyday risks, associated with a weak and dysfunctional hydrosocial cycle.”

Research Question 1: What are the drivers that generate different sources of water pollution and issues with availability in Chuquitanta, which represent possible disconnections of the hydrosocial cycle?

Research Question 2: How do different perceptions of water influence the way in which various parts of the community and actors interact with water, particularly the River Chillón and the irrigation channels?

Research Question 3: What are the health and environmental risks associated with water pollution and availability in Chuquitanta?

Research Question 4: How can coping mechanisms and/or social organisations, which address water-related risks influence a participatory process within Chuquitanta to help reconnect the hydrosocial cycle?

methodology that best addresses the research framework was devised, as outlined below.

3. Methodology: Mapping the Hydrosocial Cycle

3.1 Data collection and analysis methods

To gather primary data for this research, fieldwork was carried out in Chuquitanta for 18 days during April and May 2015 and figure 5 illustrates some examples of the activities carried out during this stage. In the pre-field trip stage, secondary data was analysed to create an initial spatial diagnosis, narrowing down the research focus and defining the methods to be utilised in the field. While in the field, the diagnosis and hypothesis were verified and refined through the chosen methodologies. Transect walks, informal and formal interviews and surveys were undertaken with various actors in the area, in order to map the disconnections in the hydrosocial cycle and their associated risks whilst also identifying potential room for manoeuvre. In addition, with help from community members during two workshops, possible future scenarios were imagined. Following the fieldtrip, the data was further analysed in order to devise strategies that would inform an environmental action plan (for more information see table 2).

Mapping and future strategic visioning

Fundamental to formulating the environmental action plan was the undertaking of scenario mapping workshops, in order to build future visions for Chuquitanta

(for more information see appendix 4.3). The conceptual background of this whole process focuses upon efforts to improve sustainability by concentrating on possible incremental changes, which could have a positive impact (Meadowcroft and Morin, 2013). In line with this, the concept of backcasting (see figure 6) is central to strategic planning for a sustainable future, as it enables specific eventualities in the future to be framed and considered (Partidario and Vergragt, 2002). This process, along with the formal and informal interviews as well as transect walks, subsequently informed the final action plan, ensuring that the collective visioning of all actors was evident in the final output.

3.2 Research Limitations

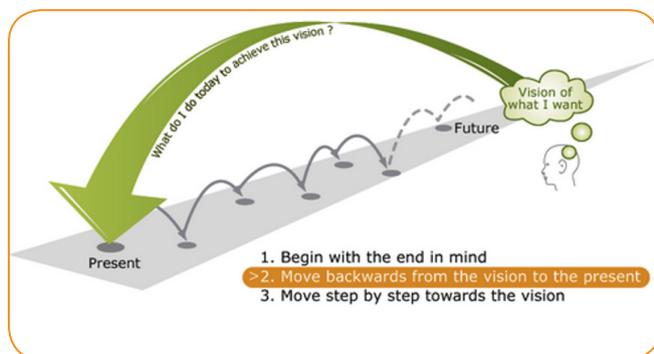
Barring customary limitations related to language, culture and distances, a number of other circumstances in the field affected the diagnosis and hence action plan. Firstly, the time in the field was not sufficient to fully grasp the complexities of the area and react to the evolving situation of our analysis, thus affecting our ability to recast and pinpoint new questions.

In addition, when studying the hydrosocial cycle, it is also important to understand the temporal variation inherent within its progression, such as seasonal river flows. However, within the limited time spent there, this was not possible. Moreover, it was only possible to collect data associated with a transitional seasonal period. The hydrosocial cycle as a framework is useful in this context for understanding water-related issues, however, the associated built-in bias towards water meant there was a tendency for the research to be exclusively oriented towards understanding issues related to this, whilst overlooking

Figure 5. Photos of the fieldwork methodology being carried out. Source: Authors



Figure 6. The process of backcasting for scenario planning. (Natural Step, 2015)



others, such as livelihoods. Furthermore, the framework assumes the researchers extensive knowledge of the decision-making processes associated with water.

The selection of interviewees and workshop participants was similarly a limitation, as it was not possible to meet with local NGOs or private actors while in Chuquitanta as planned. Consequently, the most frequent partners were community members and local government officials, which may have introduced some bias into the quality of information gathered. Furthermore, the opportunity to meet with some critical stakeholders such as the Autoridad Nacional del Agua (ANA – National Water Authority) did not materialise.

Table 2. Methodology according to project timeline (for more details see appendix 1.1, 1.2, 1.3, 1.4, 4.2 and 4.3)

Phase	Research Activities	Purposes
Pre- field trip (17th January - 20th March)	<ul style="list-style-type: none"> Literature review Secondary data collection and analysis Development of conceptual framework, hypothesis and research questions Initial stakeholder analysis Fieldwork planning involving initial contact and meetings with partners and individuals/groups 	<ul style="list-style-type: none"> Building an understanding of the area Narrowing down the focus of the research Creating an initial spatial diagnosis and analysis Overall planning of the fieldtrip
Fieldtrip (25th April - 13th May)	<ul style="list-style-type: none"> Trips to Chuquitanta of 6 full days Transect walk x 2 (urban and rural areas) 15 formal interviews (including the Mayor of SMP, local Chuquitanta municipal officers and engineers, a Callao engineer, a local doctor) 12 semi-structured interviews with the community Focus groups with 29 people (mapping, risk trees) Visioning workshop with 15 people (3D representation of Chuquitanta with models of features including green spaces, water bodies, health centres and schools to construct future scenarios) Initial analysis of the area and building an action plan Data collection in its various forms: tour of SMP, semi-structured interviews, films, photographs, transect walk with the aid of the EpiCollect+ Beta, community-based surveys, ArcGIS mapping, lecture notes, focus groups, future visioning and backcasting workshop Final presentation of results in Chuquitanta, incorporating input from the community 	<ul style="list-style-type: none"> Testing and refinement of analysis Understanding and mapping the major health- and environment-related risks Building a deeper understanding of the disconnections within the hydrosocial cycle in Chuquitanta Identifying ways in which the community is already cooperating and where there is potential for scaling up community initiatives, or identifying room for manoeuvre Pinpointing key actors for the proposed strategies
Post-field trip (15th May - 9th June)	<ul style="list-style-type: none"> Processing and further analysing primary data Refining the diagnosis and the action plan Finalising the presentation, audio-visual output and the report Reconnecting with key actors from the field 	<ul style="list-style-type: none"> Finalising diagnosis and action plan Compiling information and communicating findings in English and Spanish

4. Key Findings

In order to understand the multiple disconnections within the hydrosocial cycle a number of structuring factors have been identified. This approach has enabled the reframing of our research on a macro level, before subsequently explaining the complexity of the micro level, its inherent risk traps and their manifestations. All of these factors facilitate the understanding of the relationship between land, water and society and how the perceptions and uses of water are shaped and reshaped by these dynamics in Chuquitanta.

4.1 Chuquitanta, a place subject to multiple pressures on water and land

The research revealed how Chuquitanta is shaped and influenced by multiple urban pressures, due to its location at the border of several districts. Its proximity to Lima's centre and the port of Callao results in immense land speculation. On the northern banks of the Chillón for example, private companies are buying land to increase container storage capacity for the expanding port. The red arrows in figure 7 represent these pressures. With land at a premium due to the northern expansion of the city, land owners often sell their plots in both formal and informal markets. These elements thus intensify the already extensive disappearance of agricultural land (see figure 8), encroachment upon cultural heritage and green areas, which simultaneously degrades water sources. In addition, land-use changes and the associated loss of green spaces, significantly impacts upon the potential for groundwater recharge and therefore local water supplies (Harbor, 1994).

Figure 7. Urban pressures on Chuquitanta. Source: Google Earth (2015b)



The above pressures are accompanied by informal processes of land invasions particularly on the franja marginal¹ and the presence of illegal land trafficking that is

Figure 8. Maps illustrating the extent of agricultural land in Chuquitanta in 2003 (L) compared with 2015 (R). Source: Google Earth (2015b)



common in Lima (De Soto, 1989; Calderon, 1998). For example, some land invasions have occurred by people displaced during the Linea Amarilla Rio Rimac Project (El Comercio, 2014), illustrating that without holistic planning which challenges the root causes of informality and unregulated urban expansion, the exposure to everyday health and environmental risks associated with these processes can relocate itself. These pressures on land also threaten the quantity and quality of water sources and the ecological infrastructure.

4.2 Many actors, little coordination

In Chuquitanta, and as illustrated in Figure 9, water governance is complex and fragmented. Firstly, the governance of water is over-centralised. Water from the Chillón is managed by the Ministry of Agriculture and ANA, whose joint responsibilities include the protection of water sources from contamination and the prevention of construction on the franja marginal (Peru, 2013). However, two factors clearly illustrate the failure of these institutions in achieving these tasks; (1) the water flowing through the River

Chillón and connected irrigation channels is in fact highly contaminated (LIWA, 2014), and (2) in many areas, the franja marginal of both the river and irrigation channels are disregarded, as shown in figure 10.

Secondly, there is a disconnection between the level of responsibilities and the scale of actions. SEDAPAL is the main actor responsible for water supply and sanitation in Chuquitanta as well as in Lima as a whole. Although the mega-project “Victor Raúl Haya de la Torre” aims to provide the area with potable water for 2017 (Cabanilla, 2015), the population currently depends upon unreliable water trucks as seen in figure 13. Moreover, SEDAPAL claims that this mode of distribution is not their respon-

sibility and this undermines their ability to enforce effective control and improvement upon water quality and quantity in the area.

Thirdly, there are multiple overlaps between institutions, which create tensions around responsibilities. ANA acts at a national level but does not address the complexity of the local context and its inherent problems. This gap and the lack of resources also create a loophole, allowing illegal activities along the Chillón flourish.

In contrast, at a local scale, the Mancomunidades² in the lower basin and the Asociación del río Chillón (Chillón Valley Association) have developed multiple actions to

Figure 9. Water governance diagram presenting the institutional and community actors on a local, regional and national level. The asterisk (*) symbolises the actors with a direct influence on water governance, while the other actors are indirectly affecting water governance through interventions such as land administration and urban planning. Source: Amended from Miranda et al. (2014)

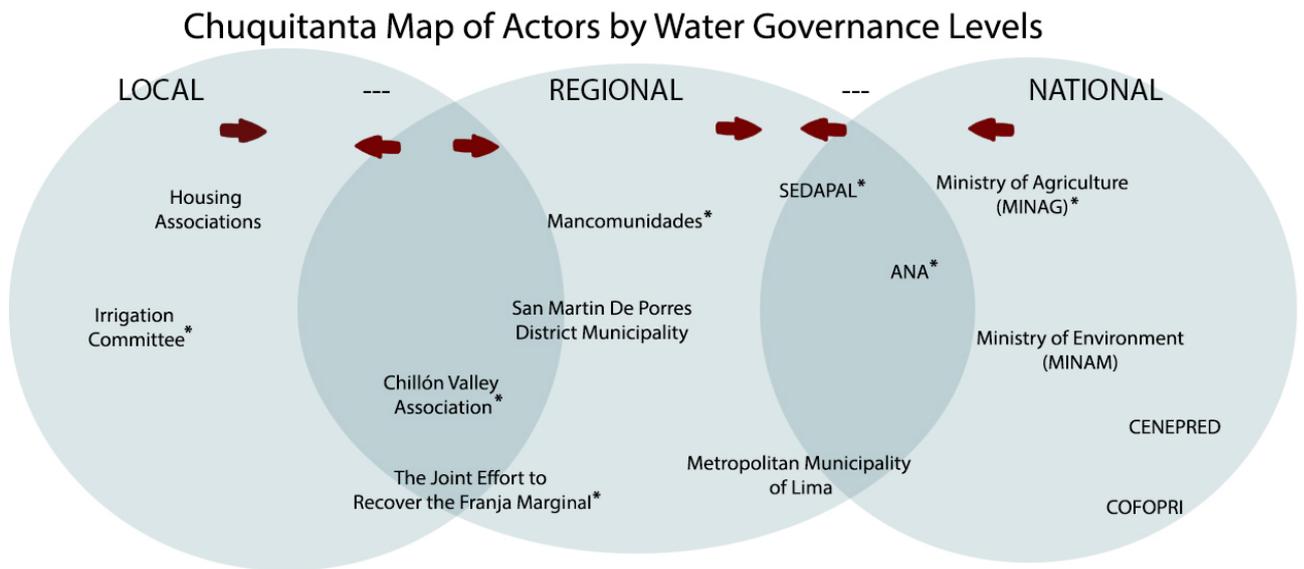
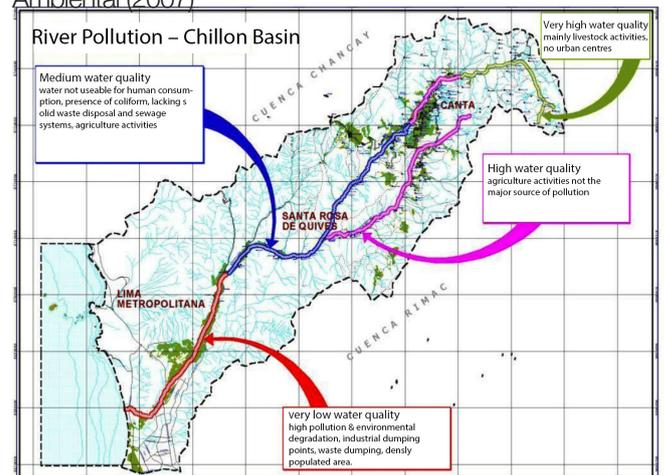


Figure 10. Photos illustrating informal encroachment on the Franja marginal. Source: Authors



Figure 11. Map illustrating contamination of the River Chillón at the basin scale. Source: Plan de Ordenamiento Territorial y Ambiental (2007)



recover the river and have attempted to call the attention of ANA to ameliorate the situation. Recently, a joint effort to recover the franja marginal along the banks of the Chillón was initiated by a consortium of different municipalities, institutions (such as CENEPRED, ANA, the ecological police) and representatives of the communities. At the same time, community initiatives and cleaning campaigns driven by organised civil society including the Asociaciones de Vivienda (Housing Associations) and the Junta de Regantes (Irrigation Committee) have endeavoured to clean-up the waste. All these initiatives, however well intended, appear poorly connected. They are also perpetually weakened by transitions between administrations with differing priorities. For example, the Plan Regional de Desarrollo Concertado 2012-2025 (Regional Development Plan for Lima) seemed to prioritise the objective of recovering Lima’s three river valleys (PRDC, 2012). However, this was subsequently abandoned by Castañeda’s administration.

In this context and as a result of these disconnections, many community groups and industries degrade the water sources freely, which reflects the aforementioned weak governance structures. Consequently, and as illustrated in figure 11, water reaches Chuquitanta depleted and ‘tired’. For the population and the environment, this manifests as exposure to daily risks.

4.3 A vicious cycle for a precious resource

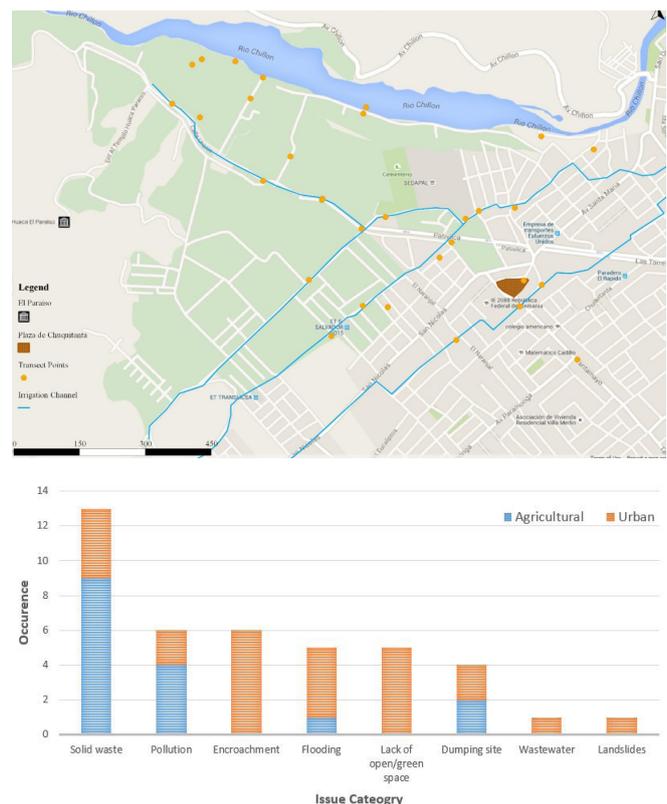
The research findings allowed the development of a spatio-temporal understanding of everyday issues and associated risks within the current hydrosocial cycle of Chuquitanta. The fieldwork results suggested inherent issues associated with waste and contamination, as can be seen from the high frequency of issues related to solid waste, pollution and dumping throughout the surveyed points as shown in figure 12 (23/41 points – 56%). Similarly, a lack of green space and encroachment upon sites of cultural importance occurred with high frequency, particularly in urban areas. The co-existence and interaction of these issues highlighted the interconnected risk traps within the hydrosocial cycle, in terms of their collective impact upon land and water, also presenting a situation whereby the society and the environment appear at the centre of ensuing everyday risks.

Furthermore, results from the surveys and additional investigation suggested significant issues with housing and service security, where the apparent lack of connection to piped water supplies and sewage systems resulted in a reliance upon alternative and often more expensive and less reliable services such as water trucks and septic tanks (as can be seen in figure 13). In addition, SEDAPAL’s wastewater treatment plant located within Chuquitanta remains impractical and unable to provide treated wastewater to the community, a feature which

would have significant potential for overcoming water quality and quantity issues inherent in the water cycle of the area. Waste management services were similarly found to be poor and sporadic, and were not congruent with the increasing population. Thus, the community is left to dump waste within their immediate vicinity, be it the street, irrigation channels or river, further degrading water and ecological resources and affecting the health of the community.

As apparent from the field research results, Chuquitanta’s water quality and quantity has been degraded. This, in line with arguments by Linton and Budds (2014), has disrupted social relations and created conflicts over the resource. For instance, the farmers wish for the irrigation channels to remain open, blaming the rest of the community for contamination. The rest of the community and the SMP district municipality generally want the irrigation channels to be closed due to health risks associated with their contamination and their propensity to pollute crops. Therefore, there is an apparent ‘stalemate’ around the responsibilities of each party concerning this

Figure 12. Spatial representation of Chuquitanta highlighting the location of the primary data collection points for the transect walks as well as key observed features in the area (a – above). The bar chart illustrates the occurrence of issues within both agricultural and urban areas of Chuquitanta according to the different surveyed points on the map (b – below). Source: Authors



resource. In addition, whilst many stakeholders seem to participate in this situation, the possibility of change appears only in the hands of those who either degrade this resource or are responsible for its protection. The risk exposure however, is essentially the burden of the community, resulting in a vicious cycle of risk traps. In this respect, the water in Chuquitanta shows evidence of being politicized whilst also reflecting increasing favour for economic-centered uses.

The following figure illustrates a number of risk traps that have been identified including “the water and waste trap”, “the water tank trap” and the “dust trap”. These traps are the result of field observation and analysis of structuring factors and are described below.

From the previous analysis of the individual risk traps in figure 14, a more holistic representation of risk in Chuquitanta was devised in order to understand where actions for change could be engaged (see figure 15).

The five structuring elements at the base of figure 15 (governance crisis, land management, lack of waste management, behaviour and illegal upstream disposal) affect the quality, quantity and availability of the water

sources in Chuquitanta by creating problems related to its spatial entities (spatial entities seen in first set of dotted boxes and problems in second set of dotted boxes). These problems create conflicts and daily health and environmental risks (see red boxes in figure). This affects the perception of water and reinforces the negative behaviours of the population towards this resource, as well as a general acceptance of the actions of the upstream industries towards this inherently depleted and risk laden resource.

The strategies laid out in the following section would attempt to ameliorate the consequences of the above-mentioned risk cycles, which are also resulting of a disrupted and disconnected hydrosocial cycle. By basing new social organisations and partnerships on the existing community structures, significant changes could be made to perceptions of water. Initially, by shifting water management in the area towards a less centralised governance structure, issues surrounding the quality and availability of water could be tackled to decrease its negative perception, assisting in the reconnection of the hydrosocial cycle. At the same time, in order to reduce environmental and health issues associated with pollution and desertification, attempts to recover open green spaces could be

Figure 14. Risk traps and coping mechanisms (see Appendix 4.1 for a visual representation). Source: Authors

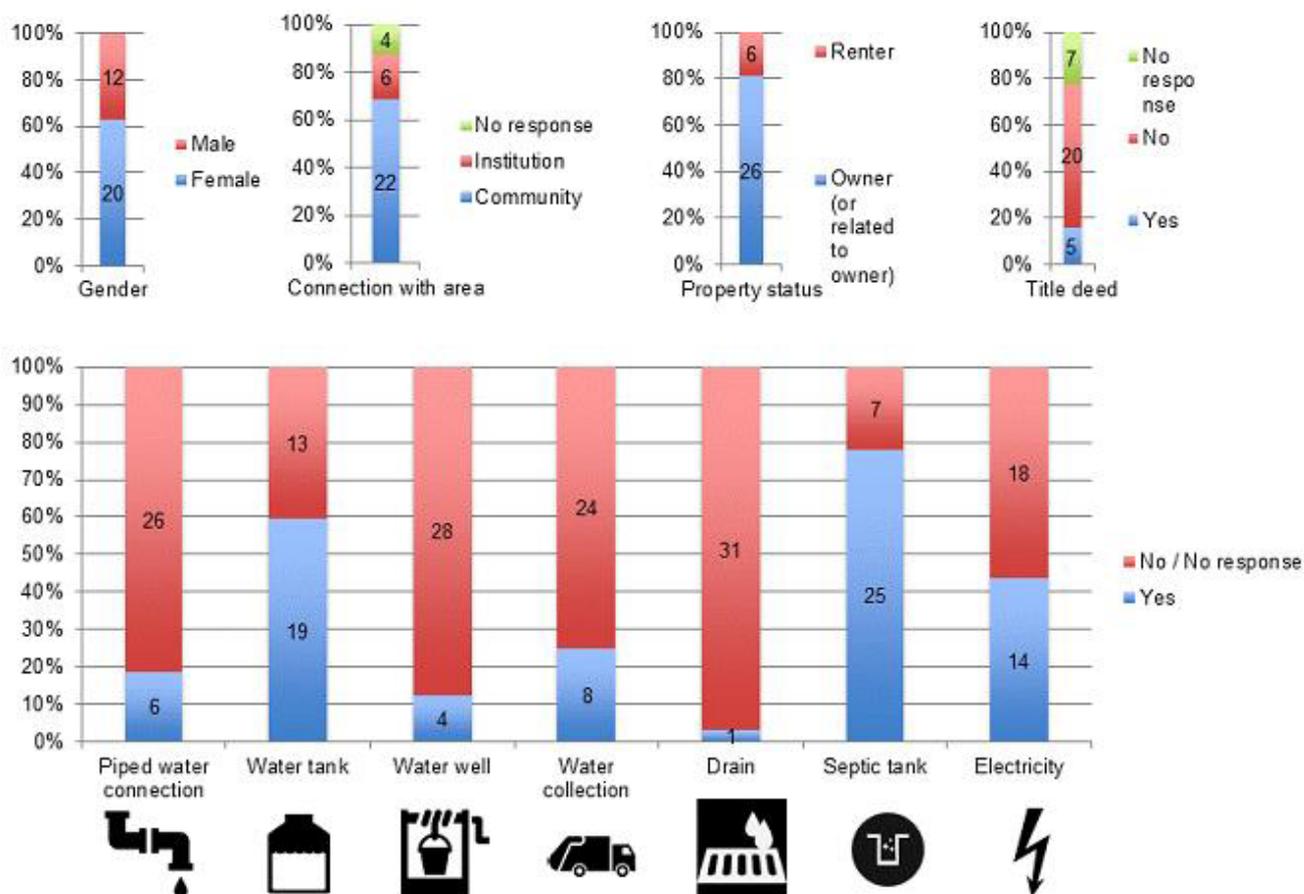
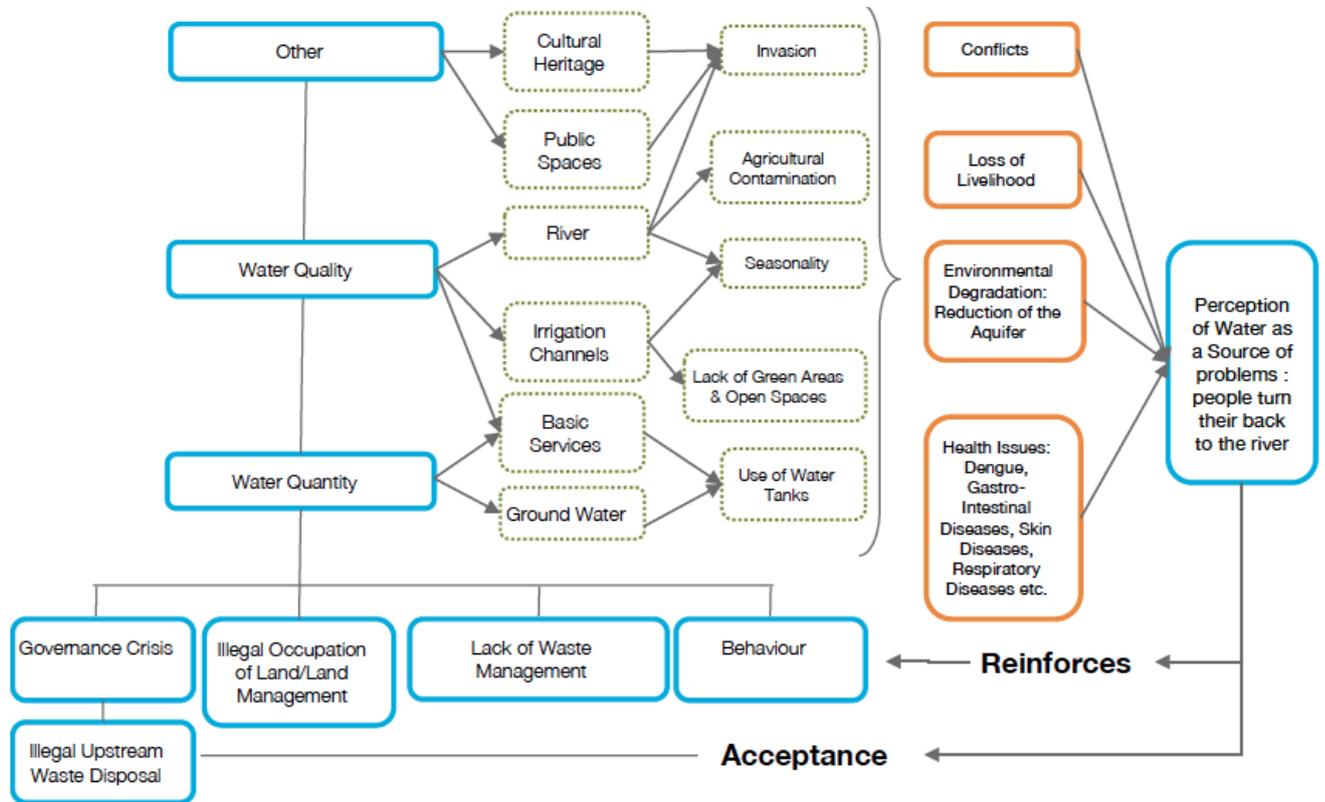


Figure 14. Risk traps and coping mechanisms (see Appendix 4.1 for a visual representation). Source: Authors

The Water Tank Trap	Coping Mechanisms
<p>By purchasing land informally and at a lower rate the buyer will not receive basic services from the municipality. They will then be dependent on unreliable water trucks, which distribute low quality, unregulated water. This can create intestinal problems that may lead to illnesses, especially among children (Ministerio de Salud, 2013). This affects the perception that the community have of the irrigation channels and the river and thus leads to negative behaviour towards the water sources.</p>	<p>The response of the community to this risk trap depends on the socio-economic status of the households. For example, the better off can afford to buy bottled water for consumption, using the water tanks solely for other uses such as washing and sewage. They also pay more attention to the source of this water.</p> <p>However, the poorest within the community and those living in settlements in more rural areas, often have no choice other than to buy water from water trucks. In these cases, people boil the water and/or use chemicals to clean it, which is also a health risk. The water trucks trap requires more control from the state and the community on the quality distributed by the informal providers.</p>
The Dust Trap	Coping Mechanisms
<p>The rapid urbanisation of the area has meant that spaces that were previously reserved for agricultural or recreational use have now been sold off in smaller plots through both the official real estate market and the informal (including land traffickers). This creates even bigger problem of informality because the areas that are supposedly reserved for recreation or public spaces by law are not respected. In the long-term, this has resulted in an unstoppable encroachment upon the areas dedicated to agriculture, an unplanned growth of the area of Chuquitanta and increased deforestation. Moreover, the rapid population growth and the aforementioned processes of informality have meant that open spaces that were previously protected such as the river banks (known as Franjas Marginales), “El Paraiso” and ancient walls continue being encroached upon and destroyed.</p> <p>The subsequent lack of public/green spaces and reforestation policies have had increased the process of desertification in the area of Chuquitanta. This results in a greater concentration of dust in the streets and therefore increasing rates of respiratory diseases, which significantly diminishes the quality of life of the citizens.</p>	<p>Encroachment upon the green spaces and agricultural land is dealt with in different ways by the community. For example, over many years, the farmers have created cooperatives and associations such as the Junta de Regantes to defend their agricultural activity, protect the irrigation channels and safeguard the right to use water for their crops. Additionally, some people have been undertaking sporadic actions for the preservation of the few remaining green spaces. Moreover, others still have been pressurising new real estate developments to include green spaces in their projects (as required by planning laws).</p> <p>On the one hand, in the case of dust, people try to cover their eyes or wear clothes to avoid the debris. There have been multiple complaints from members of the community and institutions regarding the increasing levels of environmental contamination in Chuquitanta and the lack of attempts to minimise this issue, despite sporadic actions such as spraying truck water onto the roads to reduce dust. On the other hand, the perception and behaviour of people toward these processes of desertification and the lack of public spaces is in general reflected by individuality. For example some members of the community plant trees and shrubs in front of their houses; however, this is not done in a coordinated and larger scale manner.</p>
The Waste and Water Trap	Coping Mechanisms
<p>There is a mismanagement of waste in the area due to a combination of population increase and sporadic waste collection from the municipality. This, combined with attitudes within the community, results in solid waste being dumped into the river, irrigation channels and on the streets. This leads to exposure to stagnant water, which is a source of diseases such as dengue. This creates a negative perception from the inhabitants towards the water from the irrigation channels and reinforces the dumping of waste into these channels, thus creating a vicious cycle. This vicious cycle creates divisions within the community, particularly between farmers and people living close to the channels.</p>	<p>The Chuquitanta community has organised widely to improve waste collection. However, in the last year, a problem between the waste collection company and the municipality of SMP has left the community practically without this service for months and in response, the municipality of SMP and the community have been doing part of the work. ‘Faenas’ are organised in which the community and the Irrigation Committee clean specific areas, including the channels and river banks. In addition, schools have been paramount to long-term behavioural changes regarding the management of waste.</p>

Figure 15. The cycle of risk in Chuquitanta. Source: Author



devised and act to showcase that the water flowing in the irrigation channels could tangibly benefit everyone as well as overcome the waste-dump reputation that the area currently carries. These water sources would need to be clean before they could be used for the irrigation of green spaces. Furthermore, a final approach could act to cement the area’s eco-cultural heritage, countering inherent pressures, as well as resisting potential land-use change.

disappearance of green spaces in Chuquitanta, further degradation and depletion of the multiple water sources (River Chillón, irrigation channels and groundwater reserves), an increased encroachment on and destruction of archaeological sites and a complete loss of cultural legacy. Overall, this would generate an irreparable multi-scalar rift in the hydrosocial cycle of Chuquitanta and cement the inherent risk cycles.

5. Strategies for Transformative Change

Three strategies have been chosen as part of the Environmental Action Plan based upon three fundamental pillars as illustrated in figure 16, which in their entirety, could initiate a reconnection of the hydrosocial cycle in Chuquitanta. Each strategy was developed in consideration of short-and long-term actions, multiple geographic scales and the actors and resources necessary for its implementation.

A spatial representation of what transformative change could look like in Chuquitanta was also produced which has supported the following strategies, in accordance with the future visioning of the area by multiple stakeholders. This was done in order to respond to the apparent emergency situation in the area, described as being “disastrous” by the mayor of SMP (Piaggio, 2015). Business-as-usual urban expansion would entail a complete

Figure 16. The three chosen strategies and their ‘pillars’ to facilitate transformative change – community action, institutional governance and education. These driving forces are collectively required for effective change to transpire.



Figure 17. A potential future scenario for Chuquitanta that reconnects the hydrosocial cycle, illustrating an increase in green spaces and parks along the franja marginal of both the River Chillón and the irrigation channels, recovery and maintenance of these water sources and preservation of the cultural and ecological heritage in the area. Source: Amended from Google Earth (2015b)



5.1 Strategy One: Enhancing participatory planning: Community Water Board

The first strategy is inspired by the need to realign the water governance structure within Chuquitanta, in order to recover the water resources in the area. Over 80,000 Community Water Boards (CWBs) from Latin American countries illustrate how community-based water management in peri-urban and low-middle income areas, often beyond the reach of private and public service provision, can achieve political legitimacy and longevity (Fundación AVINA, 2011). At present in Chuquitanta, once water and sanitation services are provided for households, the structure organised around lobbying for the services within the Asociaciones de Vivienda dissolves. A CWB would offer its extension, and a space within which different actors could discuss issues affecting Chuquitanta. Figure 18 illustrates how the basic structure of the CWB could work, with additional detail in Appendix 2.1 (a) and 2.1 (b).

The research revealed that the people of Chuquitanta share a common vision of restoring the natural value of this unique part of the city, particularly regarding wa-

Figure 18. Schematic outlining potential actors (centre), responsibilities and initiatives that could be involved in strategy one



ter resources. The CWB would serve as a tool, which brings actors together to discuss water-related issues via social structures already organised around the allocation of land and service provision. This would constitute a key strategy for altering the hydrosocial cycle and existing perception of water, especially if tied to educational programmes. This could reduce everyday risks within Chuquitanta and beyond, through the sharing of different perspectives of water usage and symbolism, facilitating the ‘massification’ of water- and risk-related knowledge (Zilbert, 2015).



"Start with this. Every directive should form committees. For example, one committee for health: 3 neighbours. One committee against contamination: 3 neighbours. One committee for the defence of the property rights, or for developing solutions for the problems of property."

Carlos Grimaldo,
Teacher at República Federal de Alemania

The model's implementation is realistic, considering existing structures and evidence for good relations between some Asociaciones de Vivienda and the Junta de Regantes. While Chuquitanta holds on to SEDAPAL's the promise to make water services available soon, it is possible that issues surrounding land ownership and tenure may act to slow down the process. In addition, while increasing the potential for self-governance regarding water, through enhancing access to spaces of participation, the CWB would not diminish the roles and responsibilities of other actors. It would add another layer to organised civil society, thus supporting Peru's new water law which, in a very centralised water governance system, endorses a participative approach to water management, by stipulating that ‘catchment councils’ should be set up everywhere to integrate relevant authorities and all water users (Progressio, 2012). Councils, together, write catchment-scale management plans, representing all interests, which are to be legally binding and could potentially be supported by the Lima Water Fund, AQUAFONDO (ibid).

5.2 Strategy Two: Cleaning and Greening: Public Green Infrastructure Partnerships

Strategy two would work in conjunction with the other strategies by highlighting the potential of the existing water sources for service provision in the area. The degradation and depletion of the public green infrastructure and services in Chuquitanta was evident from the findings of the project's action research, whereby the current functional regime of land, water and waste were operated in an unsustainable linear metabolism. This is consequently an urgent situation. As a result of

this, the proposed strategy incorporates the cleaning and greening of Chuquitanta through a two-staged approach (figure 19).

Their combined aim is to recover, maintain and develop public blue and green spaces in Chuquitanta ensuring their high quality and good accessibility. In addition, through these mutually beneficial partnerships, there is the possibility of attaining a more socially just and environmentally sustainable circular metabolism of water and waste. It is expected that via the undertaking of this strategy, the health and environmental risks associated with contaminated water sources and desertification could be mitigated and adapted to, allowing water to be directed towards agriculture and green spaces.

Figure 19. Basic schematic of two-staged approach to Strategy Two. Source: Authors



Stage One: Participatory Waste Management Partnership

Stage One would aim to create a public private partnership (PPP) between local informal waste collectors and recyclers, the irrigation committee, the new private waste contractor and the SMP district municipality for a more sustainable waste management system. This would be essentially centred on the district municipality as its driving force, ensuring not only a progressive and successful clean-up operation, but also a continued cleaning of open spaces, irrigation channels and the river (figure 20, Appendix 2.2 (a) and 2.2 (b)). In the short term, the first stage is based upon campaigning for waste reduction via education and awareness raising. It is then anticipated that in the medium-to-long term, contracts can subsequently be developed and if the partnership is successful, then there is the potential for scaling up the project to the city scale. It is important to bear in mind that the water sources would have to be clean to enable the initiation of stage two.

Stage Two: Green Infrastructure Development Partnership

Stage two would aim to provide public green space for recreation and community cohesion. This would be more of a community-focused partnership, requiring mobilisation by the Asociaciones de Vivienda and the Junta de Regantes, with technical assistance provided by other institutions (figure 21, Appendix 2.2 (a) and 2.2 (b)). In the short term, the focus will be on initiating open discussions regarding the potential locations for small parks along the irrigation channels, as well as the initial recovery of the franja marginal along the irrigation channels. Subsequently, in the medium to long term, the green infrastructure partnership can be developed and implemented, in conjunction with the CWB, SEDAPAL, the Junta de Regantes and Universities in place as advisory bodies to ensure effective monitoring. Appendix 3.2 illustrates a successful irrigation-channel restoration case study that could be used as a potential model for the future of Chuquitanta

5.3 Strategy Three: Cultural and Ecological Heritage Awareness Programme

The third strategy is a two-pronged approach, which would act as a catalyst for reconnecting the socio-ecological, aspect of the hydrosocial cycle by reinvigorating the importance of Chuquitanta's cultural heritage and its strong linkages to water. This would serve

to reconstruct Chuquitanta's reputation, from its current status as a 'waste dump'. It is hoped that such a scheme could enhance the area's preservation and prevent systematic conversion to urban usages from real estate speculation and urbanisation pressures.

Stage One: Education Partnership

The first aspect would consist of an educational programme and campaign partnership between the SMP district municipalities, schools and the Ministry of Culture, in order to raise awareness about the cultural and environmental heritage present in the area (see figure 22).. This stage would focus on educating the people of Chuquitanta and SMP, both children and adults, on



"What we could do is a partnership between all the neighbours in order to collect waste, plastics and papers that could become a small source of income for us as well as improve the waste collection situation."

Neighbour, Chuquitanta

Figure 20. Schematic outlining potential actors and initiatives which could be involved in the waste management PPP to start a dialogue and thus action (see Appendix 2.4 for more detail)



Figure 21. Schematic outlining potential actors and initiatives which could be involved in the waste management PPP to start a dialogue and thus action

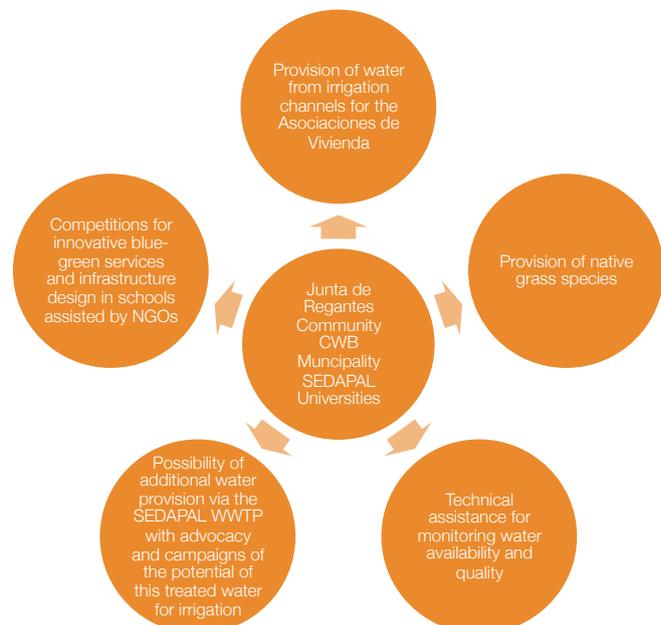


Figure 22. View overlooking El Paraiso and some of Chuquitanta’s agricultural land from a mountainous ridge between SMP and Callao (L) and an ancient wall, part of Chuquitanta’s unique cultural heritage (R). Source: Authors



the importance of such cultural heritage and on its potential to create a network of valuable resources that have to well nurtured (see figure 23). Additional support could be provided by universities, such as the Pontifica Universidad Catolica and its archaeological department, by organising workshop sessions that could be held in common spaces to increase knowledge sharing about these sites. In order to attract more people to these events, the Ministry of Health could also intervene to give advice on everyday hygiene practices. As many people in the area also run small business, the district municipality could invite entrepreneurs to share knowledge about how to run a business. At each of these event however, the purpose would be to enhance knowledge about the cultural heritage.

unique cultural legacy and to alleviate any negative views of its heritage, whilst simultaneously initiating a lobby to conserve the agricultural land that surrounds Chuquitanta. A Similar campaign has been successfully implemented in Baghdad (see appendix 3.3). If successful, funding from the Ministry of Culture could be sourced along with the involvement of UNESCO in the program, towards creating a network of archaeological sites within the city. The CWB could act as a custodian of this legacy and could monitor land-use changes, reporting to the Ministry of Culture should policy not flouted. The staging of this debate would enable the scaling up of conservation efforts at a city-wide, national and potentially international level.

Figure 23. Schematic outlining potential actors and initiatives which could be involved in the first stage of the ecological and cultural heritage strategy to educate people (see Appendix 2.3 (a) and 2.3 (b) for more details)



Stage Two: Awareness Campaign

The second stage would see a partnership between the CWB, the Ministry of Culture and the SMP district municipality, with significant media presence, perhaps including a social media campaign. The role of this alliance would be to revive a national public debate around the presence and protection of Chuquitanta’s

“The agricultural land need to stop being sold, and we need to see and dream about the archaeological sites and propose other activities for the area, such as recreational areas.”

Milagros Juarez,
Neighbour in Chuquitanta



6. Conclusions and Future Recommendations

Everyday risks in Chuquitanta have revealed themselves to be partially resulting from a disconnected hydrosocial cycle. By answering our research questions throughout this report, the resulting diagnosis has enabled the determination of the main economic, political and social drivers of everyday risks. These drivers in turn, influence and shape the relations, perceptions and conflicts around the water sources in the area, their associated vicious risk traps and cycles, in addition to the everyday environmental, health risks and coping mechanisms that actors employ to ameliorate their effects.

However, the potential for the 'scaling up' of actions to overcome these cycles is limited due to fragmented and inconsistent planning by consecutive administrations and other responsible actors, as well as a persistent lack of capacity and overlapping institutional responsibilities. This is combined with inherent issues between the constant tensions of market-led land pressures and a weak centralised governance structure, which has proven too weak to organize, control, supervise and secure access to water resources.

Accordingly, the institutional crisis together with the deteriorating conditions of the water sources, have created an undeniable state of emergency in Chuquitanta, characterised by a high level of risk exposure. It is paramount that the government declares this emergency and facilitates the creation of an enabling environment where people could subsequently start organising (in conjunction with the government) in order to drive fundamental changes. Therefore, our research has been centred on proposing an environmental action plan that attempts to identify room for manoeuvre outside of the current stakeholder 'stalemate'. Thus, by increasing the role of participation in decision making and shifting the current governance situation towards a more responsible multi-scalar governance structure, possibilities for change towards the future development of the area can be envisioned.

This report has proposed a number of possible strategies that if implemented, could lead to this transformative change, thus breaking the current status quo. These could include the recovery and maintenance of the water sources of the area, an innovative waste management system, the recovery of green spaces and finally, awareness campaigns to promote and reinvigorate knowledge surrounding the cultural heritage of Chuquitanta. To support the development of these strategies, the SMP district municipality and the metropolitan government of Lima could reinforce their control over the situation regarding land development and land use categorisation in the area. This highlights a fundamental need to also address the macro-scale processes affecting Chuquitanta.

Through the propositions highlighted in this report, a reconnection in the hydrosocial cycle could occur, where the community and the environment are at the

"This is my dream. To see the River Park, the agricultural area, and the archaeological sites. Everything positive, everything more attractive. And a better quality of life."

Luis Alvarado,
Ex Environmental Manager of San Martin de Porres



centre of a drive for socio-environmental transformative change in Chuquitanta. For this, there needs to be improved organisation towards common goals, which may constitute the first stepping-stone towards a more democratic and interconnected hydrosocial cycle.

References

- Adger, N., 2006. Vulnerability. *Global Environmental Change*, 16(3): 268-281.
- Alvarado, L. *Interview on history of Chuquitanta*. Interviewed by Dueñas Ocampo, S., 28 April 2015.
- Aspe, C. and Jacqué, M., 2015. Agricultural Irrigation Canals in Southern France and New Urban Territorial Uses. *Agriculture and Agricultural Science Procedia*, 4, pp. 29-39.
- Blanchon, D. and Graefe, O., 2012. Radical political ecology and water in Khartoum, Sudan: A Theoretical Approach beyond the Case Study. *L'Espace géographique*, 41: 35-50.
- Budds, J., 2009. Contested H2O: science, policy and politics in water resources management in Chile. *Geoforum*, 40(3): 418-430.
- Bujra, J., 2005. Lost in Translation? The use of Interpreters in Fieldwork. In V. Desai and R. Potter (eds.) *Doing Development Research*, pp. 172-179. Sage Publications Ltd, London.
- Bull-Kamanga, L., Diagne, K., Lavell, A., Leon, E., Lerise, F., MacGregor, H. and Yitambe, A., 2003. From everyday hazards to disasters: the accumulation of risk in urban areas. *Environment and Urbanization*, 15(1): 193-204.
- Cabanilla, I. *Interview on SEDAPAL plans*. Interviewed by Marchais, Q., 30 April 2015.
- Calderón, J. 1998. "Mercado de tierras en áreas agrícolas periurbanas" en *Debate Agrario* 28, [pdf] Lima. [online] Available at: < http://www.cepes.org.pe/debate/debate28/01_Articulo.pdf > [accessed 12 Feb 2015].
- Chambers, B., 2005. The Barriadas of Lima: slums of hope or despair? Problems or solutions? *Geography*, 90(3): 200-224.
- Cleaves, P.S. and Scurrah, M.J., 1980. *Agriculture, bureaucracy, and military government in Peru*. Cornell University Press pp.329-330.
- De Soto, Hernando, 1989. *The Other Path: The Invisible Revolution in the Third World*. Harpercollins.
- Dodman, D., Brown, D., Francis, K., Hardoy, J., Johnson, C., & Satterthwaite, D., 2013. Understanding the nature and scale of urban risk in low-and middle-income countries and its implications for humanitarian preparedness, planning and

- response. *International Institute for Environment and Development (IIED)*. [online] Available at: <<http://pubs.iied.org/pdfs/10624IIED.pdf>> [Accessed: 03 June 2015].
- El Comercio, 2014. 'Via Parque Rimac, Expropiaran casas a quienes rechacen oferta', [online], 07 April 2014. Available at: <<http://elcomercio.pe/lima/obras/via-parque-rimac-expropiaran-casas-quienes-rechacen-oferta-noticia-1721098>> [Accessed: 2 June 2015].
- Ely, K., 2008. *Postmodern Hydrologic Cycle*. [online] Available at: <<http://aquadoc.typepad.com/waterwired/2014/02/jeremy-j-schmidt-paper-historicising-thehydrosocial-cycle.html>> [Accessed: 20 March 2015].
- Fernandes, E., 2011. *Regularization of informal settlements in Latin America*. Lincoln Institute of Land Policy Cambridge, MA, USA.
- Fundación AVINA, 2011. *Governance for Access to Clean Water in Latin America*. [online] Available at: <<http://www.avina.net/eng/1476/avina-publica-el-libro-modelos-de-gobernabilidad-democratica-del-agua/>> [Accessed: 08 May 2015].
- Google Earth Pro 7.1. 2015a. *Lima*. <<http://www.google.com/earth/index.html>> [Accessed 19 January 2015].
- Google Earth Pro 7.1. 2015b. *Chuquitanta*. <<http://www.google.com/earth/index.html>> [Accessed 19 January 2015].
- Harbor, J.M., 1994. A Practical Method for Estimating the Impact of Land-Use Change on Surface Runoff, Groundwater Recharge and Wetland Hydrology, *Journal of the American Planning Association*, 60(1), 95-108
- Instituto Nacional de Defensa Civil, 2005. Informes de los principales Desastres ocurridos en Perú. [online] Available at: <http://www.indeci.gob.pe/compend_estad/2001/comp_2001_05.pdf> [Accessed 02 June 2015].
- IRB: Immigration and Refugee Board of Canada, 1999. Agrarian reform under the military regime of Juan Velasco Alvarado, including what the program entailed and its impact on Peruvian society (1968-1975). [online] Available at: <http://www.ecoi.net/local_link/191103/294706_en.html> [Accessed 03 June 2015].
- Ioris, A.A.R., 2012. Scarcity, Neoliberalism and the 'Water Business' in Lima, Peru. *Human Geography*, 5(2): 93-105.
- Kroeber, A.L., 1926. Culture stratifications in Peru. *American Anthropologist*, 28(2): 331-351.
- Lavell A., 2003. *Local level risk management: concept and practices*. CEPREDENAC-UNDP, Quito.
- Linton, Jamie, and Jessica Budds, J., 2014. The hydrosocial cycle: Defining and mobilizing a relational-dialectical approach to water, *Geoforum*, 57:170-180. [online] Available at: <<http://www.sciencedirect.com/science/article/pii/S0016718513002327>> [Accessed: 3 June 2015].
- LIWA, 2014. *Informe del Muestreo del Canal Josefina en Chuquitanta, Proyecto Liwa*.
- Mayoux, L., 2005. Quantitative, Qualitative or Participatory? Which Method, for What and When? In V. Desai and R. Potter (eds.) *Doing Development Research*, pp. 115-129. Sage Publications Ltd, London.
- Meadowcroft, J. and Morin, A., 2013. *Transitions to a Sustainable Future: Opportunities for Transformational Change in Canada*. Policy Horizons Canada. Available at: <<http://www.horizons.gc.ca/eng/content/transitions-sustainable-future>> [Accessed: 20 May 2015].
- Miranda, L., Takano, G., Escalante, C., 2014. City Report Metropolitan Lima and Callao. Lima: Foro Ciudades para la Vida.
- Ministerio de Salud, Red de Salud Rimac, SMP,LO, 2013. 'Diez primeras causas de morbilidad general, 2013' [online] Available at: <<http://www.reddesaludrimac.gob.pe/documentos/estadisticas/MORBI%20GENERAL.pdf>> [Accessed: 2 June 2015].
- Pando, L. R. R., and Lavell, A., 2012. Extensive and every day risk in the Bolivian Chaco: Sources of crisis and disaster. *Journal of Alpine Research | Revue de Géographie Alpine*, [e-journal] 100-1. [online] Available at: <http://rga.revues.org/1666> [Accessed 3 June 2015].
- Partidario, P.J. and Vergragt, 2002. J. *Planning of strategic innovation aimed at environmental sustainability: actor-networks, scenario acceptance and backcasting analysis within a polymeric coating chain*. *Futures*, 34(9-10), pp.841-861
- Perú, Ministerio de Agricultura, 2010. Reglamento de la Ley de Recursos Hídricos Ley N° 29338 Lima, 2010. [online] Available at < <http://www.ana.gob.pe/media/533045/reglamento%20lrh%20-%20n%C2%BA%2029338.pdf>> [Accessed: 3 April 2015].
- Piaggio, A. *Interview on SMP plans*. Interviewed by: Dueñas Ocampo, S., 8 May 2015.
- Plan de Ordenamiento Territorial y Ambiental (2007) Contaminación del Río de la Cuenca de Chillón. http://www.alter.org.pe/cuenca/flash/degradacion/contaminacion_rio.swf accessed on 14/01/2015)
- PRDC, 2013. Plan Regional de desarrollo Concertado de Lima (2012-2025), Instituto Metropolitano de Planificación, Peru.
- Progressio, 2012. Peru: How to involve people in water management. [online] Available at: <<http://www.progressio.org>>

uk/blog/ground/peru-how-involve-people-water-management> [Accessed: 31 May 2015].

Quilter, J. and Stocker, T., 1983. Subsistence economies and the origins of Andean complex societies. *American Anthropologist*, 85(3): 545-562.

Ratcliffe, J. & Krawczyk, E., 2011. Imagineering city futures: The use of prospective through through scenarios in urban planning. *Futures*, 43(7), pp.642-653.

Raymond, J.S., 1981. The maritime foundations of Andean civilization: A reconsideration of the evidence. *American Antiquity*, 806-821.

Reyes Pando, L.R. & Lavell, A., 2012. Extensive and every day risk in the Bolivian Chaco: Sources of crisis and disaster. *Journal of Alpine Research*, 100-1.

Swyngedouw, E., 2004. *Social Power and the Urbanisation of Water: Flows of Power*. Oxford University Press, Oxford.

The Natural Step, 2015. The concept of Backcasting [online] Available at: <<http://www.naturalstep.org/backcasting>> [Accessed: 20 May 2015].

The World Bank, 2014. 'Significant advances in the recovery of the Matanza-Riachuelo River Basin', [online] 29 June. Available at < <https://www.worldbank.org/en/news/feature/2014/07/29/avances-matanza-riachuelo>> [Accessed: 4 June 2015].

Travis, G., 2012. Matanza-Riachuelo Basin ppt. [pdf] [online] Available at <[http://www.caee.utexas.edu/prof/mckinney/ce397/Topics/Matanza/Matanza\(2012\)_ppt.pdf](http://www.caee.utexas.edu/prof/mckinney/ce397/Topics/Matanza/Matanza(2012)_ppt.pdf)> [Accessed 4 June 2015].

UNESCO, 2015a. The criteria for selection. [online] Available at:<<http://whc.unesco.org/en/criteria/>> [Accessed: 4 June 2015].

UNESCO, 2015b. #Unite4Heritage campaign launched by UNESCO Director-General in Baghdad. [online] Available at: < <http://whc.unesco.org/en/news/1254>> [Accessed: 4 June 2015].

UNISDR, 2009. *Global Assessment Report on Disaster Risk Reduction: Risk and Poverty in a Changing Climate*. UNISDR, Geneva, Switzerland.

Vörösmarty, C. J., Lettenmaier, D., Leveque, C., Meybeck, M., Pahl-Wostl, C., Alcamo, J., Cosgrove, W., Grassl, H., Hoff, H., Kabat, P., Lansigan, F., Lawford, R. and Naiman, R., 2004. Humans transforming the global water system. *Eos*, 85(48): 509-520.

Waselikowski, L., 2013. *Power and Interests in Conflicts over the Use of Irrigation Channels in an Informal Settlement – a Peruvian Perspective*. MSc Thesis. Second cycle, A2E. Uppsala: SLU, Dept. of Urban and Rural Development. [online] Available at: < <http://stud.epsilon.slu.se/6320/> > [Accessed: 03 June 2015].

Yamazaki, F. and Zavala, C. 2013. 'SATREPS Project on Enhancement of Earthquake and Tsunami Disaster Mitigation Technology in Peru' *Journal of Disaster Research*, Vol. 8, No. 2. [online] Available at: <http://www.researchgate.net/publication/228371809_Enhancement_of_earthquake_and_tsunami_disaster_mitigation_technology_in_Peru_A_SATREPS_project> [Accessed: 4 June 2015].

Zilbert, L., 2015. Lecture about Disaster Risk Management in Peru and the United Nations' paradigm. Lima, Peru, May 2015. Appendices

NOTES TO CHAPTER 2

1. Protected strips of land next to the river which should not be built upon.

2. Composed of different municipalities bound over a common objective to improve the quality of the River Chillón.

Appendices

Appendix 1.1 – Questionnaire for the community

Seleccione la respuesta mas relevante:

NOMBRE:

EDAD:

SEXO:

 Hombre Mujer

NÚMERO DE TELÉFONO:

RELACIÓN CON CHUQUITANTA:

 VECINO AGRICULTOR COMMERCIAL INSTITUCIONAL

DÓNDE VIVE USTED?

CUÁNTO TIEMPO HA VIVIDO USTED EN CHUQUITANTA (SI PLICABLE)?

 <1 1-5 6-10 11-20 21-30 31-40 41-50 50+

USTED HACE PARTE DE UNA PROGRAMMA DE VIVIENDA?

 SI NO Si es que si, explique por favor:

LAND SITUACIÓN:

 Proprietario Alquilando Título Sin Título

PROVISION DE INFRAESTRUCTURA:

 Connexion con la red Tanque de agua Poso de agua Colección de basura
 DESAGUE SILOS Acceso a espacios abiertos Electricidad

OCCUPACIÓN:

INSTITUCIÓN (SI APLICABLE):

ROL ESPECÍFICO EN CHUQUITANTA:

Appendix 1.2 – Interview information

Interviewees Name	Role	Date of Interview
Luis Alvarado	Formal Environmental Manager of SMP district Municipality	28/4/15
Cesar Palomino	Former member of staff of the SMP Environmental Office	28/4/15
Victor Saveedra Delgado	Callao Environmental Manager	28/4/15
Carlos Fernandez Martinez Romero	Representative of Los Olivos	28/4/15
Ivan Rodriguez Cabanilla	Representative of SEDAPAL	30/4/15
Milagros Juarez	Secretary of Junta Directiva	1/5/15
Eloise Cortoba	Treasurer - Junta De Regantes	1/5/15
Manuel Concha	SMP Engineer	1/5/15
Viviana Barrera Gonzalez	Chuquitanta Municipal co-ordinator	1/5/15
Ana Acevedo	Representative of FOVIDA	4/5/15
Gilberto Huaman	Urban Geographer and Engineer of SMP District Municipality	7/5/15
Freddy Santos Ternero Corrales	Mayor of SMP District Municipality	8/5/15

Appendix 1.3 Interview Questions

Formal interview questions for Community

<p>Risks</p> <ul style="list-style-type: none"> • What are the most important risks that you face on a daily basis? • What are the elements that you feel are causing this? • Are you aware of any risks to your health associated with this source? • How many times have you or your family members been sick (stomach) in the last year?
<p>Communal Areas</p> <ul style="list-style-type: none"> • Where do you come from? What do you do? • Where do you live in Chuquitanta and how long have you lived there for? • Do you rent or own the property? • How has the area changed since you have been living/working here? • Have any changes to urban or rural Chuquitanta affected your life?
<p>Services</p> <ul style="list-style-type: none"> • Where do you get your water from? • What type of drainage system do you have? • What is the quality of the water you consume? • Do you use the Puquio on the other side of the river?
<p>Governance</p> <ul style="list-style-type: none"> • Do you feel that there is anything being done by either the municipality or local/community organizations to address your concerns about water? If not, what would you like to see happen? • We are particularly interested in examining the irrigation channels. We've heard there have been some debates surrounding this - what is your position? • Do you feel it's important to keep or reclaim the franja marginal? Are there any other particular challenges in this area that you would like to see resolved?

*Formal interview questions for Community***Background**

- What is the development/history of Chuquitanta?
- What is the role/work of your office?
- Have any changes to the water quality and quantity occurred since you have been working in the area?
- What do you know about the way the agriculture land is irrigated?
- Do you see any issues in that?
- What should be done to improve the situation?

Urban Development Policies/Projects

- What are the current/past projects you are now working with/have done? (Related to Water; land; urbanisation; economy)
- What was the duration of the project?
- What was it about?
- Is the conservation of this land for food production or as green space taking priority or is satisfying the urban expansion dominating the agenda?

Collaboration Capacity/Actors involvement

- Do you think the irrigation canals should be preserved? Who do you think should be in charge?
- Is there a level of co-ordination with the current irrigation committee?
- Has there been any successful community engagement? Why/Why not? How it can be improved?
- Which government institutions/companies/NGOs do you believe you need to collaborate with in the future?
- How would that collaboration work?
- What would the difficulties and opportunities be?
- What is the working relationship between SMP and neighbouring districts?

Challenges and difficulties

- Are there any specific barriers that limit your capacity to improve water and waste management through your work?
- Do you see the encroachment on the franja marginal as a natural consequence of urbanisation or as an issue?
- What are the main risks that your constituents face? Anything can be done to reduce the risks?
- What would be the possible solutions for the future?

Appendix 1.4 – Stakeholder details

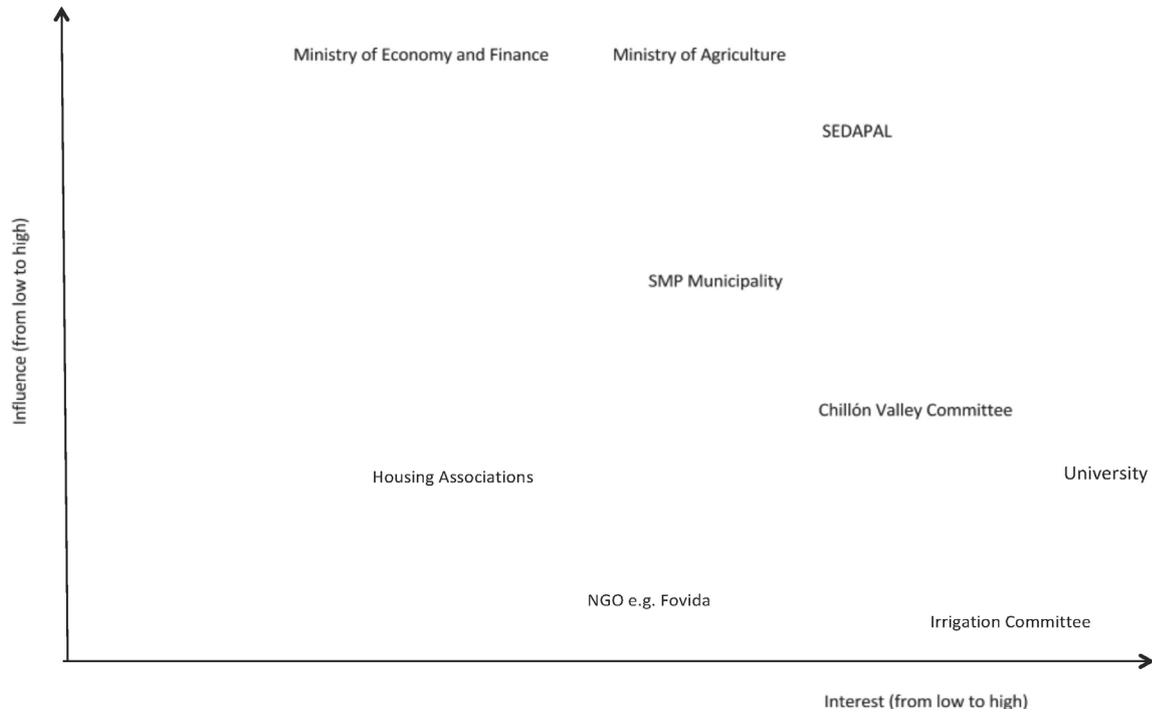
Stakeholder	Role	Comments
Aquafondo	A civil association that complements the efforts of the state in the preservation of watersheds and water supply for Lima and Callao. http://www.aquafondo.org.pe	Could be involved in all strategies as a support provider but particularly strategy 1.
CENEPRED	CENEPRED is in charge of the reconstruction, estimation, prevention, and reduction stages of the disaster risk management process (Yamazaki, F. and Zavala, C 2013:226)	The River Chillón is a seasonal river that has been prone to flooding in the past.
Chillón Valley Association (Asociación del Río Chillón)	Develops multiple actions to recover the river Chillón and tries to call on the attention of ANA to advance in this task	Involved in strategy 1
Chuquitanta Community	Helping to understand everyday risk in Chuquitanta Helping to understand how people relate to the land and water - their conception of risk and coping mechanisms Helping to provide an understanding of how farming families have responded to the changes in land use policy over the years, how it has affected their lives - conceptions of risk, relationship with nature, land and water, as well as other people	This encompasses the attendees at our workshops, formal and informal interviews that took place throughout our fieldwork and liaison we had with the farming community in the area. Involved in strategies 1 and 2(b)
COFOPRI	“established in 1996 for distributing property titles.” (Sara, Takano & Escalante 2014:23)	A large proportion of the population in Chuquitanta do not have title deeds. COFOPRI have operated in the area in the past.
Housing Associations (Asociaciones de Vivienda)	To provide a level of organisation and representation to households within each association	Involved in strategy 1 and 2 (b)
Informal waste collectors	Informal collection of waste from Chuquitanta	Involved in strategy 2 (a)
Irrigation Committee (Junta de Regantes)	Manages the distribution of water from the irrigation channels to farmers in Chuquitanta. Cleans the channels at certain times of the year.	Involved in strategy 1 and 2 (a) (b)
Lima Metropolitan Municipality (MML)	consists of 42 district municipalities “...local provincial government with regional government competences ... At the metropolitan level there is a well-recognized governance problem level between the Metropolitan Lima Province and the Callao Province. Although both are connected and form the same metropolitan region there exists a very limited planning and administrative relationship regarding national-sectorial, regional or local spheres which generates constant overlapping and even conflict/competition situations.” (Sara, Takano & Escalante, 2014: 7) “Municipalities in Lima are not currently participating in decision making on water and sanitation investments in the city. (IBID:34)	

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Lima Water Fund	Support civil society	Could be involved in all strategies as a support provider but particularly strategy 1
Los Olivos Municipal Authority	A district in North Lima where local government is aimed at improving the quality of life of people through labour and business promotion with assistance in health and education. It aspires to be a leading institution in improving the quality of life and promoting economic, ecological and social development of the district	Borders on the River Chillón before it reaches Chuquitanta.
Mancomunidades	Organisation composed of different Municipalities along the River Chillón, bound over a common objective.	SMP is currently not part of this organisation.
Media	Disclose the water injustice issues and power relation of different actors in the discourse of everyday risks	Involved in strategy 3.
Metropolitan Planning Institute (IMP)	“Urban development planning in Lima occurs under the jurisdiction of two institutions; the IMP of the MML, and the Provincial Municipality of Callao that tend to develop plans in parallel ways. ... The IMP is currently elaborating the Territorial Plan (POT) for the Chillón, Lurin and Rimac basins, which is expected to be finished in 2013.” (Sara, Takano & Escalante, 2014: 9-10)	
Mining companies	Contributes to pollution coming from upstream in the River Chillón	
Ministry of Agriculture and Irrigation (MINAGRI)	Has the authority to design, establish and execute government policies concerning agriculture. Particularly in relation to the Chillón, they have the authority to protect water sources from contamination and preventing the river banks from being constructed upon	Involved in strategy 1.
Ministry of Culture	Responsible for all cultural aspects throughout the national territory. Formulate, implement and develop strategies to promote culture in an inclusive and accessible way carrying out conservation while protecting cultural identity. http://www.cultura.gob.pe/en	Involved in strategy 3.

Stakeholder	Role	Comments
Ministry of the Environment (MI-NAM)	Oversees environmental sector of Peru. Has two sub-divisions - strategic development of natural resources and environmental management. Has the authority to design, establish and execute government policies concerning the environment.	
National Authority for Water (ANA)	Governing body and technical regulator of the national system of water resource management. It is an agency attached to the Ministry of Agriculture and Irrigation. In charge of granting water rights to both agricultural and urban users. In relation to the Chillón, they have the authority to protect water sources from contamination and preventing river banks from being constructed on.	Involved in strategy 1
National Superintendence for Water and Sanitation Services (SUNASS)	State entity responsible for setting tariffs. Determines SEDAPALs cost recovery	
Pig farms (private sector)	Contributes to pollution of water sources in Chuquitanta	
Private waste contractor	Collection of waste from Chuquitanta	Involved in strategy 2 (a)
Provincial Municipality of Callao	Handles affairs such as cleaning and basic services.	Same as above
Real estate companies	Purchase and sale of land in Chuquitanta adding to further urbanisation.	
Regional Government of Callao (GRC)	Handles regional matters pertaining to Callao	The mouth of the River Chillón is in Callao. Additionally, industries from Callao are encroaching on Chuquitanta.
San Martin de Porres (SMP) Municipality	"The 2003 Organic Law of Municipalities reduced urban planning to the district scale, to the point that each municipal district is able to approve its own urban development plan." (Sara, Takano & Escalante, 2014:10)	New administration elected in November 2014. There is a smaller, more local office in Chuquitanta. Involved in strategies 1, 2, and 3.
School	Provides primary and secondary education to residents in the area.	Involved in strategy 1, 2(b) and 3.
UNESCO	UNESCO works to create the conditions for dialogue among civilizations, cultures and peoples, based upon respect for commonly shared values. UNESCO's mission is to contribute to the building of peace, the eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information. http://www.unesco.org/new/en/unesco/about-us/who-we-are/introducing-unesco/	Involved in strategy 3.
Universities	Provide technical assistance and monitoring	Involved in strategy 2 (b)
Water and Sewage Service of Metropolitan Lima (SEDAPAL)	Lima's Water Company. "a decentralized public company owned by FONAFE at the Ministry of Economy and administered by the Ministry of Housing, Construction and Sanitation)" (Sara, Takano & Escalante, 2014:34). They are the main actor responsible for water provision in Chuquitanta and Lima as a whole.	There is a SEDAPAL waste-water treatment located in Chuquitanta on the banks of the Chillón which treats wastewater from other districts of Lima.

Appendix 2.1 – Stakeholder details

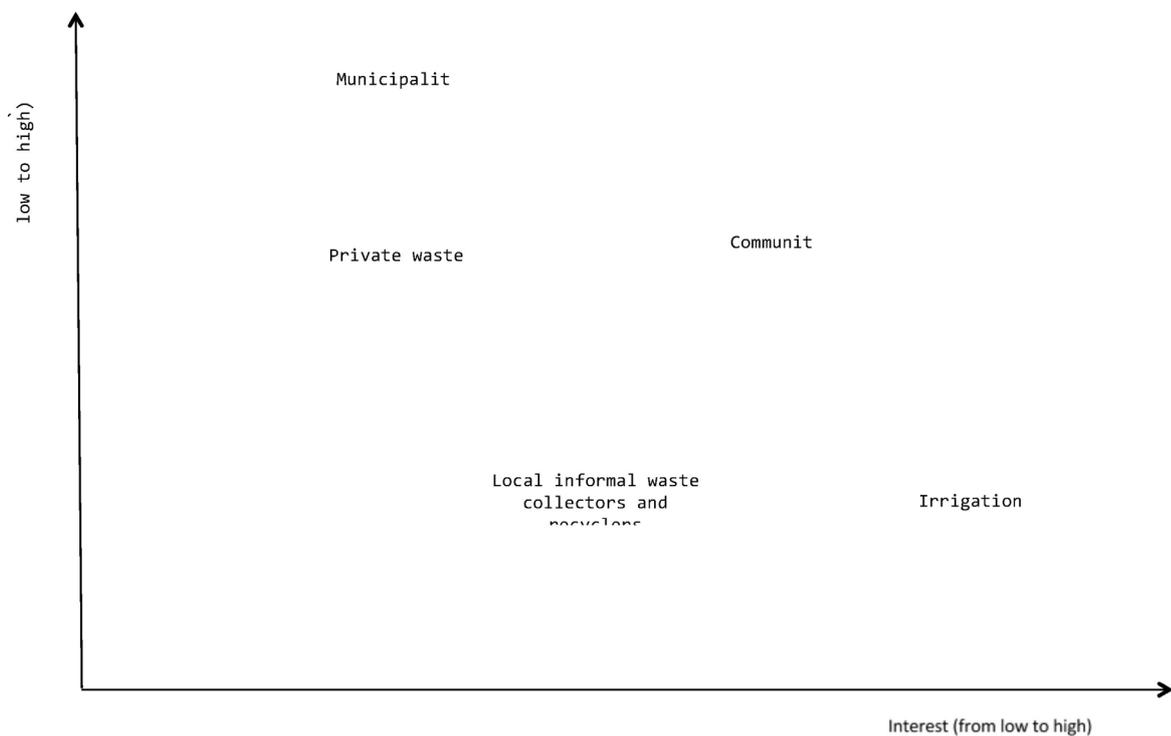
Strategy One: Enhancing participatory planning: Community Water Board



1

Appendix 2.2

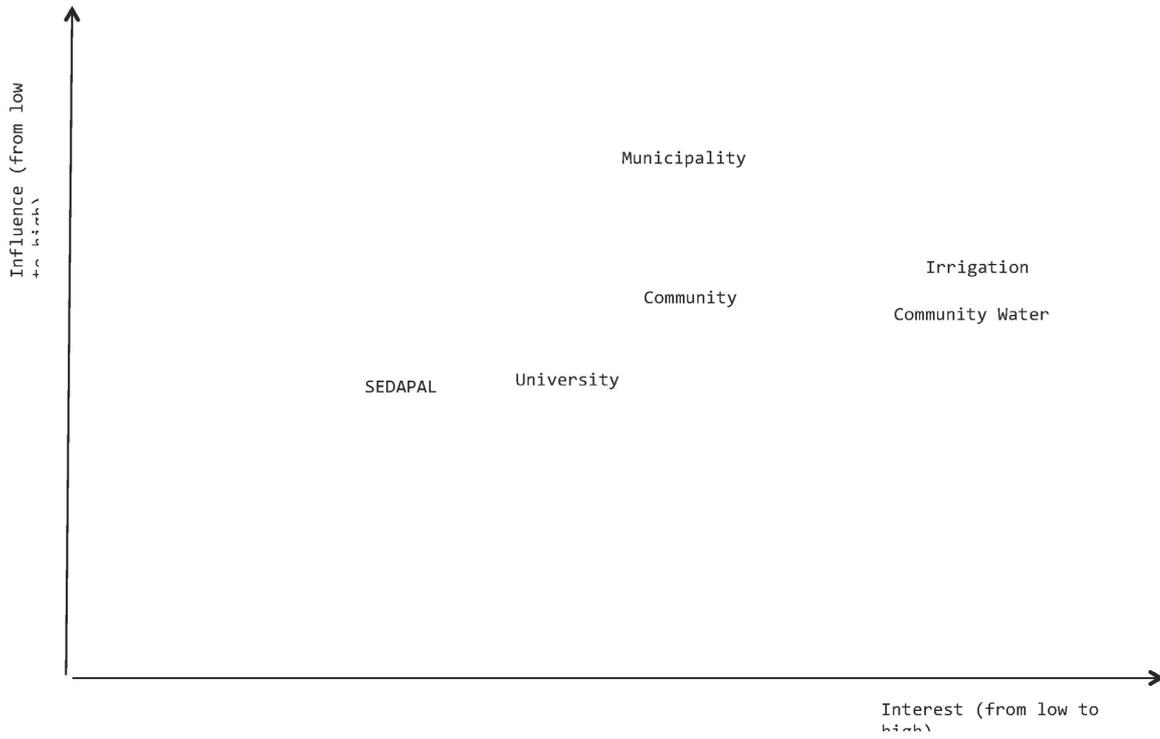
Strategy: Two: Cleaning and Greening: Public Green Infrastructure Partnerships



2

Appendix 2.3

Strategy Three: Cultural and Ecological Heritage Awareness Programme



Appendix 3.1 - Case Study 1: Buenos Aires Case

Buenos Aires, Argentina

Recovery of the Matanza-Riachuelo River Basin by community water board



Photo: View of the Matanza-Riachuelo (M-R) River by Victoria Ojea/ World Bank

Description:

The Matanza-Riachuelo (M-R) River has been a discharge site for industrial waste and sewerage, making it one of the most polluted rivers in the world. However, in June 2009, Argentina implemented an innovative project: the Integrated Plan for Environmental Sanitation for the clean-up and sustainable development of M-R River basin. The project is supported by the World Bank and implemented by the M-R River Basin Authority (ACUMAR). It included an eight-member Board of Directors that established a Municipal Council and Social Community Commission responsible for the river clean-up and basic services provision.

*"We have just hit a milestone. The contracts have been signed to begin major works to improve sanitation coverage," says **Daniel Mira-Salama***

World Bank, Environmental Expert and Project Co-director.

Objectives:

- Improve sewerage services in the M-R River Basin and other parts of the Province and City of Buenos Aires by expanding transport and treatment capacity.
- Support a reduction of industrial discharges to the M-R River, through the provision of industrial conversion grants to small and medium enterprises and technical assistance to improve environmental monitoring and enforcement of environmental targets for selected industrial activities
- Promote improved decision-making for environmentally-sustainable land use and drainage planning, and pilot urban drainage and land use investments, in the M-R River Basin
- Strengthen the basin agency's (ACUMAR) institutional framework for on-going and sustainable clean-up of the M-R River Basin

Results/Achievements:

More than 70,000t of solid waste has been removed from the basin, and some 243,000m³ of open-air garbage dumps have been cleaned up, representing 30% of the work that needs to be done.

A total of around 300mn pesos (US\$77.3mn) was invested in 122 potable water projects that benefit 165,000 people. An additional 39 initiatives, an investment of 400mn pesos, are soon to start (2010)

Reference: 2009 World Bank Project Appraisal Report

<https://www.worldbank.org/en/news/feature/2014/07/29/avances-matanza-riachuelo>

[http://www.cae.utexas.edu/prof/mckinney/ce397/Topics/Matanza/Matanza\(2012\)_ppt.pdf](http://www.cae.utexas.edu/prof/mckinney/ce397/Topics/Matanza/Matanza(2012)_ppt.pdf)

Appendix 3.2 - Case Study 2: Alpes Côte d'Azur, Southern France Case

Alpes Côte d'Azur, Southern France Innovative uses of agricultural irrigation canals



Photo: Typical uses of canals Sources: Aspe, Chantal (2015)

Description:

In France's Provence Alpes Côte d'Azur region (areas around the Durance Basin), new functionality was given to the irrigation canals in order to introduce long-term water management and form a hydro-social system. Research and findings have suggested the potential role of the irrigation canals was part of an intangible cultural heritage and area's economic and social development in bringing sustainable development to the Durance Basin area and ensuring a more productive role for agriculture. As a result, the traditional ways of using the irrigation canals are being re-examined and gives a new representation of nature while also maintaining a sense of wilderness.

Objectives:

- To introduce new uses and activities of agricultural canals while considering the relationships between nature and society.
- To protect biodiversity and landscapes, watering public and private gardens, replenishing the water table, protection of the natural environment of rivers and diverted waterways.
- Develop a shared and heritage-based management of the canals.

Results and Achievements

- In its 8th framework programme (2003-2006), a canal contract is rolled out by RMV Water Agency, which aimed at managing canals in a way that take into account their multi-functionality.
- New leisure activities such as hiking, jogging, kayaking, "Natural Discovery Walks" and "Heritage walks" have developed to link the agricultural and rural ways of life.
- The canals that run through numerous agglomerations have also become landscaped spaces, used as elements of urban parks

Reference: ASPE, C. and JACQUÉ, M., 2015. Agricultural Irrigation Canals in Southern France and New Urban Territorial Uses. *Agriculture and Agricultural Science Procedia*, 4, pp. 29-39.
<http://www.sciencedirect.com/science/article/pii/S2210784315000686#>

Appendix 3.3 - Case Study 3: Baghdad, Iraq Case

Baghdad, Iraq

Using social media campaign in preservation of cultural heritage

Description:

On the 5th of March, 2015, a social media campaign called Unite4Heritage was launched at Baghdad University, with the support of UNESCO, to counter the propaganda of cultural cleansings and raise the awareness of cultural heritage preservation. This campaign involved the collaboration between students, government ministers and officials from Baghdad university and demonstrated the power of social networks to create a global movement to protect and safeguard heritage under threat.



In the campaign, all people are invited especially the young people from the Arab region to use all forms of media, for example social media, to send photos and write short stories about the importance of heritage sites to people's lives and to illustrate the concept of unity in the protection of cultural sites.

This campaign called for the support from Iraq's Minister for Tourism and Antiquities, Minister for Higher Education and Scientific Research and also the Minister for Culture. The start of the project was funded by the Japanese Government for the Safeguarding of Iraq's heritage, and focused on monitoring, communication, awareness-raising and technical assistance.

Objectives:

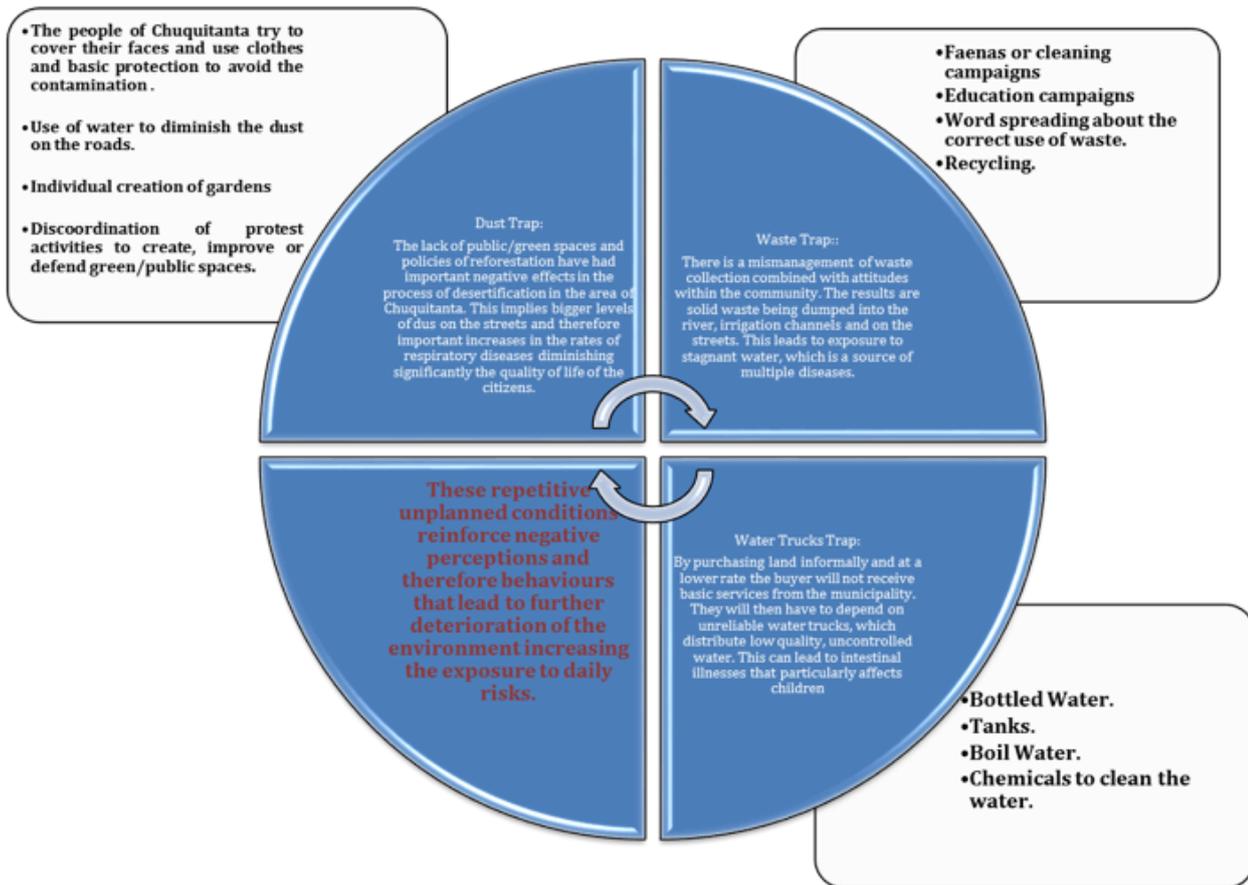
- To build a comprehensive set of legally binding international treaties to protect culture
- To build a coalition for culture with the coordination of NGOs (local and international), students and government officials to protect cultural sites and to prevent black market trade in cultural artefacts.
- To promote the power of culture to reconcile people and encourage people to protect heritage in times of conflicts.

Results/Achievements:

- A website <http://www.unite4heritage.org/material.php> was established that allows people to share their photos and stories through emails, Facebook, Twitter and Instagram.
- Experts from Iraq, Syria and many other countries, along with intergovernmental and non-governmental partners including Interpol, the World Customs Organization, museums, leading auction houses and national governments in surrounding countries were highly involved to defend the cultural heritage

Reference: UNESCO official website
<http://whc.unesco.org/en/news/1254>

Appendix 4.1 - Diagram illustrating some risk traps identified in Chuquitanta in each section of the circle.



Attached to each risk trap (in the white boxes) are the coping mechanisms that are employed by the population to disrupt these (Appendix 4.1 provides a more in depth analysis of each risk trap). Source: Authors

Appendix 4.2 - Workshop output: Everyday Risk Matrix

Feature	Issue no.	Action	Consequence	Risk	Explanation	Scale
River	1	Informal occupation	Waste and dumping; reduced infiltration	Health	Flood risk; bank collapse; disease from waste; damaged ecosystems	Localised/micro
	2	Dumping	Channel blockage	Flood and Health	Disease from stagnant water; livelihoods	Localised/micro
	3	Channelisation	Removal of natural channel	Flood and Environmental	Flood risk downstream and environmental depletion	Meso
	4	Climate seasonality and waste	Reduced flow in summer months replaced by wastewater	Health	Related to diversion to irrigation channels and associated use by farmers	Macro
	5	Industrial effluent	Pollution	Health and Environmental		Meso/Macro
	6	Insufficient Wastewater Treatment	Pollution	Health and Environmental		Micro/Meso
Irrigation channels	1	Waste dumping	Pollution	Health		Micro
	2	Dumping	Blockages	Flooding and Health	Treading on debris	Micro
	3	"	Stagnant water	Health		Micro
Feature	Issue no.	Action	Consequence	Risk	Explanation	Scale
	4	Channellisation	Removal of natural channels and reduced infiltration	Flooding		Micro
	5	Building over channels	Land-use change, loss of cultural heritage	Human conflict	Between those who want them open/closed	Localised/Micro
Groundwater	1	Extraction from aquifers	Depletion of resource	Land subsidence and risk of building collapse	Building on areas that have undergone significant extraction	Micro
	2	"	"	Env risk (degradation) and use of other sources		Micro

	3	Lack of control and maintenance	Aging infrastructure			Macro
	4	"	Leakages	Livelihood	Financial risk (payment for lost water)	Localised/Micro
	5	Use of pesticides	Pollution of soil and groundwater	Health		Localised/Micro
Water Trucks	1	Temporality	Lack of water supply	Health and human conflict	Dehydration and loss of livelihood	Localised/Micro
	2	Intensified commercialisation of resource	Potential increased cost	Livelihood	Increased proportion of income spent on water	Meso/Macro
Feature	Issue no.	Action	Consequence	Risk	Explanation	Scale
Green Space	1	Lack of integrated planning for green space	Sedentary and motor skills	Health		Macro
	2	"	Desertification and dust	Health		Micro
	3	"	Lack of areas for community cohesion and meeting points	Livelihood		Micro
	4	"	Lack of natural diversity	Environmental		Micro
Archaeological Sites	1	Encroachment	Degradation of sites	Loss of cultural heritage		Micro
Irrigation and agricultural land	1	Lack of protection of agricultural land	Decreased area of agricultural land	Depleted ecosystems; flood risk; livelihoods		Micro/Meso
Health Centres	1	Lack of integrated planning	Lack of communication around health related risks, poor resource allocation	Health; livelihoods		Meso/Macro
	2	Lack of shared planning within community associations for communal health centres	Increased incidence of certain health risks and poor resource allocation	Health; livelihoods		Micro/Meso

Appendix 4.3 - Plan for scenario planning workshop

First scenario: Business as usual.

Visual: Show expansion of houses, loss or movement of green areas/trees, pollution, gradual closure of irrigation canals.

- **Urban expansion**
 - Land use is changed to residential use
 - Agricultural land is sold to real estate companies (housing on agricultural land)
 - Franja Marjinal will be totally occupied by business and people (housing along the river and over canals)
 - Other green and open spaces will be populated (housing on the areas that are not yet populated)
 - Land traffickers continue to encroach on and destroy archaeological site
- **Water related issues:**
 - Continued uncontrolled selling of water by water trucks (quality) (put trucks in the image)
 - Flooding will continue (blue around the river)
 - Groundwater depletion (showing boreholes?)
- **Water pollution:**
 - River will continue to be polluted (purple on river)
 - Continued pollution the irrigation canals that are left leading to higher risk of dengue. (purple on river and canals)
 - Pesticides and polluted water from the canals are used in agriculture (purple on farming land left)
 - Pollution of groundwater leading to increase of conflict and more dependent of the water that comes to the uncontrolled water trucks (the straw thing?)
 - More waste and continued limited solid waste management
- **Other**
 - Real estate companies become more powerful
 - Informality continues and lack of land titlements
 - Dust
 - Lack of education on how to manage waste, the canals, open spaces etc. continued Individuality
 - Health issues continues - epidemics appear representing public health risks - respiratory, skin and intestinal diseases. (more specifically hepatitis, dysentery, diarrhea, asthma, TB, rashes, bronchitis) (how to show this spatially?)
 - Fragmented planning (overlap of institutions - for instance division of labour between ministry of health and SEAPAL related to water quality and the trucks)

Questions: This is some of the most crucial aspects that has been mentioned during our fieldwork so far (workshop, interviews)

- Is there anything that you believe that we are missing in this scenario...what? why?
- What do you see is the biggest issues in this scenario..why?
- What do you not agree with..why...what would happen instead
- Can you think of ways to cope in this scenario..
- Is it what you believe will happen? Why?

Also, take some time to think about some positive aspects that can come out in this scenario and carry them through to the next once (give some example?)

- Ground water and sewage for some ??
- Some land titles will be achieved but people will still move to the area and be informal and the cycle will continue. (community) People will continue to live on the Faja Marginals.
- Piped water and sewage for some (cycle)
- Knowledge will continue through younger generations and they will be more aware of coping mechanisms. Exacerbating the coping mechanisms but not tackling the source.
- New opportunities for businesses due to higher population (but pressure on services)
- Ability to collect more taxes as more people become formalised.
- Pavement of streets

Second scenario

A solution that addresses some aspects of problems but not all and could lead to a bad outcome. Reactionary mitigation. **(Hydro cycle without social part)**

Visual: conservation of green areas, adequate open spaces, health river and canals, recharge of aquifer

- **Ecological focus and conservation**
 - Reforestation of open spaces, parks and areas around the river
 - Revival of wetland and wildlife
 - More open spaces and natural green areas (possibly privately owned)
 - More trees
 - Farming land preserved
- **Water**
 - Recharging of the aquifers
 - Flood defences (gabiones - chain links with rocks - and terraces. (negatively affects people downstream)
 - Irrigation canals are open and clean water
 - One or two irrigation channels available to irrigate green spaces. Some irrigation channels are put underground to irrigate open spaces we have seen.

- **Other**
 - Reduced dust and desertification
 - Community faenas cleaning irrigations channels/cleaning campaigns (but not change in behaviour) → less waste and pollution.
 - Displacement of people from the Franja Marginal

Some positive aspects?

- Educate citizens about importance of environment, ecosystem and green areas.
- Control of use of pesticides and monitoring of the quality of produce

Questions: This is some of the most crucial aspects that has been mentioned during our fieldwork so far (workshop, interviews)

What do you think would happen this scenario was implemented in Chuquitanta to mitigate some of the ecological issues?

- Is there anything that you believe that we are missing in this scenario...what? why?
- What do you see is the biggest issues in this scenario..why?
- What do you not agree with..why...what would happen instead
- Is it what you believe will happen? Why?
- Who would be responsible and why? How do you think it would work?

Third scenario: Towards a better future. (Complete Hydro-social Cycle)

Visual: Densification of houses, clean river, conservation of green areas, adequate open spaces, improved public services (More and More)

Dust, agricultural land, water (river, canal, groundwater, supplied water) education, health, land titles, waste

- **Overall vision:** Encouraging development within existing urbanised areas rather than on non-urbanised land. Integration of people and nature → a whole hydro-social cycle...

Question: What do you think would happen if the planning of Chuquitanta was made in a sustainable and integrated way taking into account the whole hydro-social cycle, integrating people and nature?

- **Use of land**
 - Fully integrate the management of green space, land and different water sources into policy.
 - Agricultural land has a function - fresh produce, recharging the aquifers, ecological reserve, green space along irrigation channels, water from river used to irrigate green spaces and farming.
 - Archaeological sites are protected and have green areas around them. Used as an ecological education space.

- Franja Marjinal around the irrigation channels is protected. People currently living on them are relocated.
- Densification - build up instead of out.
- Enforcement of protection of green areas

Questions (stop on discussion of use of land):

- Ask them to display this themselves, where would it go..why..how
- Any additional, crucial, land uses that we are missing here...
- Add who is responsible...
- Backcasting...what need to happen to come here... add actions
- **Health and Water (pollution):**
 - Health campaigns with schools and hospitals. How would this happen? **
 - Reuse water from WWTP
 - Educational programmes on the importance of water, how you treat it, waste etc. Further co-operation between schools and hospitals etc. -- who and how?
 - Better waste management - reduction on amount produced, recycling and reuse of material, compost heaps, local bins and dumpsters. --- who and how?
 - More efficient/multiple uses of irrigations channels (such as public space, wetlands)
 - Water for all - what do you see as being feasible?

Questions:

- Ask them to display this themselves, where would it go..why..how
- Any additional, crucial, land uses that we are missing here...
- Add who is responsible...
- Backcasting...what need to happen to come here... add actions
- **Governance/Democracy:**
 - Create local community space for meetings, socialising and business - A space for democracy and decision making. - How would this happen? where would it happen? How would it be managed? For instance, space where you can get help from the municipality about how to receive land titles, does this already exist? Markets? Neighbours collaborate to enact consensus to hold real estate companies to account.
 - Ultimate goal is to change governance structure, improve participation and promote inclusion.

Questions:

- Who and how to create these spaces.. How would they work?
- Backcasting..what needs to happen to strengthen democracy/governance

ACTION PLAN

- Focusing on the backcasting of the different parts of the scenario..we already started that, but now in more in depth..



6. Quebrada Verde. Exploring the relationship between risk to livelihoods, ecological infrastructure and urban development

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Abbreviations

AAM: Asociación de Autoridades de las Municipalidades de la Cuenca de Lurín (Association for the Authorities of Municipalities of the Lurín Basin)

ALA: Administración Local del Agua (Local Water Administration)

ANA: Autoridad Nacional del Agua (National Water Authority)

COFOPRI: Comisión de Formalización de la Propiedad Informal (Formalization Agency of Informal Property)

CPR: Centros Poblados Rurales (Rural Population Centre)

IDMA: Instituto de Desarrollo y Medio Ambiente (Institute of Development and Environment)

IMP: Instituto Metropolitano de Planificación (Metropolitan Planning Institute)

JAS: Junta de Usuarios del Agua

MML: Municipalidad Metropolitana de Lima (Metropolitan Municipality of Lima)

PDRC-LM 2025: Plan Regional de Desarrollo Concertado de Lima Metropolitana 2025 (Regional Development Plan for Development for Metropolitan Lima 2025)

PLAM 2035: Plan Metropolitano de Desarrollo Urbano Lima y Callao 2035 (Metropolitan Urban Development Plan for Lima and Callao 2035).

QV: Quebrada Verde

SEDAPAL: Servicio de Agua Potable y Alcantarillado de Lima (Potable Water and Sewerage Service Provider for Lima)

SLF: Sustainable Livelihood Framework

UA: Urban agriculture

VMT: Villa Maria del Triunfo

Executive Summary

This report presents the result of a six-month long research project exploring the relationship between everyday risk and urban development in Lima, Perú. Our area of focus is Pachacámac, a district in southern Lima, in particular, one of the Centros Poblados Rurales namely Quebrada Verde (QV). Our research aims at exploring how risks are produced, experienced and responded to within this peri-urban settlement. QV is largely a representation, of not only the growing urbanisation and industrialisation Lima Sur is experiencing, but also that of the broader area of Lima. Using QV as a case study, we aim to explore how 'risk traps' are manifested and affect both peoples' livelihoods and the surrounding ecological infrastructure.

Through the lens of the 'Sustainable Livelihoods Framework', we critically analyse the livelihoods of people in QV at household level and assess the ensuing risks and vulnerabilities. Ultimately, we develop strategies, which aim at mitigating those risks and are capable of leading towards transformative change through the collaboration action of local communities, governmental agencies and the private sector. Two strategies are proposed in order to promote a better socio-economic and ecological future for not only QV but also Pachacámac, the broader area of the Lurín Basin and the city of Lima. They include: (1) Water management strategy and (2) Local economy development strategy.

1. Introduction

1.1 Background

In recent years, the city of Lima has experienced rapid urban expansion coupled with socio-economic inequalities and attendant consolidation of neoliberalism. These issues are reinforced by the lack of an integrated planning process, the absence of institutions and effective policies for regional and city management, as well as weak coordination between public authorities. These circumstances in turn create conditions of risks at different scales; limiting the capacity of people to cope with the impacts of hazards that they are exposed to and rendering them incapable of disrupting them (Johnson et al., 2012).

Lima's expansion not only exceeds its administrative limits but also degrades its fragile ecosystem: the *lomas* and the city's three major valleys. The settlements of the most recent expansions are already destroying large parts of the *lomas*¹. In addition, the increasing loss of agricultural land and green spaces is evident in the rapid urbanisation of the main river basins of the city - Rimac and Chillón valleys by 90% and 70% respectively (Alfaro & Huerse, 2010). The Lurín Valley, which is referred to as the "last green valley of Lima" (Figure 1A), is commonly perceived as an indispensable hub of natural resources and ecosystem services, not only for the inhabitants of this area but also for Lima

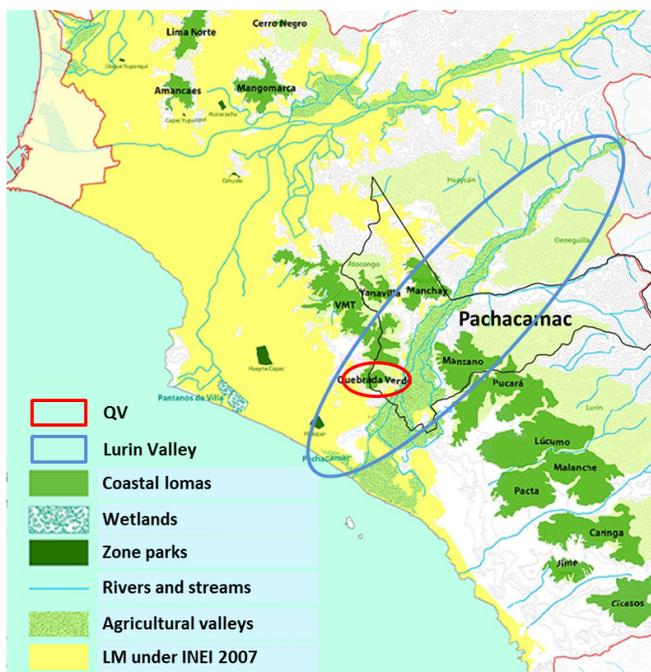
Our research is centered on the district of Pachacámac, which is located in the southern part of Lima (Lima Sur), in the Lurín Valley. The Metropolitan Municipality of Lima (MML) recognises Pachacámac as the touristic and archaeological district of Lima and perceives the main economic activities in this district to be agriculture and tourism (Ley 23614).

Despite its wealth of resources, Pachacámac faces high levels of poverty; a high concentration of Lima's population living in extreme poverty is found in this area (MML, 2012a). More recently, the area has witnessed a rapid land use change from agriculture to housing (Chong, 2009). The Ordinance of 2008 by the MML and consequent approval of the zoning plan for the Lower Basin of the Lurín Valley offered the chance for urban developers to acquire land and for large companies to expand their operations into the Valley.

Mining concessions in this context claim without restriction or regulation, 41% of the Lurín watershed (Bebbington and Bury, 2009). They threaten the ecosystems and intensify the competition for natural resources, especially water. The socio-environmental changes brought by this trends of urbanisation and industrialisation are also negatively affecting the people's livelihoods and increasing water scarcity.

Pachacámac has developed different patterns of peri-urban settlements, such as the 62 Centros Poblados Rurales (CPRs) along the Valley, including Quebrada Verde (QV). The case of QV exemplifies the tension between the urban and rural systems, hence our decision to focus here in this research.

Figure 1a. Map of Pachacámac, the Lurín Valley and QV (Modified from MML, 2012b).



1.2 Research Objectives

By exploring QV as a case study, we aim to contribute to the understanding of the relationship between risk and urban development in the peri-urban interface of Lima. This research precisely aims at uncovering the livelihood vulnerabilities, towards the proposal of an apt transformative strategy, ultimately for a more sustainable future for QV, Pachacámac and Lima.

2. Analytical Framework

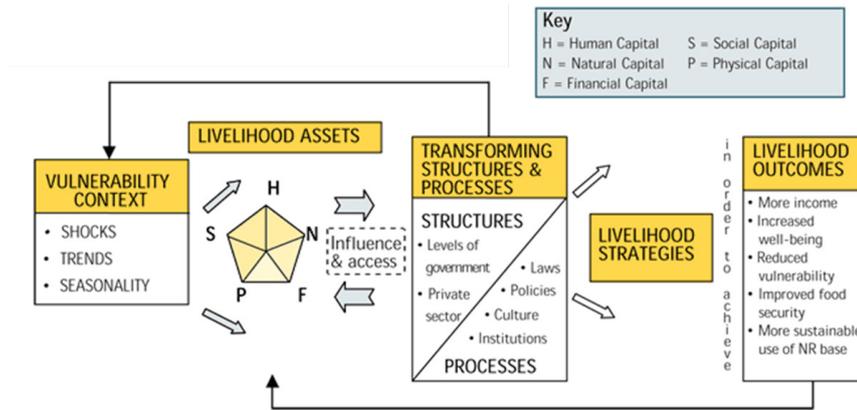
2.1 Sustainable Livelihood Framework

The Sustainable Livelihood Framework (SLF) as an analytical framework for this study provides a holistic analytical approach, by examining the interplay among different assets, institutions and processes that affect people as well as the context of vulnerability in which they live (Box 2A).

Box 2a. SLF In-Depth.

The SLF (Figure 2A) posits that the external environment in which people exist provides a vulnerability context characterised by trends, shocks and seasonality (DFID, 1999). At the centre of the framework are the livelihood assets that the people have access to and use. These assets are both created and destroyed consequent upon the vulnerability context (ibid). There are various quantities and combinations of assets: financial (F), human (H), natural (N), physical (Ph), political (Po), and social (S) (Table 2A) (ibid)

Figure 2a. Components of the SLF (From Practical Action, n.d.).



Despite the usefulness of the SLF, it has some ingrained limitations, which we have critically considered and made efforts to counter. They include:

1. The possibility of losing perspective of the space and place. We counterbalanced this by incorporating an explicitly spatial approach (e.g. transect mapping, zooming out to larger scales) in our research.
2. Lack of a gendered-perspective. This is of particularly important for analysing livelihoods on a household level. We made efforts to encourage women to participate in our research (e.g. providing activities for children at our workshop so mothers could attend).

Table 2A. Livelihood assets in QV (Compiled from DFID, 1999, Baumann, 2000, Meikle et al., 2001).

Assets	Definition	Examples
Financial (F)	Financial assets are the financial resources that people use to achieve their livelihood objectives.	Stocks (savings), regular inflows of money, supplies of credit
Human (H)	Human assets are the skills, knowledge, ability to work, and good health that enable people to pursue different livelihood strategies and achieve livelihood objectives.	Skills, knowledge, labour, health
Natural (N)	Natural assets are the natural resource stocks from which services useful for livelihoods are derived.	Nutrient cycling, land, water, biodiversity
Physical (Ph)	Physical assets are the basic infrastructure and consumer goods needed to support livelihoods.	Transport, shelter & buildings, water supply & sanitation, energy, communication

Political (Po)	Political assets include access to operational, technical and legislative factors allowing for political negotiation over rights. Generally, political assets are not typical in the SLF, but we include them because we value explicit political participation and consider it a fundamental asset in itself. Our primary research in QV points out that the CPR residents have historically been politically active and organised on a local level. Furthermore, the CPR Association conducts monitoring of newcomers, indicating strong political presence and making formal political participation more likely. In addition, our research involved examining the effects so far of the Development Plan of 2003 on the settlement, based on which, land was divided into different zones for specific uses.	Political & civil rights, political representation & recognition
Social (S)	Social assets are the social resources that people draw on in order to attain their livelihood objectives. These are developed through networks and connectedness; membership to groups (particularly formal groups); and relationships of trust, reciprocity and exchanges. A sustainable livelihood approach aims to improve social networks by investing in community organisation.	Networks, memberships relationships of trust, access to wider institutions

2.2 Hypothesis and Research Questions

Our preliminary diagnosis and theoretical framework led us to the following hypothesis:

In light of this hypothesis, we aim to answer the following research questions:

At the QV household level, there exists different kinds of livelihoods. The community experiences restricted access and control over water as well as an increased water demand due to the surrounding urbanisation and industrialisation. This impacts negatively on the assets available to households and as a result, reduces their capacity to sustain their livelihoods in the case of shocks or stresses. Furthermore, the mismanagement and increased use of water in the existing context of water scarcity negatively affects the environmental infrastructure, including the lomas and the agricultural land.

However, we argue that by strengthening the social assets of the QV community through better understanding and management of water at the QV and Lurín Basin level, residents can increase their social capacity to confront the vulnerabilities and protect the ecological infrastructure.

How are people in QV building their livelihoods with the available natural, human, physical, financial, social and political assets?

1. How are these assets being utilized to adapt to and overcome existing vulnerabilities?

2. How do the interventions from different actors (such as the public/private sector, and civil society) and by different processes (such as policies and culture) determine access to these assets?

3. In the context of this peri-urban interface, what are the tensions around water use at the Lurín Basin and what are the opportunities to improve water management?

4. How does the environmental degradation at the Lurín Basin affect people's livelihoods now and in the future?

3. Methodology

We undertook our research in three phases, as expanded on in Table 3A

The pre field-trip phase involved the use of using mainly secondary data to develop a preliminary diagnosis and understanding of the historical development, risks and livelihoods in QV and the Lurín Basin. In addition, we formulated detailed plans for our fieldwork phase, including the identification of key actors to be interviewed and formulation of interview questions.

During the field trip phase, we undertook six transect walks in two groups conducting semi-structured interviews and participatory mapping exercises. By working in two teams, during the transect walk, we were able to collect a wider and unbiased range of opinions (Figure 3A). One team was guided by the representative of the Asociacion de Pobladores de CPR Quebrada Verde (CPR Association) while the other, worked independently. The results of the transect walks are summarised in Appendix 2.

Table 3A. Research Activities.

Phase	Research Activities	Purposes
<p>Pre field-trip: Research using secondary data (12th January - 25th April)</p>	<ul style="list-style-type: none"> • Collection of secondary information, literature review and production of mind maps to understand the interplay between planning dynamics, stakeholders and environmental degradation. • Study of historical context. • Selection of the SLF. • Skype interview with Andres Alencastre about the Development Plan (2003). 	<ul style="list-style-type: none"> • To understand the context and identify key stakeholders. • To formulate the analytical framework, hypothesis and research questions. • To plan the fieldwork, develop participatory methods and become familiar with mapping devices and processes.
<p>Field-trip: Research on the field and data collection & analysis (see Appendix 1 for a detailed field-trip schedule) (26th April - 14th May)</p>	<ul style="list-style-type: none"> • Six transect walks with semi-structured interviews. • Interviews with different institutions. • Participatory mapping exercises and data collection with EpiCollect+. • Workshop. • Definition of macro and micro strategies. • Presentation of the strategies to the stakeholders and representatives of QV. 	<ul style="list-style-type: none"> • To understand the history & social context of QV. • To understand the migratory flows (when, where, why). • To determine the conditions of livelihoods and water management at a household level. • To understand the power relations at play in the Lurin Valley. • To identify the community's perception of possible actions for transformative change. • To test the feasibility of the strategies with some actors.
<p>Post field-trip: Data processing and consolidation of strategies (15th May - 5th June)</p>	<ul style="list-style-type: none"> • Processing and analysis of collected data and information. • Refinement of macro and micro strategies. 	<ul style="list-style-type: none"> • To analyse and synthesise information to prepare a presentation, a written report and a video.

Furthermore, we held a workshop session in QV (Photo 1), with 73 residents in attendance (Figure 3B)²; to gain an understanding through shared experiences of how

water is managed and its impacts on their livelihoods and the ecological infrastructure. In addition, we aimed to capture the community's perception of possible ac-

Photo 1. The Workshop at the CPR Association (Source: Authors, 2015).



Figure 3A. Map resulting from observations made during transect walks (Source: Authors, 2015).

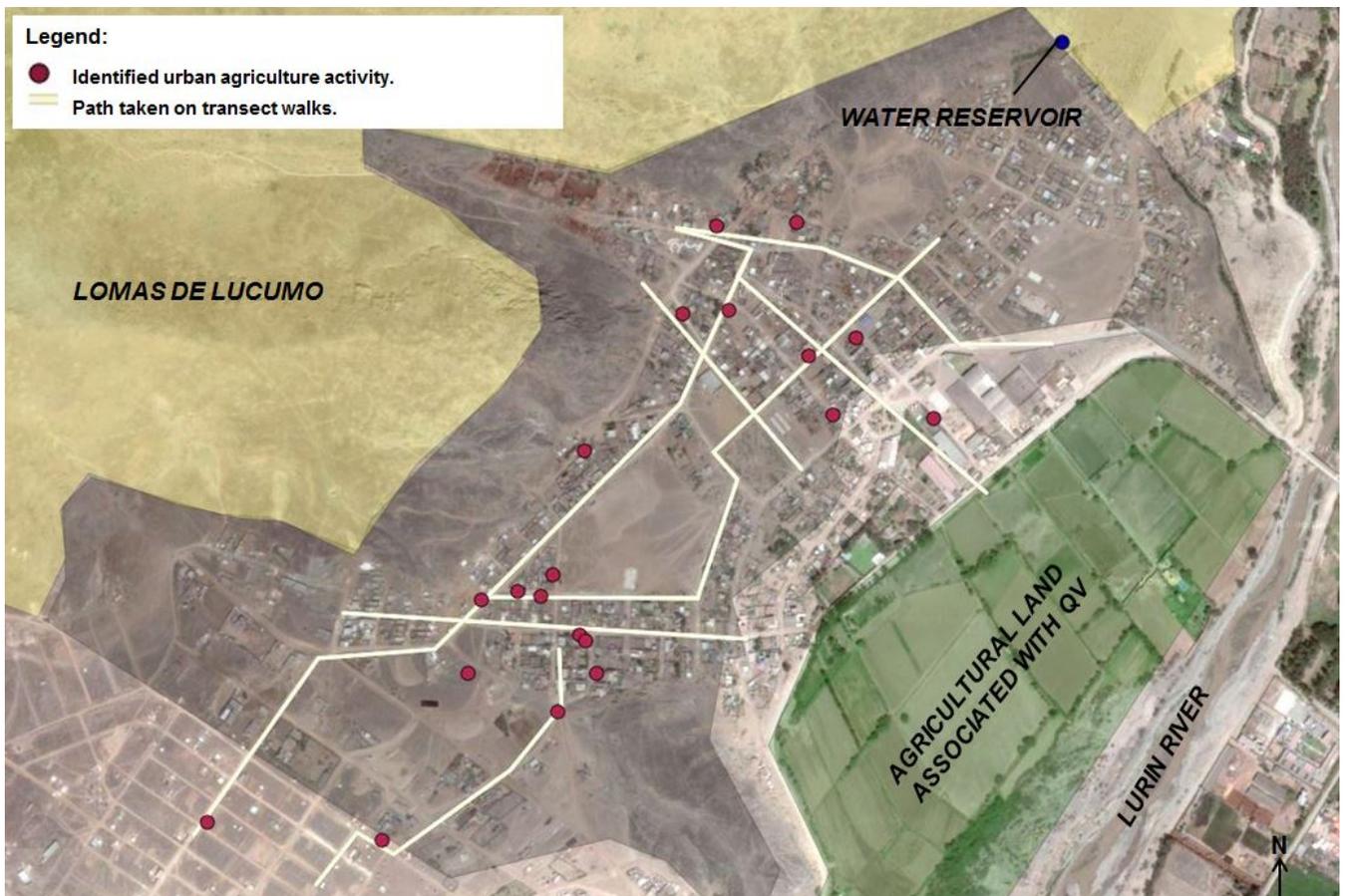
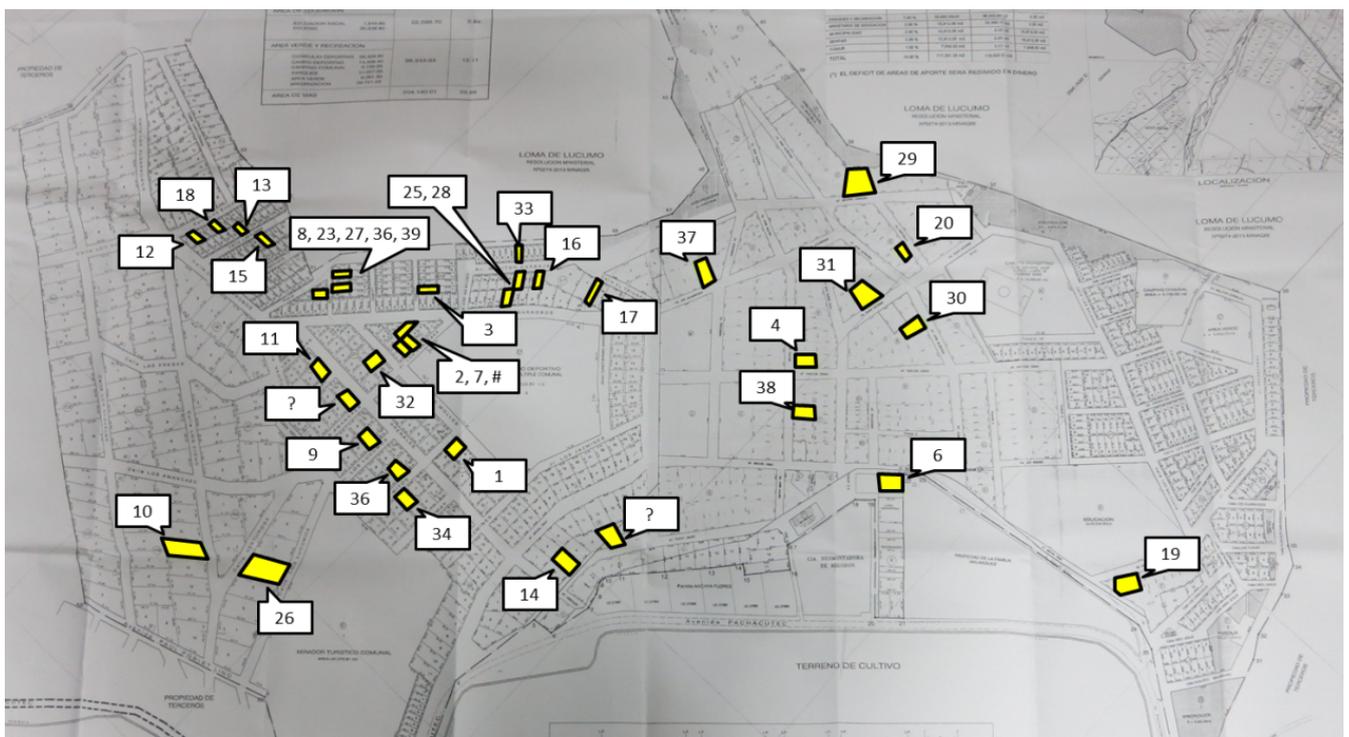


Figure 3B. The households present at the workshop. The attendees mapped their houses. The households who attended the workshop covered all the area of QV.



tions towards improved water management. The results of the workshop are as outlined in Appendix 3. Semi-structured interviews were also conducted with different institutional actors at various levels (Table 3B and Appendix 4).

Table 3B. Interviewed institutions at different levels.

Level	Institutions
Local	CPR Association of QV Lomas de Lucúmo Junta de Usuarios del Agua (JAS)
Regional	MML Municipality of Pachacámac Junta de Usuarios del Distrito de Riego de Lurín y Chilca The table of the Lurín Basin
National	Ministry of Housing Instituto de Desarrollo y Medio Ambiente (IDMA) Red Agua Segura ³

Based on the results of the aforementioned activities, we developed a two-part strategy as part of an action plan. We tested the feasibility of these strategies by sampling the opinion of some residents and institutions during interview sessions as well as during the final presentation made to partners in Lima. These allowed for feedback and opened a space for conversation between some stakeholders and representatives of QV. Post field trip, we refined our strategies, incorporating further research to fill in the identified information gaps.

Despite the thorough nature of our research, there were some limitations to our methodology. First, due to our limited access to secondary data, our preliminary diagnosis might have lacked a well-rounded representation of varied views and consequently be biased. Secondly, due to the restricted time on the field and the unavailability of some respondents, we were unable to conduct interviews with some key respondents. These included farmers on the agricultural lands next to QV, mining industries, neighbouring CPRs, particular water associations and members of the district of Pachacámac. Although we tried to interact with the broadest diversity of participants in QV (gender, age, occupation, etc), we are aware that the absence of the views of these respondents may have constrained our analysis. Moreover, being the first research team from MSc ESD programme to conduct research in Pachacámac, we chose to utilize transect walks and workshops as major data gathering tools as opposed to focus groups, in order to avoid further constraining our observations and gain a better understanding of the local context.

4. Key Findings

4.1 Historical Context of Quebrada Verde

QV and the neighbouring CPRs were established by people who formerly worked in haciendas⁴, on land that originally belonged to indigenous communities (Mar et al., 1964). QV's location along the axis of the railroad (Figures 4A and 4B), coupled with the presence of a cotton gin and a school distinguished it from other CPRs (Mar et al., 1964).

Figure 4A. The railway line constructed along QV (Photo from Mar et al., 1964). Despite its importance for the development of QV, it was closed down due to the rapid growth of road-based transportation.



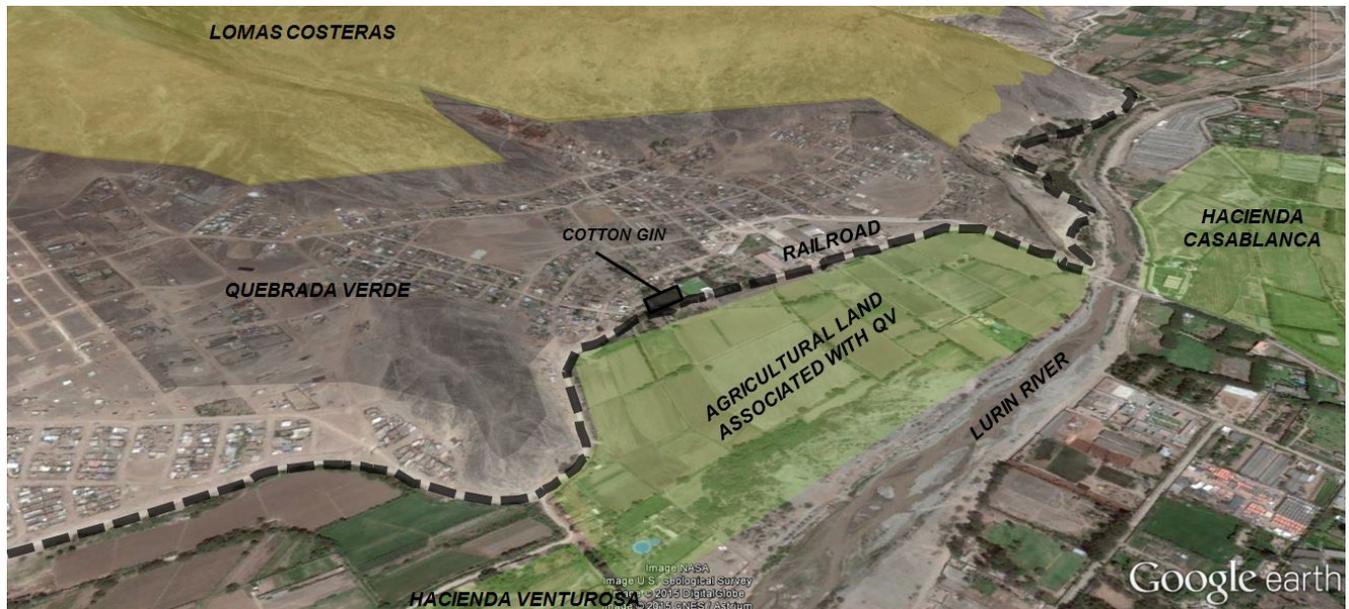
Given the dependence of farming activity on water availability, water management has historically been used cladded with power relations and individual manipulations (Mar et al., 1964). Mar et al. (1964) document a period of decrease in supply caused by excessive irrigation and also highlighted the correlation between availability of water supply and how much profit could be obtained from cotton. Historically, there have been three sources of water in QV: (1) the Lurín River (2) the springs ("puquio") and (3) groundwater. The springs occurred seasonally in the lomas but no longer do because of the degradation of the lomas. The lack of water from April to November generated conflicts which led to the creation of a "turnos" y "mita" water sharing regime, originally managed by the Direccion de Aguas (Mar et al., 1964) but now, by the Junta de Usuarios del Agua (JAS).

4.2 Water Provision and Management

Micro Level Context

At the micro level, water provision for QV residents is by pumping from a groundwater reserve and then storing in a reservoir located on a hill, inside the CPR. This process is managed by JAS, an organisation created by the CPR

Figure 4B. Map with historical details of QV (Source: Authors, 2015). Following the closure of the railroad and the land (Agrarian) reforms of the 1960s, a small group of landowners purchased the land formerly occupied by the heirs of hacienda Venturosa (Mar et al., 1964). Today, the ownership of this land still lies in the hands of a few people, who often sub-parcel it on rental basis for various purposes.



Association and run by residents from QV, independent of SEDAPAL. JAS distributes water through pipes, only to the houses that are located in the lower part of the CPR.

Residents connected to this service, receive water once a week in the best case, and store it in 200L house water tanks (Photo 2). The southwest region of QV, mainly occupied by new residents, has no piped water due to the slope of the area, being higher than the reservoir (Figure 4C). Hence, they resort to purchasing water from trucks run by private water companies at the rate of two (2) Soles per 200L. Whereas, piped water from the reservoir costs 0.50 Soles per 200L. Consequently, this presents clear evidence of uneven and unequal cost and affordability of water amongst inhabitants of QV.

Photo 2. Water tanks in QV (Source: Authors, 2015).



We also observed that the inhabitants have developed requisite adaptive and coping measures for this limited water supply. As such, they are able to use efficiently, the limited amount of water they receive. By placing strict limits on the quantity of water used for domestic activities and re-using water e.g. dish/laundry washing water reused for irrigation purposes or for flush toilets, they are able to achieve this (Photo 3).

Going by reports from the local Health Centre on the absence of reported cases of dengue fever; a highly prevalent illness in the area, we can argue that residents' water management measures are effective. Moreover, informative sessions and workshops on good water practices are organised by the Health Centre for inhabitants and in schools once a week. Knowledge acquired through these sessions constitutes an important asset for their resilience in such context of water scarcity.

Nonetheless, during our fieldwork, we observed the existence of an important gap in the residents' understanding of the relationships between different aspects of the water cycle. First, most residents were not aware of the linkage between the silos (used in the absence of sewage infrastructure) and the pollution of groundwater (used for drinking). Second, a majority of the residents had a positive outlook to the ongoing urbanisation of QV, as they hope it would amount to economic benefits for the area. However, they seemed oblivious of its tendency to decrease water supply in the long run. Additionally, an awareness of the influence of activities further up the Lurín Basin on the availability of ground water for the residents in QV was lacking.

Figure 4C. Map of transect walk paths and households we spoke to on our transect walks (Source: Authors, 2015). We see that older and long-term residents are clustered in the northeast part of QV whilst new residents tend to live further southwest. A law that went into effect in 2004 under COFOPRI allowed people who occupied land in a “pacific and permanent way” (e.g. by showing bills for water and electricity services for 10 years or more) to claim ownership of that land. However, if they occupied the land before 2004, then the district is responsible for land titling. The CPRs follow the same process of formalisation. This contributed to the waves of urbanisation in recent years; several of the new residents had come from Villa el Salvador.

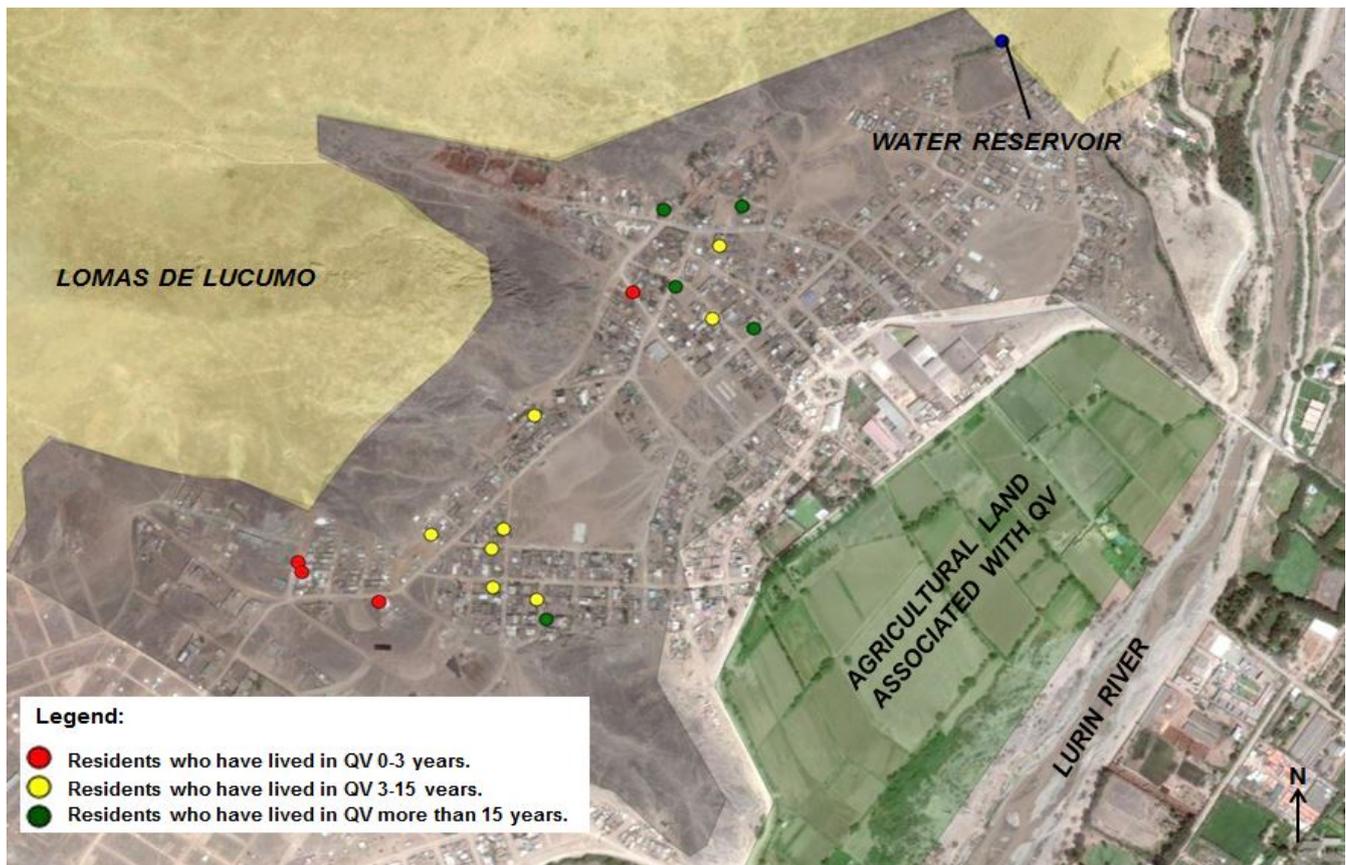


Photo 3. Inhabitants have the ability and knowledge to manage the limited amount of water they receive (Source: Authors, 2015).



Despite the fact that QV has an operating water system in some parts of the area and a good knowledge of water use, the rapid urbanisation and industrialisation in the Lurín Valley threatens the amount and quality of water available in the present and future. This calls for a broader understanding of water management.

Macro Level Context

Despite being the smallest basin in Lima, the Lurín Basin plays a crucial role towards the recharge of groundwater for the whole city (AquaFondo, 2013). Divided into three levels: Lower, Medium and Upper (Figure 4D) its territorial development relies on and affects the city’s entire water system.

Several actors directly influence water management in the Lurín Basin (Table 4A). The CPRs however, have poor representation at the Municipality of Pachacámac with virtually no political power in the region. According to Jacinto Mendoza, the president of the CPR Association (Box 4A), QV is making efforts to form alliances with other CPR Associations so as to constitute a stronger voice for water supply-related negotiations with institutional actors such as the Ministry of Housing.

Box 4A. Asociacion de Pobladores de CPR Quebrada Verde (CPR Association).

- It is an active organization comprised of 11 members who make decisions on behalf of the association.
- It hosts meetings that are public for all residents of the CPR. Such meetings hold at an interval of two weeks
- The residents of QV elect a president for the Association once in three years by casting votes.

4.3 Land

Pachacámac’s population grew by 9.1% between 1993 and 2007 (PLAM 2035, 2015). Consequent high interest from private investors and industrial developers in the Lurín Valley has resulted in substantial land-use modification, associated land grabbing and trafficking, considerably reducing agricultural areas. The Lower Basin has been the most urbanized when compared to other parts of the Basin (Table 4B). This in turn affects the ecological infrastructure, consequently lowering water availability.

Table 4B. Distribution of urban and rural area in the Lurín Basin in 2007 (Modified from Alfaro & Huerse, 2010). We note that the Lower Basin was mostly urbanised (98.3%).

Sub-regions Lurín Basin	% of Land (2007)	
	Urban	Rural
Upper Basin	66.6	33.4
Medium Basin	24.5	75.5
Lower Basin	98.3	1.7
Total	96.2	3.8

Lima’s 2003 Organic Law of Municipalities places the responsibility for approving urban development plans in the hands of each district municipality; these plans regulate urban planning and constitute a useful basis for budgeting (Miranda Sara et al., 2014). However, only few local governments are able to comply with urban land use regulations (ibid). Although district governments provide permits for urbanization and construction, they do not participate in the formulation of ur-

Figure 4D. The districts of the Lurín Basin (Modified from Alfaro & Claverías, 2010).

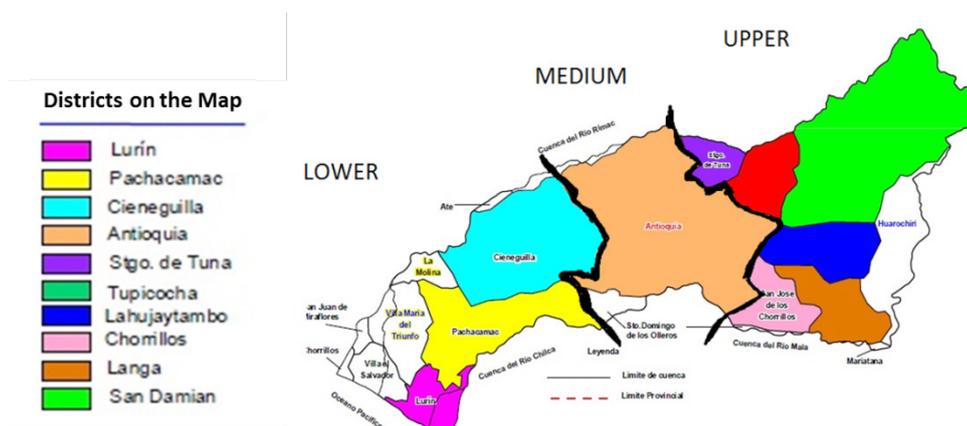
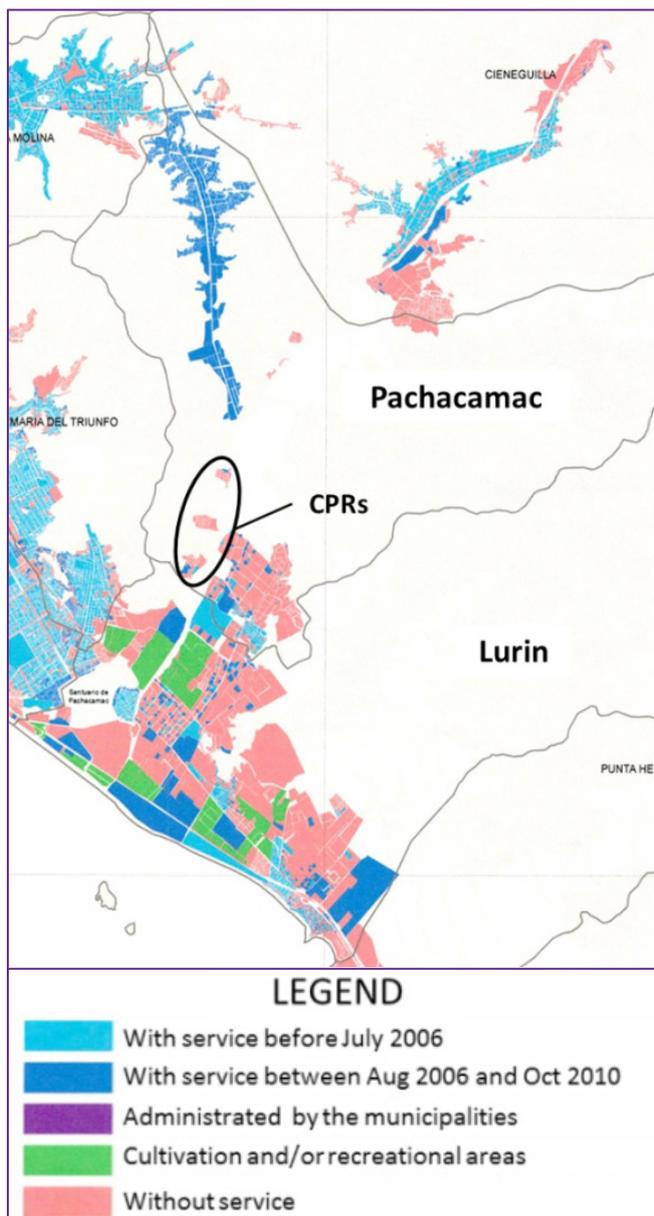


Table 4A. Actors for water management in the Lurín Basin (Compiled from Davila, 2015; Macizo, 2015; Morales, n.d.).

Name	Level	Role/Main Activities	Comments
ANA: Autoridad Nacional del Agua (National Water Authority)	National	<ul style="list-style-type: none"> Governing body of National System of Water Resources attached to Ministry of Agriculture and Irrigation. Responsible for carrying out the actions needed to preserve, protect and exploit the water resources in a “sustainable” way. Builds strategic alliances and partnerships with regional governments and integrates the action of different actors to promote adequate management of water resources. 	<ul style="list-style-type: none"> Created in 2009. The local branch in Lima, ALA (Local Water Administration), manages the water of the Chillón, Rimac and Lurín Basins. Carlos Franco (Red Agua Segura) noted that they are not very active in the Lurín Basin and that they do not know how much water is available in total, to manage the supply and demand in a sustainable way. He also noted they tend to prioritise the Chillón and Rimac Basins.
SEDAPAL: Servicio de Agua Potable y Alcantarillado de Lima (Potable Water and Sewerage Service Provider for Lima)	Lima	<ul style="list-style-type: none"> Provides public water and sanitation service in Lima. Partially present in Lurín Basin (Figure 4E). Under the office of the Ministry of Housing. 	<ul style="list-style-type: none"> Plans to expand its services to the Lurín Basin in the next five years. According to Josue Cespedes Alarcon, a technician at SEDAPAL, it anticipates that urbanisation will intensify once SEDAPAL has established basic water and sewage infrastructure.
AAM: Asociación de Autoridades de las Municipalidades de la Cuenca de Lurín (Association for the Authorities of Municipalities of the Lurín Basin)	Lurín Basin	<ul style="list-style-type: none"> Association of 10 mayors that unite to discuss issues (not limited to water) in the Lurín Basin. 	
La Mesa de Trabajo Sobre el Agua de la Cuenca del Río Lurín (Watershed Council for the Management of the Lurín Basin)	Lurín Basin	<ul style="list-style-type: none"> Created in 2007 by the Ministry of Housing to promote a space for dialogue and consensus between water users and the conservation of ecological infrastructure. Ministry of Housing remains the lead institution of the Watershed Council. Promotes sustainable management of the water to reduce the water stress of the Basin. Includes 10 municipalities that participate in AAM. 	
Mancomunidad ⁵ of the Middle and Upper Lurín Basin (Mancomunidad de la Cuenca Media y Alta de Lurín)	Middle and Upper Lurín Basin	<ul style="list-style-type: none"> Promotes integral development of Lurín Basin. Has joined Watershed Council to give more participation to people. There is no Mancomunidad in the Lower Basin. 	<ul style="list-style-type: none"> Created in accordance with the Law of Mancomunidades No. 29029 in 2007 by municipalities of Middle and Upper Basins’ Social Organisation.
Irrigation Committee of the Districts of Lurín and Chilca (Junta de Usuarios del Distrito de Riego de Lurín y Chilca)	Lurín and Chilca districts.	<ul style="list-style-type: none"> Comprised of users of agricultural land. 	<ul style="list-style-type: none"> Created in 1982. Farmers give the Committee an estimate of the quantity of water they think they will require and the Committee helps distribute it.

Residents of the Lurín Basin	Lurín	<ul style="list-style-type: none"> • Since ancient times, the population of the Upper Basin has traditionally captured rain. • They have initiated conservation activities, which have had positive impacts on agricultural productivity and efficient use of water resources. • Such activities include platforms and terraces, reservoirs for water harvesting, forested areas and grasslands, infiltration trenches, and gravity irrigation systems. 	
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Figure 4E. SEDAPAL water provision in the Lurín Basin (Modified from: SEDAPAL, 2010).



ban development and housing policies (ibid). The 2004 Actualización del Plan de Desarrollo Concertado of the Municipality of Pachacámac highlights that the role of the district of Pachacámac in the metropolis is not explicitly defined and is “in a thousand forms” pressured by the metropolitan processes of “private interests” in construction and services and rural land speculation (Municipality of Pachacámac, 2004).

In order to guide the inclusive, connected and compact urban development of the city, Lima’s administration and UN-Habitat have recently developed the Metropolitan Urban Development Plan for Lima and Callao 2035 (PLAM 2035, Plan Metropolitano de Desarrollo Urbano Lima y Callao 2035). The PLAM 2035 has divided the Lurín Basin into five different sectors. Despite this, on the contrary, Pachacámac is proposed as an area for agriculture and ecological conservation (Figure 4F). Notably, the PLAM fails to make adequate provisions to negate one of the adverse trends observed by one of its advisors (Alberto Ibañez, sidebar).

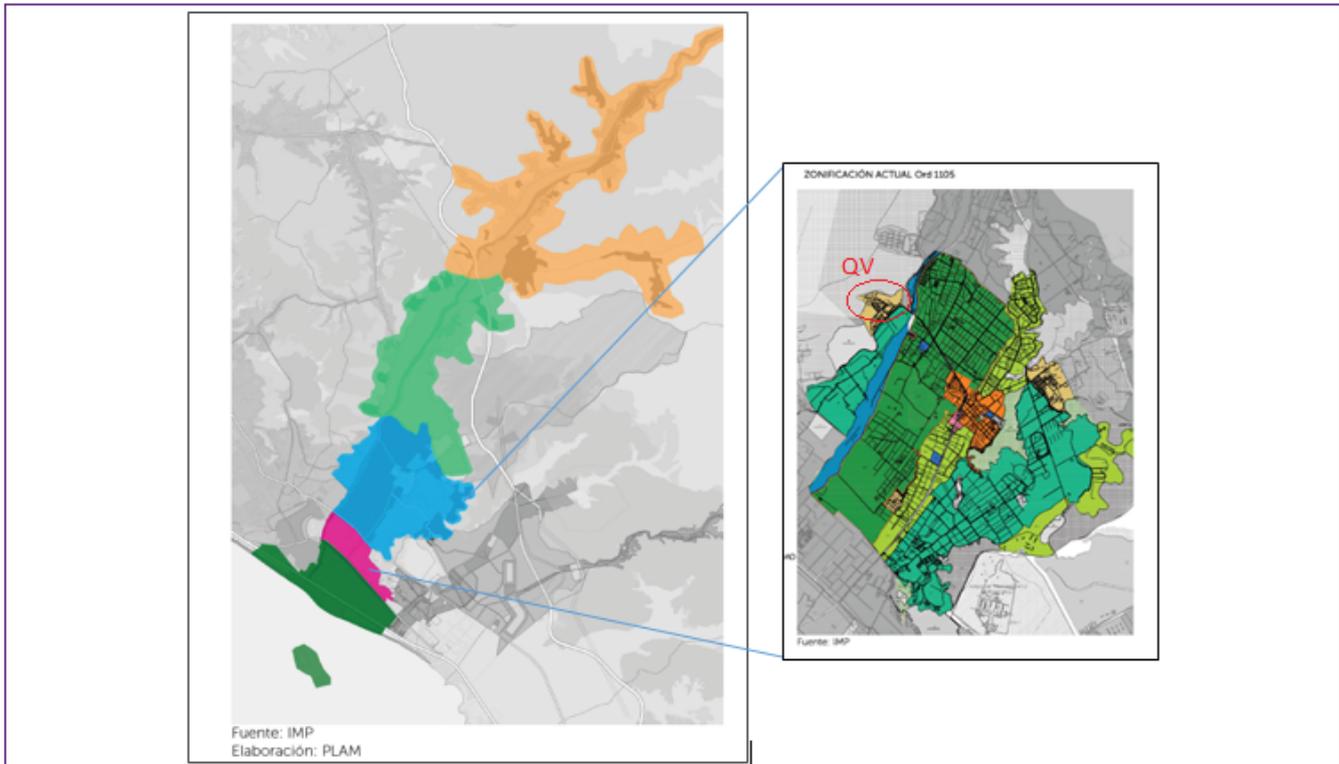
Alberto Ibañez - Advisor PLAM 2035

“The pressure that the Valley is suffering is extremely huge and there are not enough tools to stop urbanisation. Every day, two houses are being constructed.”

4.4 Industrialization and Mining

Mining activities in particular require large quantity of water whilst also constituting a major source of water pollution from heavy metals. This industry is a very important in Peru’s economy and two processes (Box 4B) reinforce its power. Although less than 2% of Perú’s mining concessions are active, companies are likely to accelerate their planned exploration and extraction activities in the coming years⁶.

Figure 4F. Division of sectors of the Lurín Valley and Pachacámac District (left) is in blue; proposed area for agriculture (right) (Source: PLAM 2035, 2015).



Carlos Franco - Red Agua Segura

“There are no policies to control the quantity of water industries use or the quality of the wastewater they dispose.”

The Lurín Basin has a high percentage of mining concessions in relation to its surface area (Bebbington and Bury 2009). Rosalia Davila, from the Junta de Usuarios de Riego de Lurín y Chilca, highlighted that the water quality at the Lower Basin is already very degraded from untreated wastewater and mining waste from the Upper and Middle Basin. Thus, future increases in mining activity are likely to intensify existing problems around water resources, further damaging the ecological infrastructure (e.g. lomas) (Figure 4G).

The Plan Regional de Desarrollo Concertado de Lima Metropolitana (PRDC-LM) has no clear statements about measures to control mining or pollution. The PLAM 2035 intends to protect the Lurín Valley by allowing for a concentration of industries in a 4,000ha eco-industrial park “Las Pampas de Lurín” (Figure 4H)⁷. In this plan, the Lurín Valley is posed to become the new productive urban centre of the city. Thus, despite the Plans aim to promote a “sustainable” city, the new factories and industries would threaten the fertility and ecosystems of the Valley, given the intention to construct them on agricultural land (Orrego, n.d).

Box 4B. Two processes that promote mining activities.

- **System of property rights:** The Peruvian Constitution states that natural resources in the subsoil belong to the national government; thus, the government gives concessions to mining companies without regard to who owns the land above the soil. Conflict is thus generated between ownership of what exists above and beneath the land surface. Land titles for residential purposes are given by COFOPRI (Ministerio de Vivienda, Construcción, y Saneamiento, 2015), and there is no form of dialogue between COFOPRI and the Ministry of Mines and Energy. Obtaining a mining concession title takes approximately four months (Latin Resources Limited, n.d.; GEOCATMIN, 2015).
- **System of “obras por impuestos” (public work in exchange for taxes):** Companies are allowed to conduct “public works” in lieu of tax payment to the national government. The local and regional government’s budget for the implementation of public work projects is managed by the Ministry of Economy and Finance. There is thus a high incentive for municipalities to accept mining companies in their area.

Furthermore, a significant barrier to the actualization of this project is the lack of water supply from SEDAPAL in the area. Project 'Ramal Sur' aims to address this by providing potable water for the districts within Lima Sur, for a period of at least 7 years⁸. An alternative solution is to extract 0.5 m³/seg of water from the

river; a process that will have devastating effects on the whole Valley (Sanchez-Aizcorbe, 2002). Thus, we have a situation whereby plans are in full gears for the construction of high-level industrial projects in a location that has a history of low-level ground water for irrigation purposes.

Figure 4G. Mining concessions on lomas (Source: GEOCATMIN, 2015). In Lima in 2014 there were 314 concessions and 170 petitions; 207 of the concessions were located on lomas (PLAM 2035). QV is an area with many mining concessions (blue box), with most of them not yet activated.

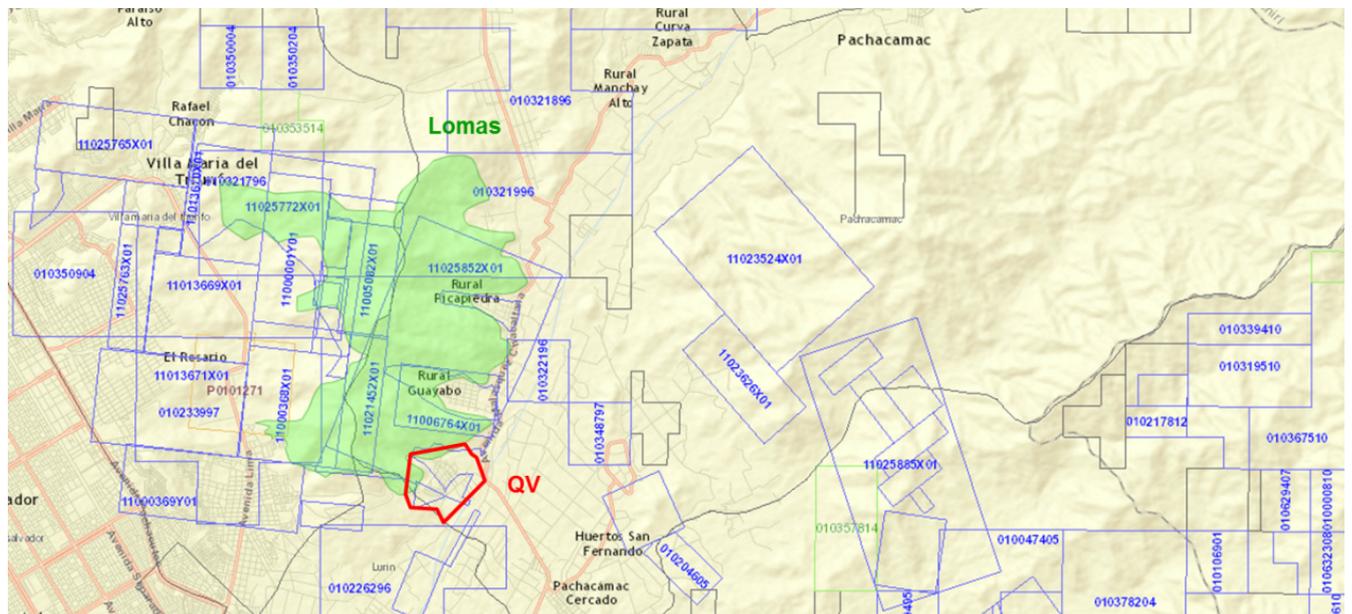


Figure 4H. Correlation between groundwater and the Eco-Industrial Park [Source: (left) IMP, 2007; (right) MML, 2014].

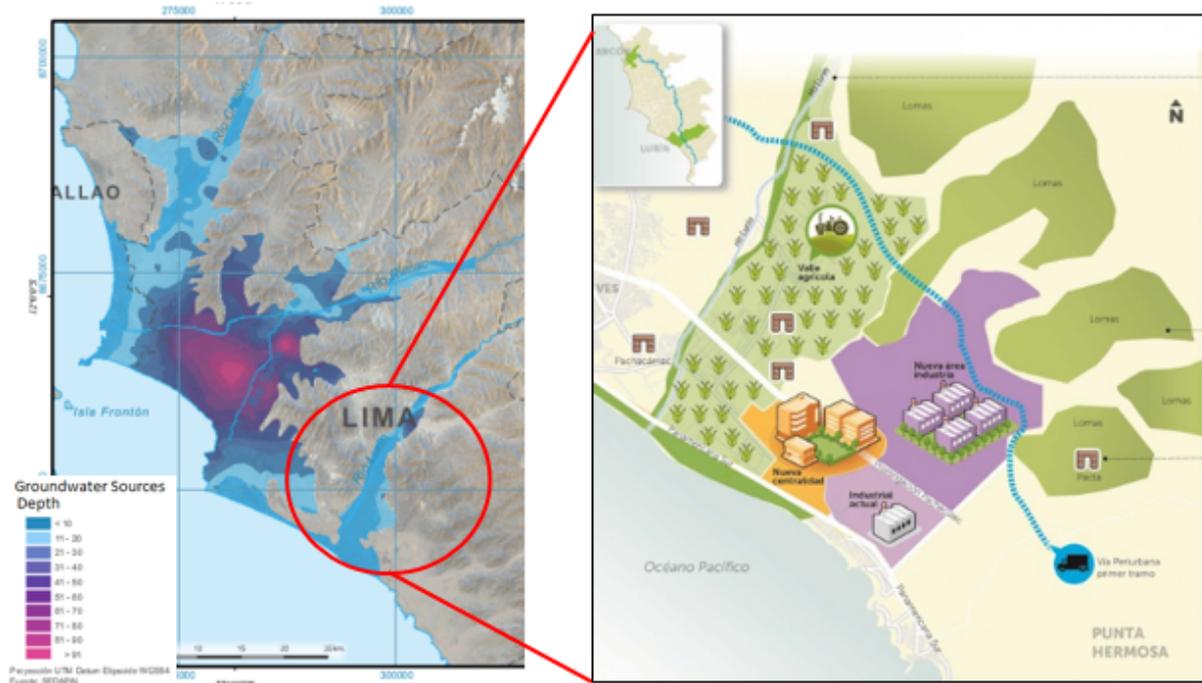


Table 4C. National actors that have an indirect but important role in water governance.

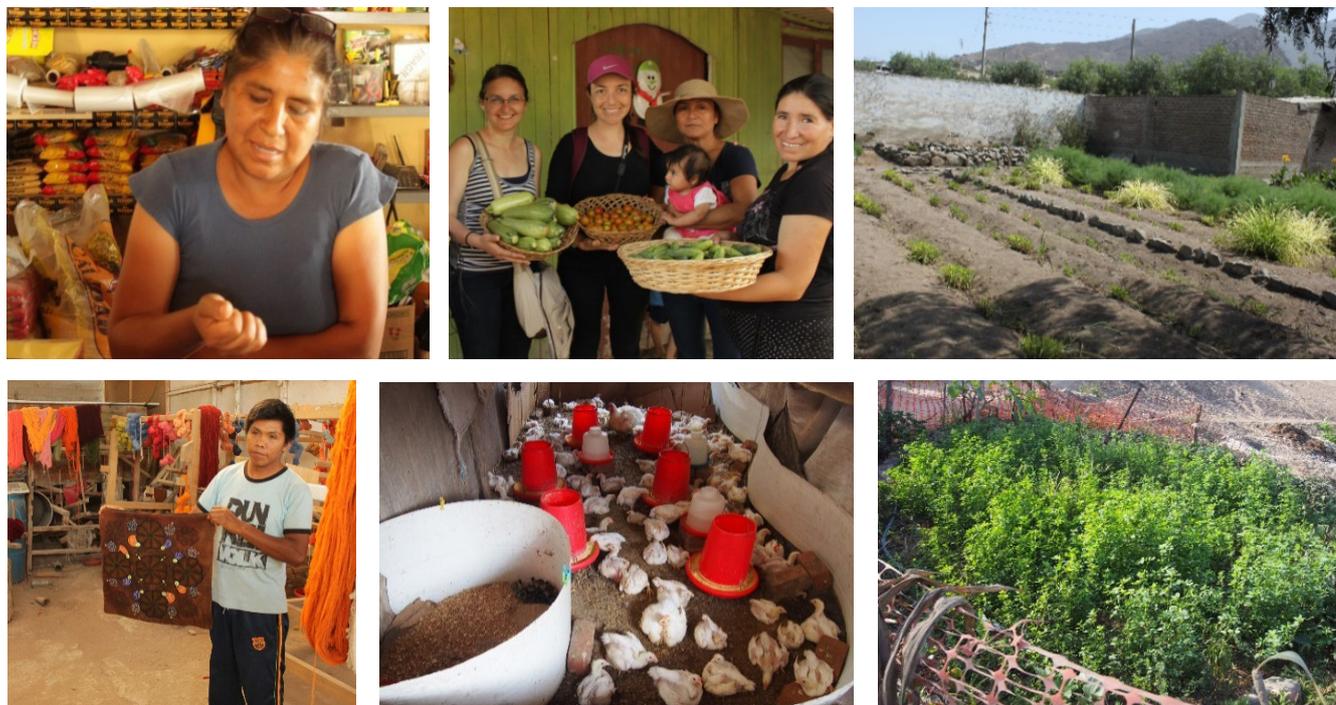
Name	Form of Influence
Ministerio de Vivienda, Construcción y Saneamiento (Ministry of Housing, Construction and Sanitation)	- Under Ordinance 1841, Ministry of Housing promotes urbanisation and industrialisation in the Lower Basin. - Lead institution of the Watershed Council of Lurín Basin. - SEDAPAL and COFOPRI both fall under this Ministry.
Ministerio de Energía y Minas (Ministry of Energy and Mines)	- Approves mining concessions, which are sub-surface and conflict with land uses on the surface.
Ministerio de Economía y Finanzas (Ministry of Economy and Finance)	- Manages “obras por impuestos” (public work in exchange for taxes) commonly used by mining companies and other industries.
Ministerio de Agricultura y Riego (Ministry of Agriculture and Irrigation)	- Aims to improve the efficiency of water management and sustainable use, with a focus on basins. - ANA falls under this Ministry.
Ministerio del Ambiente (Ministry of Environment)	- Recognises the importance of water management and the impact of industries on mining and water resources, but mainly focuses on climate change mitigation.

The impacts of industrialisation and mining are thus reinforced by the lack of coordination between various actors who play indirect but important roles in water governance at the national level (Table 4C). As a result, any strategy that attempts to address this dynamic system must link macro and micro levels of water management.

4.5 Livelihoods

Our field research also revealed that the residents of QV tend to have more than one occupation and source of livelihood at household level - *mil oficios*. Common occupational groups included carpenters, artisans and cooks. We noted that whilst men worked mostly outside

Photo 4. Livelihoods in QV Top row: (left to right): artisan, storeowner, and livestock. Bottom row: Urban Agriculture (Source: Authors, 2015).



Consuelo – resident of QV

“I breed chickens and I earn more money than my husband who works outside QV.”

Rosa - resident of QV

“UA is my only occupation because it provides me with a more secure income.”

QV, women worked mostly within QV, usually in urban agriculture (UA) or livestock care (Photo 4).

Land space available for agricultural purposes in QV is decreasing drastically, with current statistics showing very few families – an average of five (5) are involved in agricultural related occupations⁹. This is because, over the past century, land for agriculture have been allotted in increasingly smaller plots, in the interest of alternative land uses, such as housing. Nevertheless, UA and livestock-related occupations are still present in QV (Figure 3A). A number of households domestically breed chickens and guinea pigs while others grow vegetables or fruits in small plots. Some households sell their excess products outside QV due to the lack of a local market. Urban agriculture is practiced mostly by women, some of whom gained the knowledge through the support of NGOs, such as IDMA¹⁰.

Photo 5. Eco-tourist park “Lomas de Lúcumo” (Source: Authors, 2015).



Urban Agriculture in QV emerged in a bid to address two major problems the community faced: malnutrition and anaemia. The Health Centre in collaboration with local women initiated a pilot project in 2006 in order to help small-scale farmers by providing them with technical support and requisite knowledge. Due to the rapid expansion of UA in QV, in 2008 it was anticipated that food production would be included in the Development Plan of Pachacámac. However, this was not implemented because the local authorities focused heavily on the promotion of ecotourism (Muñoz, 2015).

Ecotourism also constitutes a significant economic activity in QV, as some inhabitants work as tour guides while others sell their handcrafts and agricultural produce to tourists. The “Lomas de Lúcumo” aims to preserve the lomas by promoting ecotourism (Photo 5). Currently ecotourism in QV is only seasonal, attracting tourists mainly during winter when the lomas are green. However, the community is willing to promote its sustenance all year-round.

Jacinto Mendoza – President of CPR Association

“We want to build small bungalows to accommodate the tourists and promote outdoor activities, such as hiking.”

Under the previous mayor of Lima, Susana Villarán, and in accordance with Resolution No. 0274-2013-MINAGRI of the Ministry of Agriculture and the Ordinance 1853 (MML, 2014), Lomas de Lucúmo (photo 5) was declared as an area of conservation. However, many residents have expressed doubts over the current government’s will to protect the ecological infrastructure.

Letter to Mayor of Pachacamac on behalf of residents of QV (2015)

“Every time there is a political campaign the agricultural and ecological land are given to people for development.”

5. Risk in Quebrada Verde

For the purpose of our research, we consider risk to be the probability of harm caused by the exposure to natural or man-made hazards, amplified by an existing vulnerability context (Nadim et al., 2006). This combination of hazards and vulnerability is reinforced by coping capacity: coping mechanisms that people deploy using available assets. Risk can be described according to the following equation:

$$\text{Risk} = (\text{Hazard} \times \text{Vulnerability}) / \text{Coping capacity}$$

The vulnerability context of the desert makes water scarcity an existing natural hazard, and various processes (e.g. urbanisation, industrialisation) make water scarcity a human-induced hazard as well. This produces risks to people's livelihoods at the household level (Figure 5A) and upon the ecological infrastructure in the short and long term.

CPR Association, which organises meetings open to all QV residents twice a month, the organisation of women involved in UA, the ecotourism association Lomas de Lucumo, and JAS. However, we noticed the absence of a water management organisation (in QV), one whose responsibility would be to link and share knowledge on water use and provision for household, sanitation and UA purposes. Additionally, a major social asset to cultivate would be an organisation that ties together elements of the water cycle, which are currently under the management of separate entities. This organisation would further maintain the integrity of the ecological infrastructure.

Our research also revealed that the people in QV have a number of assets, which we highlighted in Figure 5B. We regard social assets as fundamental to cultivating the other assets and coping capacity and thus base our strategies mainly on them. The social assets that QV has include the

Figure 5A. Risks produced by water scarcity in relation to each asset of the SLF.

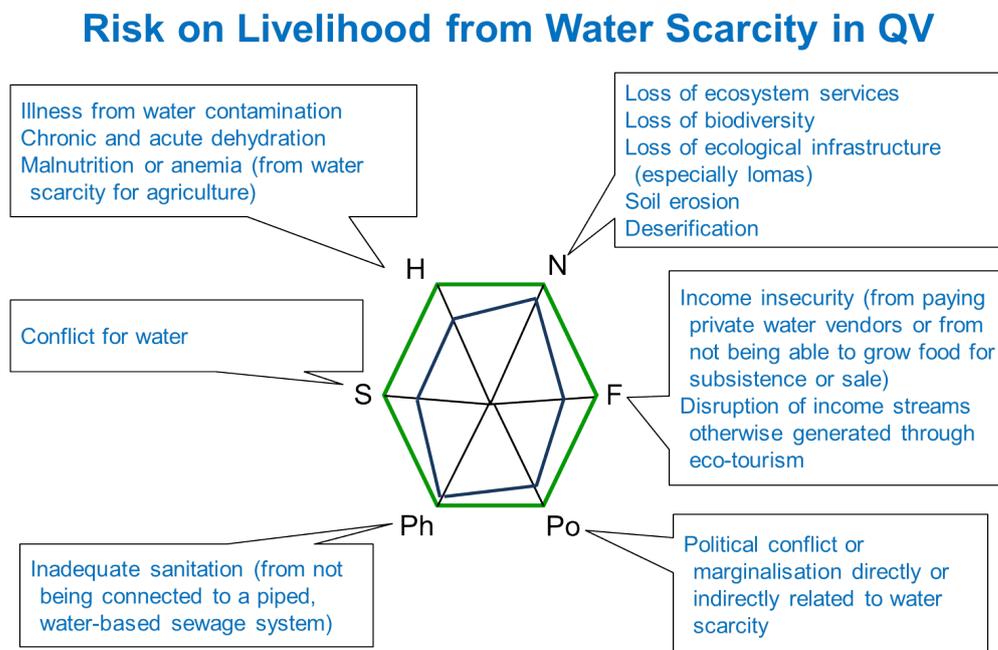
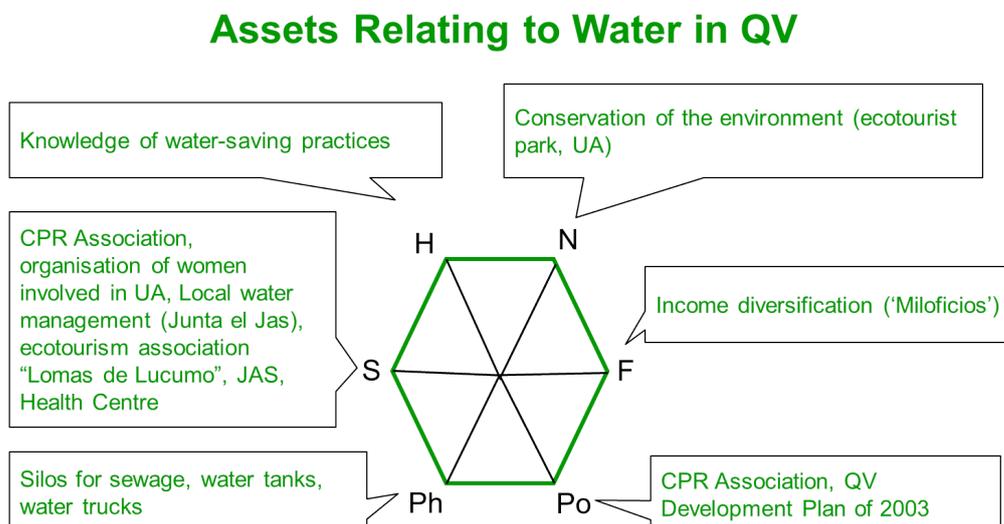


Figure 5B. SLF assets in QV.



6. Visions for the Future

Based on the findings of our research, we assess three scenarios of water management at various scales in QV. The first scenario occurs where the status quo is maintained; the second and third scenarios attempt to envision transformative change (Table 6A).

7. Strategies

In order to realize scenarios 2 and 3, which typify an ideal situation, we propose two strategies: (1) Water Management Strategy and (2) Local Economy Development Strategy.

7.1 Water Management Strategy

At a Macro Level: Coordination and Scaling-Up of Watershed Council

We have identified the Watershed Council, founded in 2007, as a key entity that can influence water management at the Basin level and consequently protect the ecological infrastructure and livelihoods. This strategy would involve the following aspects which also are strategy is summarised in Table 7A:

Sharing Knowledge

Drawing from our observation that QV residents possess knowledge on how to collect and use water efficiently but seem not to acknowledge their dependence on water from

Table 6A. Evaluation of three scenarios of water management.

Scenario	Impact upon water security	Impact upon ecological infrastructure	Impact upon livelihoods	Impact upon cultural identity
Business as usual: <i>Scenario 1</i> SEDAPAL projects for water and sewage infrastructure by 2020, as well as the PLAM 2035, intensify urbanisation in the Valley 'water as an economic good'	<ul style="list-style-type: none"> Groundwater contamination persists due to the extensive use of silos without regulatory framework and industrial abuse Water reserves are depleting in the Valley 	<ul style="list-style-type: none"> Agricultural land is depleting, land speculation forces farmers to sell their lands Lomas around the Valley and the CPRs are about to become extinct Loss of biodiversity and ecosystem services 	<ul style="list-style-type: none"> Loss of income from the disappearance of agricultural production Diseases related to water contamination and scarcity increase Higher prices paid for water 	<ul style="list-style-type: none"> QV and Pachacámac gradually become fully urbanised and lose part of their peri-urban and rural characteristics Lurín Basin loses part of its cultural identity as the "last green valley of Lima"
Adaptation <i>Scenario 2:</i> Integrated Water Management in the Lurín Basin 'water as a social good and a human right'	<ul style="list-style-type: none"> Conservation of water resources in the Basin and the whole city through decentralised management while respecting the hydrological cycle 	<ul style="list-style-type: none"> In the long term, the effects of mining and industrial waste can be reduced 	<ul style="list-style-type: none"> Households in the whole of Lurín Basin become water efficient with improved sanitation 	<ul style="list-style-type: none"> Lurín Basin sets an example for sustainable water management under conditions of water scarcity, climate change and urban growth
Adaptation and mutual development <i>Scenario 3:</i> Integrated Water Management and local economy strategy for QV community empowerment	<ul style="list-style-type: none"> Improved water management through wastewater reuse 	<ul style="list-style-type: none"> Ecological services are restored in the settlement by preserving the lomas and agricultural areas, in the context of urbanisation Respecting the hydrological cycle makes QV green again 	<ul style="list-style-type: none"> Food sovereignty, social networks, economic activity generated, healthy lifestyle, community empowerment 	<ul style="list-style-type: none"> Pachacámac remains a district of touristic attraction

the Medium and Upper Basins, we propose that this Watershed Council could organise skill-sharing workshops to disseminate knowledge of the whole Basin and unify the water users. This can be done in collaboration with NGOs that have been in the region over a long time and possess requisite technical expertise, such as IDMA or Grupo GEA¹¹.

Mancomunidad

Carlos Franco - Red Agua Segura

"The Lurín Basin is divided in 3 sub-basins: High, Medium and Lower Basin. The problem with the management of water comes from the fragmentation between the sub-basins."

The absence of a Mancomunidad at the Lower Basin that can participate in the Watershed Council has resulted in a fragmentation of interests among all the municipalities along the Valley. We propose the creation a Lower Basin Mancomunidad to facilitate bottom-up organisation in the Watershed Council. Once sub-basins are united, the Watershed Council will have a stronger political position. Part of the objectives of this strategy is to generate space for collective decision-making regarding the management of water at the basin level. As a result, this would enhance existing social assets and consequently the political power necessary to challenge unsustainable use of water, which has hitherto been promoted by economic priorities for development.

Countering the challenges of mining and urbanization

Following the strengthening of shared knowledge and the creation of the Lower Basin Mancomunidad, we propose the involvement of regional actors in the Watershed Council, specifically SEDAPAL and ALA. Once this has been achieved, it can progress to information-gathering programmes. Through Mapping, hydrological data collection and other research activities this group may have access to communicate with key actors in other sectors, such as COFOPRI, Ministry of Economy and Finance and Ministry of Energy and Mines. Although our strategy does not make provisions for linkages between the regional and national governance levels, networks of information can foster this crucial dialogue.

Limitations

Despite the prospects of this strategy, the following limitations exist. First, drawing from our observation on the existence of fundamentally different interests and perceptions of the uses of water amongst the different actors, it may be difficult for them to unite around a particular vision of water management. Second, some of the actors, which this strategy aims at uniting, possess, ingrained contradictory perspectives on water management.

For example, the Ministry of Housing is the lead institution of the Watershed Council and oversees the affairs of SEDAPAL; however, through the Ordinance 1841, it also promotes urbanisation and industrialisation in the Lower Basin. Similarly, the MML, through Ordinance 1853, encourages the protection of the ecological infrastructure of the city, including rivers, aquifers and agricultural valleys, whilst on PLAM 2035 however, it promotes urbanisation and industrialisation in the Lower Basin. Thus, even if the actors we have identified do manage to unite around the same purpose, contradictions such as these can constitute barriers to finding the necessary resources for achieving that overarching goal.

Rosalía Dávila - Junta de Usuarios del Distrito de Riego de Lurín y Chilca

"The different Ministries of Perú are not articulated towards the same objective. For example, the Ministry of Agriculture has interests different from the Mining Ministry. All the ministries should take care of the water resource, because it is fundamental for all the activities. Today, the water quality in the Lower Basin is very poor as the industries dump the wastewater without any treatment."

Moreover, the municipalities in the Lurín Basin are not coordinated in their management of water. The only way to reduce water scarcity is to protect water in the upper part but also to stop the urbanisation process in the lower part."

The National Authority of Water (ANA) is not clear with the legal framework for the management of water. The regulations are not respected by any actor. The legal framework includes: Law 3057 and Law 2938."

Third, there is a short window within which this strategy can be optimally achieved (especially considering the fact that mining concessions would become active soon), but in reality, institutional change occur at a rather slow pace. Finally, the short-term tenure of district municipalities and mayors and consequent changing interests of each administration may compromise the stability of the Watershed Council's.

Alfonso Salcedo Rubio - Former Presidential Advisor and Director of the Watershed Council of the Lurín Basin for three terms.

"The major difficulty is the different interests of the Municipalities that change every time the Mayor changes."

Table 7A. Water Management Strategy (Macro Level).

Strategy 1: Coordination and Scale-Up of Watershed Council			
Objective	Political strength of entire Lurín Basin, challenging power of mining and other industries in addition to urbanisation.		
How	Creation of Mancomunidad at Lower Basin and unification with Watershed Council. Involvement of regional actors in Watershed Council. Information gathering programmes with which to address national-level actors.		
Who	Mancomunidad, Watershed Council, AAM, ALA, SEDAPAL, NGOs		
When	Short-term	Medium-term	Long-term
	<ul style="list-style-type: none"> Workshops for skills sharing organised with Watershed Council. Creation of Lower Basin Mancomunidad and unification with Watershed Council. 	<ul style="list-style-type: none"> Involvement of regional actors (e.g. ALA and SEDAPAL). Commencement of information-gathering programs about Lurín Valley. 	<ul style="list-style-type: none"> Dialogue with other actors and sectors (e.g. Ministry of Energy and Mines).
Outcome	Increased political strength of entire Lurín Basin, greater availability of information to challenge mining and other national government interests, in favour of water protection.		
Limitations	<ul style="list-style-type: none"> Contradiction of interests between and within actors. Requires expedite action but in reality institutional change occurs at a slower pace. Political interests of mayors change depending on administration. 		

At a Micro Level: Local Water Management and Sanitation

To support this macro-scale level of the sustainable water management strategy, some actions some actions are required at the local level. We are thus proposing a strategy for improving the management of water and sanitation in QV. One, which could also incorporate the other CPRs of the lower Lurín Basin such as Picapiedra and Guayabo (Table 7B).

Stage 1: Identification of Water Experts in the CPR

Through our transect walks and workshop sessions we identified ‘water experts’ located in different areas of QV. These are ordinary residents who have developed their own water management techniques for preserving, reusing and treating water according for their daily needs and activities. This group of individuals present a potential network of QV ‘experts’ who can share and transmit their knowledge of water management to other members of the CPR.

Stage 2: Sharing Knowledge and Implementing New Practices on Water Management and Sanitation

This network of “experts” can share their knowledge through weekly workshop sessions organised by the CPR Association. The CPR Association can also help link these “experts” to JAS and the Irrigation Committee of the Districts of Lurín and Chilca. These spaces of ex-

change can be could serve for QV residents to learn new water-saving practices whilst also playing a crucial role in the knowledge-sharing stage of our macro strategy.

In this same stage, we prioritise education on water management and sanitation for the children in school, particularly regarding the links between groundwater

Box 7A. Eco-toilets..

- Eco-toilets (also known as dry toilets, baños secos) are a form of decentralized sewage management used by small groups and peri-urban or rural communities.
- They work in the following way: urine and faeces is discharged into a box underneath the toilet, lined with sawdust or a similar material. The box is replaced every six months.
- Benefits:
 - Cheap.
 - Human waste does not contaminate groundwater.
 - Provides a dignified form of sanitation without having to wait for getting access to a piped system.
 - Does not use water.
 - Reuses human waste: the contents of a full box can be used as fertilizer.
- Establishing who is responsible for managing the eco-toilet is important towards ensuring that it is used efficiently in the long run.

contamination and potable water; and the link between urbanisation and increased water demand. To “close the loop” of the water cycle, we also suggest lessons and themed weeks, focusing on sanitation and hygiene. The support of the Health Centre is an indispensable precondition for this, as well as the workshop sessions, to flourish.

We also propose the introduction of eco-toilets to address the problems of groundwater contamination from sewage and poor piped sanitation services (Box 7A). The educational institutions would be an ideal location for a pilot project. It would thus function as a hub of new ideas to help break the cultural barriers to eco-toilets. Finance for this project could be sourced from the CPR Association and whilst project monitoring could be by a local management team, created for this purpose.

Stage 3: Documentation, Evaluation and Mainstreaming of Successful Practices

In this phase, we suggest an evaluation of the cost-effectiveness and efficiency of eco-toilets and strategies proposed at convened workshop sessions. Projects adjudged successful may then be mainstreamed in QV, perpetuating an iterative cycle of water knowledge and management.

Key Actors and Limitations

The key actors for this strategy include the CPR Association, JAS, the Irrigation Committee of the Districts of Lurín and Chilca, local and national NGOs.

The technical support and training on wastewater treatment could be provided by either NGOs like IDMA, or water management experts at municipal level such as SEDAPAL. A potentially significant limitation to this however, would be the difficulty to obtain resources from them or coordinate their activities.

Political recognition, primarily from the Municipality of Pachacámac, would also be a determinant of the success achieved from this project, and would contribute towards scaling up the networks of knowledge. However, this can only be achieved through a strong social organisation system.

7.2 Local Economy Development Strategy

The objective of our second strategy is to enhance and increase the community's financial and social assets by developing a more self-sufficient QV economy; the intended outcome is to build social cohesion in QV and

Table 7B. Water Management Strategy (Micro Level).

Strategy 1: Local Water Management and Sanitation			
Objective	Strengthen the community’s capacity to manage water and sanitation.		
How	Share knowledge on water management; provide education and training on water and sanitation through workshops and introduction of pilot projects.		
Who	CPR Association, Health Centre, school, local water experts, JAS, the Irrigation Committees of the Districts of Lurín and Chilca, NGOs.		
When	Short-term	Medium-term	Long-term
	<ul style="list-style-type: none"> Identify water “experts” in QV. Organise workshops on water management and sanitation. Provide education on water management and sanitation for the children at school. Eco-toilet pilot project in school. Monitoring and evaluation of water management practices and eco toilet pilot project. 		Mainstreaming of successful practices of sustainable and efficient water management and sanitation.
Outcome	<ul style="list-style-type: none"> Enhanced capacity to manage water on a local level. Improved sanitation and quality of water in the long-term. 		
Limitations	<ul style="list-style-type: none"> Difficulty obtaining resources. Challenges coordinating activities of different actors. 		

thus increase the CPR's political power (Table 7C). This strategy draws on the community's interest in strengthening the local economy by building upon the major activities of ecotourism and UA. The promotion of these activities would over time, encourage the protection and appreciation of the land and ecological infrastructure.

Ecotourism

Adolfo Herrera -- Pachacámac Municipality, Ecotourism Director

"There has been a 700% growth in tourism in QV in the past two years. It is important that the residents change their mindsets to allow them to earn income from ecotourism year-round."

Given the significance of ecotourism in QV, promoting it year-round, not only when the lomas are green is of paramount importance. This can be achieved by strengthening the already existing local ecotourism association (Lomas de Lúcumo) in collaboration with various actors.

The creation of a public private partnership between the Lomas de Lúcumo and private tourist agencies in Lima can serve to advertise the ecotouristic park in Lima and beyond. This partnership can also provide the appropriate training for tour guides in order to improve the association's services. Additionally, collaboration between the municipality of Pachacámac and MML-led programme "Lomas de Lima" can create a space to host attractive events on a bigger scale.

These actions build upon QV's existing appreciation of the lomas and constitute a vital factor given the government's intense desire to protect them.

Urban Agriculture

The popularity of UA activities within QV and in Lima reflects the recognition of its value as a vital tool towards improving resident's livelihoods¹². We propose the creation of a social cooperative to manage a communal garden and local market. This would contribute to the community in a two-fold way: first, by enhancing the local economy; and then, by strengthening social cohesion. Given the fact that private sub-parcelling of land for various uses has driven urbanisation in Lima, the collective maintenance of a garden can help challenge that process in QV.

A starting point is to identify the available land with the help of the CPR Association. In terms of human resources, the women's group for UA in QV can play an integral role in establishing the communal garden and the market. The CPR Association¹³ and IDMA may provide financial and technical support respectively. The social coopera-

tive can be organised to ensure management of the market where local farmers and the Ecotourism Association sell their products and crafts (Box 7B). The practices in VMT district (Box 7C) provide a useful example of institutionalising UA practices under limited water availability without invading the lomas.

Following the establishment of the market, the school could then be integrated into the project. Through this, students for example can learn how to grow food with water-saving techniques such as drip irrigation and re-use of water in the school garden. In the long term, farmers can sell their products outside QV. We favour the possibility of recognition of UA as a formal activity in Pachacámac, similarly to VMT.

Box 7B. Cooperatives

- Cooperatives are autonomous organizations of people that voluntarily meet to proffer solutions to common economic, social and/or cultural needs. They promote collective welfare through collaborative practices and equitable distribution of production.
- Principles of cooperatives include voluntary and open membership; democratic member control; autonomy and independence; education, training and sharing of information; and cooperation and solidarity.
- Types of cooperatives: producer cooperatives, worker cooperatives, consumer cooperatives, credit unions, retail/purchasing cooperatives, social cooperatives.
- In Peru there are cooperatives relating to wine, grain, coffee and llamas. A prominent example is COCLA, a second-tier cooperative made of 22 first-tier cooperatives. Its focus is coffee and gender equality.

Box 7C. UA in VMT (Source: RUAFA, n.d.).

- In order to address food security and poverty in the area, the district of VMT conducted a multi-stakeholder policy formulation and action planning process for UA from 2005 to 2007.
- Despite a poor soil quality and limited annual rainfall, this initiative has established over 500 family and community gardens.
- UA in VMT now provides the poor households on hillside with a source of food and income.
- The key outcomes include: (1) development of the Strategic Plan on Urban Agriculture; (2) creation of a multi-stakeholder platform for UA to involve various local actors with human and financial resources; and (3) approval of Framework Ordinance recognizing Urban Agriculture as a legal activity in the district.

Limitations

We anticipate that a primary limitation to this strategy would be the time required as well as probable difficulty in the establishment of the cooperative, especially because of the absence of a history of dynamic and long-lasting cooperatives in Peru. Hence, being a somewhat novel initiative, access to expertise on foundation and functioning principles for running cooperatives may be difficult to come by.

Furthermore, guidelines and administrative rules regarding the allocation of initial roles within the cooperative, management and establishment of a cordial relationship between the CPR Association and the cooperative would need to be agreed on.

Finally, the accommodation of more tourists, the scaling up of UA and the general growth of the local economy may result in an increase in the absolute local consump-

Table 7C. Local Economy Development Strategy

Strategy 2: Local Economy Development			
Objective	Enhance and increase the community's financial and social assets by developing a more self-sufficient QV economy.		
Ecotourism			
How	PPP with tourist agencies in Lima. Collaboration with district of Pachacámac and MML "Lomas de Lima".		
Who	Lomas de Lúcumo, tourist agencies in Lima, Municipality of Pachacámac, MML.		
When	Short-term	Medium-term	Long-term
	PPP with tourists' agencies in Lima for advertisement purposes. Training for tour guides. Collaborative events with "Lomas de Lima".		Provision of accommodation and outdoor activities throughout the year.
Urban Agriculture			
How	Creation of communal garden and local market supported by social cooperative.		
Who	Local residents, Farmers, CPR Association, Schools, Municipality of Pachacámac, VMT (farmers and municipality), IDMA.		
When	Short-term	Medium-term	Long-term
	Identification of land (CPR Association) Organisation of social cooperative (women's group with financial and technical support from CPR Association and IDMA) Integration of tourist association into the market: selling hand-crafts Learning from VMT	Collective management of communal garden and local market Engaging schools in cooperative activities	Market development to sell products outside QV (e.g. Lima) Legal recognition of UA in Pachacámac
Outcomes	Increased social cohesion within QV Greater political power of QV Self-sufficient local economy Protection of lomas and agricultural land.		
Limitations	Establishing a cooperative takes time, expertise and resources. If roles of managing cooperative are not clear or overlapping, they can generate conflict in the future. Accommodation of more tourists and scaling up of UA would likely increase the absolute local consumption of water.		

tion of water. However, our strategy intends to acknowledge the hydrological cycle and to encourage sharing of local knowledge of water recycling.

8. Conclusion

The two strategies we have proposed - Water Management, at macro and micro level, and *Local Economy Development* build upon and strengthen existing social assets. The knowledge of water management constitutes a fundamental condition for effective functioning of a local economy based on ecotourism and UA. At the same time, given the complexity and importance of water management at the Basin level, the social cohesion and political empowerment built by the local economy are of paramount importance to strengthening networks of knowledge around water management and thus preserving the indispensable “last green valley of Lima”.

However, a drawback to the preservation of this “last green valley” is that the growth of the local economy that we advocate for may increase water consumption. Nonetheless, we advocate growth based on sustainable water reuse, and management. Moreover, the strengthening of the Watershed Council with the creation of a Lower Basin Mancomunidad will regulate water use in the valley and better represent water users outside of the industrial sector. This in turn will allow users within local economies to minimise overuse of water.

Although our research has focused on one of 62 CPRs, we argue that the mechanisms that reproduce vulnerabilities and risks are replicated in a similar way across the periphery of Lima. Taking into account the expansion of the city, the lack of an integrated planning process and the absence of policies and institutions to address the risks created at different scales, a simultaneous top-down and bottom-up approach to resolution of existing problems is crucial.

Conflicts in large-scale processes of governance need to be reconciled. Thus, scaling up networks of existing knowledge and practises would create fundamental connections across institutions, communities and state levels in order to build a more sustainable and inclusive city.

9. Further Research

Given that this is the first case study on Pachacámac for this MSc, we suggest further multiple-scale research across the following levels.

- Basin and National Levels: A nuanced investigation of the actors and activities taking place at the scale of the Lurín Valley and in Peru as a whole.
- Municipality Level: More nuanced understanding of the relationship between the MML and the district of Pachacámac. Greater comprehension of the consequences of changes in administration.
- Local Level: In-depth analysis of how “new-residents” and “old-residents” of QV perceive the environment and the knowledge base on water management they possess. Given the presence of water scarcity and land speculation in the area, we consider the possibility of “reinventing” the CPR as a Common Property Regime.

References

- Allen, A., Mattingly, M., Dávila, J. D., McAlpine, P., Chhabra, M., Budds, J., Minaya, A., Corubolo, E. (2011) ‘Developing an environmental planning and management process for the peri-urban interface: guiding and working principles.’ *Living between Urban and Rural Areas*. London: Development Planning Unit, University College London. [Online] Available from: http://www.ceelbas.ac.uk/dpu/k_s/publications/EPMvol2.pdf. [Accessed 2 February 2015].
- Alfaro, J. and Huerse, R. (2010) ‘Diagnóstico Socioeconómico de la cuenca del Río Lurín’ *Proyecto: Desarrollo Territorial y Generación de Empleo en la Cuenca del Río Lurín*. Lima: Centro Global Para el Desarrollo y la Democracia (CGDD) and Centro de Investigación, Educación y Desarrollo (CIED) [Online] Available from: <http://www.cgdd.org/files/DIAGNOSTICO%20SOCIOECONOMICO%20CUENCA%20LURIN.pdf>. [Accessed 25 May 2015].
- Aquafondo. (2013) ‘Chapter 2: Las cuencas de Lurín, Rímac y Chillón, fuentes de agua para Lima y Callao.’ *Modulo para la creacion de materiales de difusion sobre el problema hidrico en Lima y Callao*. Lima: Aquafondo. [Online] Available from: http://www.aquafondo.org.pe/pdf/aprende-mas/2._Las_Cuencas_de_Lima_-_Chillon_Rimac_y_Lurin.pdf. [Accessed 25 May 2015].
- Baumann, P. (2000) ‘Sustainable livelihoods and political capital: Arguments and evidence from decentralisation and natural resource management in India.’ Working Paper No.136. London: Overseas Development Institute. [Online] Available from: <http://www.eldis.org/vfile/upload/1/document/0708/DOC8378.pdf> [Accessed 20 May 2015].
- Bebbington, A. J. and Bury, J. T. (2009). ‘Institutional challenges for mining and sustainability in Peru.’ *Proceedings of the National Academy of Sciences*, 106(41), 17296-17301.
- Cannon, T. (2008) ‘Reducing People’s Vulnerability to Natural Hazards, Communities and Resilience.’ Research Paper No. 2008/34, World Institute for Development, Economics Research, April 2008.

- Chong, C. L. J. (2009) *CPR*. 'Urban Experiences In a Rural Environment. Small Rural Settlements in Lurin Valley, Lima, Peru.' The 4th International Conference of the International Forum on Urbanism (IFoU), Amsterdam/Delft.
- Dávilla, R. (2015) *División técnica Junta de Usuarios del Distrito de Riego de Lurín y Chilca*. Personal Interview [07 May 2015].
- Dillon, M. (2005) 'The solanaceae of the lomas formations of coastal Peru and Chile.' *A Festschrift for William G. D'Arcy: The Legacy of a Taxonomist*, pp 131-156.
- DFID. (1999) *DFID sustainable livelihoods guidance sheets*. [Online] Available from: <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf> [Accessed 20 May 2015].
- FAO (n.d.) 'Urban and Peri-urban Agriculture in Latin America and the Caribbean: LIMA.' [Online]. Available from: <http://www.fao.org/ag/agp/greenercities/en/GGCLAC/lima.html> [Accessed 24 May 2015].
- El Comercio (2014) Gobierno anula 110 concesiones mineras por inactividad. [Online]. Available from: <http://elcomercio.pe/economia/peru/gobierno-anula-110-concesiones-mineras-inactividad-noticia-1713656> [Accessed 25 May 2015].
- GEOCATMIN (2015). Map for Location of Mining Concessions. [Online] Available from: <http://geocatmin.ingemmet.gob.pe/geocatmin> [Accessed 4 Jun 2015].
- Global Water Intelligence (2014). "Chapter 10: Peru, Overview of indicators" in *Global Water Intelligence Market Insight: Peru*. [Online.] Available from: http://www.globalwaterintel.com/client_media/uploaded/20130220_GWM2014_Peru_sample_chapter.pdf [Accessed 2 May 2015]
- INDECI (2011) 'Estudio para determinar el nivel de vulnerabilidad física ante la probable ocurrencia de un sismo de gran magnitud: Distrito: Pachacamac.'
- Jamasmie, C. (2014) 'Less than 2% of Peru's total mining concessions are active.' [Online]. Available from: <http://www.mining.com/less-than-2-of-perus-total-mining-concessions-are-active> [Accessed 25 May 2015].
- Johnson, C., Dodman, D. and Brown, D. (et al.) (2013) 'Understanding the nature and scale of urban risk in low-and middle income countries and its implication for humanitarian preparedness, planning and response.' *International Institute for Environment and Development (IIED)*, London, UK (2012), pp 72.
- Latin Resources (n.d.) 'Overview of process for grant of a mining concession in Peru.' [Online]. Available from: http://latinresources.com.au/overview_of_process_for_grant_of_a_mining_concession_in_peru [Accessed 25 May 2015].
- Macizo, G. (2015) Secretaria Técnica de la Cuenca del Lurín. Ministerio de Vivienda, Construcción y Saneamiento. Personal Interview [08 May 2015].
- Mar, J. M. et al. (1964) *El Valle de Lurín y el Pueblo de Pachacamac: Cambios Sociales y Culturales*, Universidad Nacional Mayor de San Marcos: Lima, Peru.
- May, C., Brown, G., Cooper, N. and Brill, L. (2009) *The Sustainable Livelihoods Handbook, An asset based approach to poverty*. Oxfam. [Online] Available from: <http://policy-practice.oxfam.org.uk/publications/the-sustainable-livelihoods-handbook-an-asset-based-approach-to-poverty-125989>. [Accessed 28 February 2015].
- Meikle, S., Ramasut, T. and Walker, J. (2001) 'Sustainable Urban Livelihoods: Concepts and Implications for Policy.' Working Paper No.112. London: Development Planning Unit, University College London.
- Méndez-Lemus, Y. M. (2012) 'Urban growth and transformation of the livelihoods of poor campesino households: the difficulties of making a living in the periphery of Mexico City', *International Development Planning Review*, 34 (4), 409-438.
- Ministerio de Vivienda, Construcción, y Saneamiento. (2015) *Que es COFOPRI?*, [Online]. Available from: <http://www.cofopri.gob.pe/faq.asp?i=1> [Accessed 25 May 2015].
- Miranda Sara, L., Takano, G., and Escalante, C. (2014) 'City Report: Metropolitan Lima and Callao.', part of *Metropolitan Lima and the Sustainability Challenge: Growing Cities in Growing Economies* serie. Lima: University of KwaZulu-Natal.
- MML (2012a) *La pobreza en Lima Metropolitana*, [Online]. Available from: http://www.planlima.gob.pe/documentos_del_plan/Is-mesa-pobreza%20urbana-exposicion-18-05-2012.pdf [Accessed 14 Jan 2015].
- MML (2012b) *MAPA DE LA ESTRUCTURA ECOLOGICA DE LIMA*, [Online]. Available from: https://encrypted-tbn0.gstatic.com/images?q=tbn:ANd9GcRVDiV4cU_HlvbhW-4G07Z3YDz3HwCe-eBD-QPKbiSeshevRA_d_h [Accessed 14 Jan 2015].
- MML (n.d.) 'Lurín: ciudad sostenible', *Plan LIMA Y CALLAO 2035*, [Online]. Available from: <http://plam2035.gob.pe/pampas-de-lurin-se-convertiran-en-el-polo-industrial-mas-importante-de-la-ciudad> [Accessed 14 Jan 2015].
- Morales, C. (n.d.) 'Lineamientos de Política para la gestión del agua en la cuenca alta y media del río Lurín. Centro Global para el Desarrollo y la Democracia, Mancomunidad Municipal Cuenca Valle Lurín.', [Online]. Available from: <http://www.cgdd.org/informes/LINEAMIENTOS%20DE%20POLITICA%20PARA%20LA%20GESTION%20DEL%20AGUA%20EN%20LA%20CUENCA%20ALTA%20Y%20MEDIA%20DEL%20RIO%20LURIN.pdf> [Accessed 25 May 2015].

- Morse, S., Mcnamara, N., and Acholo, M. (2009) *Sustainable livelihood approach: A critical analysis of theory and practice*, Geographical Paper No.189, [Online]. Available from: <http://www.reading.ac.uk/web/FILES/geographyandenvironmentalscience/GP189.pdf> [Accessed 20 May 2015].
- Municipalidad de Pachacámac. (2004) 'Municipalidad de Pachacámac: Actualización del Plan de Desarrollo Concertado.'
- Muñoz Oliveros, M. (2015) Facilitator and Agro-ecology expert. IDMA. Personal Interview [5 May 2015]
- Nadim, F., Kjekstad, O., Domaas, U., Rafat, R. and Peduzzi, P. (2006) 'Global Landslides Risk Case Study', *Natural Disasters Hotspots Case Studies, Disaster Risk Management Series*, 6 (2), 22.
- Orrego, J. L. (n.d.) 'Pachacamac y Lurin: apuntes historicos y vision de futuro. Retrieved from Rumbo al Bicentenario.' [Online]. Available from: <http://blog.pucp.edu.pe/item/23646/pachacamac-y-lurin-apuntes-historicos-y-vision-de-futuro> [Accessed 25 May 2015].
- PLAM 2035 (2015). 'Plan Metropolitano de Desarrollo Urbano Lima y Callao 2035 - Metropolitan Urban Development Plan for Lima and Callao 2035.' Lima: MML and UN-HABITAT. [Online] Available from: <http://limatieneunplam.blogspot.com/2015/05/descarga-el-plam2035.html> [Accessed 24 May 2015].
- PRACTICAL ACTION (n.d.) 'Livelihoods.' [Online] Available from: <http://practicalaction.org/livelihoods-4>. [Accessed 3 June 2015].
- PROYUBIN (2014) 'Instalarán más industrias en el sur de Lima.' [Online]. Available from: <http://www.proyurbin.com/noticias/instalaran-mas-industrias-en-el-sur-de-lima.html> [Accessed 25 May 2015].
- Roman, A., Winker, M., Tettenborn, F., and Otterphol, R. (2007) 'Informal settlements and wastewater reuse: Improve of urban environment and alleviate poverty in Lima, Peru', Institute for Wastewater Management and Water Protection, 2nd SWITCH Scientific Meeting, Tel-Aviv, Israel.
- RUAF (n.d.) 'Villa Maria del Triunfo (Lima, Perú).' [Online]. Available from: <http://www.ruaf.org/villa-maria-del-triunfo-lima-per%C3%BA> [Accessed 24 May 2015].
- Sanchez-Aizcorbe, A. (2002) 'El fin del Lurin.' Retrieved from Caretas, [Online]. Available from: <http://www.caretas.com.pe/2002/1728/articulos/lurin.phtml> [Accessed 25 May 2015].
- Torres, M. R. K. and Miranda, S. L. (2012) 'Do Inclusive Scenarios Contribute to Reduce Water Vulnerabilities Facing Climate Change in Metropolitan Cities? The Case of Lima, Peru', Policy Brief No 5, September 2012.
- UN-HABITAT (2015) 'PLAM 2035: an opportunity for metropolitan Lima to grow sustainably.' [Online]. Available from: <http://unhabitat.org/plam-2035> [Accessed 29 May 2015].
- United Nations (2014) 'Gestion del agua en San Andres de Tupicocha, Lima, Peru.' Experiencias de adaptacion al cambio climatico, COP 20, Lima Climate Change Conference, December 2014.

NOTES TO CHAPTER 6

- The lomas is a unique ecosystem along the coastal area of Peru. It occurs in the winter in some parts of sandy mountains that consist of desert territory. The lomas phenomenon is important firstly because of its role in the water cycle and secondly due to its biological value, such as oxygen regeneration (Dillon, 2005).
- To encourage the participation of women, we provided activities for their children; up to 35 under the age of 13 attended and older children were encouraged to participate in the workshop.
- A Perú-wide voluntary association that links a dozen specialised organisations around issues of water supply and sanitation in both urban and rural areas.
- Estates of significant size, typically established by colonial landowners.
- Mancomunidad is a legal body comprised of freely associated entities. It can exist to achieve a particular goal or indefinitely.
- As of 2014, 15,000 of 55,000 mining concessions passed the seven-year government mark to begin operations or lose privileges over the land (Jamasmie, 2014) and only 110 concessions were annulled for lack of activity (El Comercio, 2014).
- This project was approved by the Ordinance No. 310-MML, which regulates land uses in the Lower Basin of the Lurín Valley.
- This project is expected to commence following completion of project Ramal Norte, which was expected to end in 2014. It is planned in two stages: first covering up Villa Maria del Triunfo (VMT) then the other districts until Pucusana.
- This information was gathered from various sources, including the Junta de Usuarios de Riego and the QV residents.
- IDMA works on projects around UA only with women who have children. IDMA supports the farmers in the process of commercialisation of their products and in acquiring an organic certification, which is valid in Peru only.
- The ecotouristic park "Lomas de Lúcumo" were established with the financial and technical support of GEA.
- MML's Ordinance for the promotion of UA has helped establish many projects in Lima (FAO, n.d.); the district of VMT, a neighbour of Pachacámac, also successfully developed its strategic plan for UA and recognised UA as a legal activity (RUAF, n.d.).
- The CPR Association told us it has available plots and is willing to offer them for use as a market and communal garden.

Appendices

Appendix 1. Field-trip schedule (26th April 2015 - 12nd May 2015)

Date	Activity	Who	Objectives
Sun 26 th April	City Tour: Costa Verde, El Agustino, Barrios Altos, JCM;	Guided by facilitators and partners (i.e. Lilliana Miranda)	Gain a general overview of Lima;
Mon 27 th April	AM: Student presentations of pre-fieldtrip diagnosis (with discussion panel) PM: Discussion on the historical development, urban expansion, food policy, real conditions of livelihoods, issues of the plan in QV; Operate the research & fieldwork plan. Prepare for the first field day;	Student groups, facilitators and partners; Assisted by Andres, Diana, Zeremariam, Jose, Arturo;	Receive feedback from facilitators & partners; Accordingly modify our research & field plan; Refine our methodology and interview questions; Deepen the understanding of the plans and the history of QV;
Tues 28 th April	FIELDWORK: First visit to Pachacamac; Transect walk, mapping and observation; Talk to several individuals of QV; Organise and analyze information from the 1st field day; Plan for the 2nd field day;	Assisted by Andres, Giovanna, Diana, Zeremariam, Jose, Arturo;	Gain first insights into research areas; spatialise impressions; Get a basic understanding of everyday practices; Refine our field plan;
Wed 29 th April	AM: Lecture (1): strategic planning in Lima; Lecture (2): understanding, defining and mapping of risk; Prepare (interview) questions;	(1) Albert Ibañez (technical co-ordinator of the PLAM); (2) Linda Zilbert (risk expert); Facilitated by Arturo, Diana, Zeremariam;	Deepen the understanding of strategic planning in Lima; Understand how risk is perceived and managed;
Thur 30 th April	AM: Lecture (1): water as a human right; Lecture (2): SEDAPAL water provision plan in Lima; PM: Discussion on questions and teams (roles) for next day's transect walk, the plan for workshop (objective, scale, topics) and focus groups;	(1) Carlos Franco Pacheco (advisor to the IMP); (2) Josué Céspedes Alarcón (SEDAPAL); Facilitated by Diana, Zeremariam and Adriana;	Refine our hypothesis and fieldwork plan; consider possible actors for interviews; Refine our fieldwork plan
Fri 1 st May	FIELDWORK: Transect walk, mapping and observation (splitting in 2 teams covering different zones); Visit a few households and conduct semi-structured interviews;	Interviewee: (i.e.) Rosario (CPR secretary, ecotourist guide), etc.; assisted by Diana, Zeremariam, Arturo, Jose, Giovanna;	Deepen the understanding of everyday practices; understand people's perspective on risk, lomas, water access, urbanization, urban agriculture, development plan, etc.
Sat 2 nd May	Organise and analyse findings from the previous day; Form the definition, management & connection of daily risk with ecological infrastructure, Lurin Valley; Discussion on workshop methodology (activities, check-in & out, refreshment, etc.); Plan for the next day's transect walk (more questions like infrastructure);	Facilitated by Diana, Zeremariam;	Understand the history & social diversity of Quebrada Verde; Map the conditions of livelihoods and related assets; Deepen the understanding of the daily risk in QV; Understand the context and identify key stakeholders;
Sun 3 rd May	FIELDWORK: Transect walk, mapping and observation (splitting in 2 teams covering different zones); Visit a few households and conduct semi-structured interviews;	Interviewee: (i.e.) Maria (store owner), Sergio (Sedapal, livestock, local market) and Consuelo, Jose (Mili-offices); Ana (aquaponics & organic agriculture), assisted by Diana, Zeremariam, Arturo, Jose;	Understand the migratory flows (when, where, why); Deepen the understanding of the different neighborhood and their perception about the risk; Map the conditions of livelihoods and water; Refine our fieldwork plan;

Date	Activity	Who	Objectives
Mon 4 th May	AM: Lecture (1): Plan Lima y Callao 2035; Lecture (2): Urban Development Plan;	(1) Mariamella Castro (responsible for public spaces and ecological infrastructure); (2) Alberto Ibañez (Advisor PLAM 2035);	Deepen the understanding of the preservation of Lurin Valley, a proposed agricultural system and related challenges; Deepen the understanding of urban development control; Understand the government model and their plans and policies for the conservation of Lurin Valley; Understand agricultural practices in QV and their association with the Development Plan; Understand the context and identify key stakeholders; refine research & fieldwork plan;
Tues 5 th May	PM: Interview (1): activities, involvement in the Plan, land owners of agricultural land in the valley, etc.; Organise and analyse findings on yesterday's field; Plan for workshop on 6th May; Interview (2): Lima-Huancavelica Program (agriculture, involvement of the organisation, future visions); Interview (3): Protection of Lurin Valley and its economic development; Analysis of the interviews; Plan for workshop on 6th May;	Interviewee (1): Mariamella Castro (responsible for public spaces and ecological infrastructure); Interviewee (2)-Maiko Munoz (IDMA); Interviewee (3)-Señor Ingeniero Carlos Alberto Rivas Plata Diaz (Desarrollo Económico, MML);	(1) Understand agricultural and food context in QV, Pachacamac, Lurin Valley and the involvement of community; (2) understand the interaction between protection of the Valley, economic development and the change of land use; More focused risk identification; refine fieldwork plan;
Wed 6 th May	Workshop: water supply, use and treatment (wastewater);	Facilitated by Diana, Zeremariam, Arturo, Jose, Andrea;	Understand households' water consumption and use pattern and sanitation practices; Share our research plan and invite the participation of the interested communities;
Overnight in Quebrada Verde			
Thurs 7 th May	FIELDWORK: Transect Walk; Interview (4): water system and management, collaboration with sedapal; Interview (5): water for agriculture in the valley; Interview (6): Eco-tourism management of the Municipality of Pachacamac;	Interviewee (4)-Junta directiva el Hias; Interviewee (5)-Cesarillo Villazana (Junta de Riego de Pachacamac); Interviewee (6)-Adolfo Herrera (Eco-tourism director, Pachacamac Municipality);	Deepen the understanding of the water system and management context in QV; Understand water for agriculture in the valley and related governmental discourses about water, agriculture, environment; Deepen the understanding of eco-tourism (livelihood) management in QV;
Fri 8 th May	Interview: urbanisation, land, settlement, water issues;	Interviewee: Gladiz Maciso (Technical Secretariat of the Lurin Basin, Ministry of	Deepen the understanding of urbanisation, water issues and ecological infrastructure as well as the risk of water scarcity;
Sat 9 th May	Organise and analyse findings on the workshop; Establish life stories in QV; Analyse findings on the workshop and interviews; Develop strategies;	Assisted by Diana and Zeremariam;	Identify the risk of water scarcity in the livelihood context; Understand the coping mechanisms in QV;
Sun 10 th May	Refine strategies (splitting in 2 teams covering different scales); Prepare for final presentation;	Strategy proposal to Diana, Zeremariam and Adriana;	Identify the risk of water scarcity in the livelihood context; Understand the coping mechanisms in QV;
Mon 11 th May	Telephone interviews: UA projects and co-operatives; local market (financial support); women participation; livestock to sell in local market; food and irrigation system and eco-toilet projects in schools; experience and paradigms of eco-toilet projects; opinions on doing workshops concerning water management and sewage;	Interviewees-IDMA; Jacinto; Maria; Consuelo; School; Maria Chinga (health center); Jaime; Jose, Sergio, Justiano;	Deepen the understanding of the risk of water scarcity; Connect the evidence and support of our strategies;
Tues 12 th May	Final presentation & discussions	Student groups, facilitators, partners, stakeholders;	Collect feedback from all stakeholders of QV and other actor groups on our proposed strategies.

Appendix 2. The results of the transect walks

Who?	Date	Group	1. History When (& why) did you come to QV? What do you do before?	2. Job What job(s) do you have? How do you go to your work and how long does it take you?	3. Land Do you own any land?	4. Infrastructure Electricity, water, waste, garbage, waste water? Illegal services? Is it easy to build a house?	5. Environment What do you think of the eco-touristic park? The lomas and the eco-infrastructure?	6. Social Are you part of any organisation in QV? What role do you have and how you participate? Are you part of any saving groups?	7. Development Plan What do you think of the development plan for QV and how it will affect you livelihood?
Roja +4	1st May	A		Father in construction FT but instable; livestock (a few chickens) Daughter in factory (unemployment)	no other land; legal documents; owners; not possible to expand		nice lomas ; tourism (guides)	group of water users; members of tourism	No, but lomas need to be protected
Manibelle	1st May	A		informal handicraft; restaurant in Pachacamac	rent house		do not know	no friends; single mother	no
Roy	1st May	A		gas industry delivery in QV	Owner (\$30-40,000), builds his own house		Nice for leisure and children	CPR meeting; active member	no
Malazquez	1st May	A		Pensioner from agriculture and other	Own property		Yes important	Lives with his daughter	Yes, they plan to build a sewage system but altitude is a problem
KGs	1st May	A		-	-		play	football team	no
Juan	1st May	A		Grocery and restaurant (family business)	own since 2004		Benefits a lot from tourism	-	No
Nunez	1st May	A		construction-store-bar	own from heritage		Need to protect more	Former CPR president	People respect the plan, is very important
Matilda family	1st May	B		security job FT; food PT (touristic)	own land title	agricultural land is not a part of QV		no	no
Rosa family +2/3Ch	1st May	B		UA in market; construction	own house; rent agricultural land outside QV		depends on it	women' group for UA	-
Filbert family (3)	1st May	B		handicraft business with his wife	own land; house+workshop		depends on tourism (selling products)	no	
Rosario +1+4Ch (in Lima)	1st May	B		eco-tourism PT; cook; husband mechanics	land; house+agriculture in QV		depends on tourism	CPR secretary	-
Deniel	3rd May	A		constructor in Casaríña	casaríña				
Rebecca	3rd May	A		land selling office of senior Alcantara in Casaríña					
Jaqueline	3rd May	A		land selling office of senior Alcantara in Casaríña					
Florencia and Rosa	3rd May	A		Industry and maid	No space, no livestock	Taxi for work, full tank and wants to buy more, gets water from trucks, gates, water price is a big issue	Don't pay for lomas, cementos free	House expensive but pays for savings, security issues and stealing cats; participates in QV meeting	Has heard about the new plan
Alfredo, Marco and Shdon	3rd May	A		Carpenter, bread, painter + construction		Separates grey and black water, don't reuse water, transport and electricity are big problems, they don't like secdgal	Like nature		Have to progress about water and drainage
Linda, Sanliago and Christian	3rd May	A		Owne grocery store	Bought land 3 years ago Build store on her own land, title is a long procedure	Have new electricity but not connected yet, solid waste, water and electricity are main issues	Has not been to lomas but likes them, likes the idea of urbanization in loma	No friends, know that organizations exist, has faith in the CPRs Organisations	
María	3rd May	A		Housekeeper and guardian	Bought land 3 years ago, bought the land from the previous administration	Needs to build the house slowly, the biggest problem is the water and the electricity	Loves lomas, agriculture is important for the valley especially Casablanca that can't keep doing agriculture when moves	Jacinto gave cements to build staircases	

Who?	Date	Group	1. History When (& why) did you come to QV? What did you do before?	2. Job What job(s) do you have? How do you go to your work and how long does it take you?	3. Land Do you own any land?	4. Infrastructure Electricity, water, waste, garbage, waste water? Illegal services? Is it easy to build a house?	5. Environment What do you think of the eco-touristic park? The lomas and the eco-infrastructure?	6. Social Are you part of any organisation in QV? What role do you have and how you participate? Are you part of any saving groups?	7. Development Plan What do you think of the development plan for QV and how it will affect you livelihood?	
Sergio and Consuelo	3rd May	A	15 years ago in QV, 2 kids	Sergio in sedrapa, livestock, sell chickens to markets in san isidro, wife works in a company	Own land, bought from Jacinto garden, trees and plain to have more public space planning infrastructure, corruption in QV for land titling, not organized; woman does chicken/livestock and man works outside and often times the chicken/livestock is more profitable -- say this is common in QV	Buy food from Lurin valley Reuses water	Loves lomas	Good and bad things about Jacinto, builds 3 successful classes, CPR organization works well but not as they expect, communal kitchens, social relationships are good, but people inside are divided 10 people in junta directive of HHAS		
Oscar	3rd May	A	8 years in QV	He works in agriculture and rents land to cultivate in several areas in Lurin and Pachacamac. He decides what crops to cultivate and then sells them to Mercado Malcrista de Sanantiago.						
Asusera	3rd May	A	14 years in QV, she is about 20 years old and has five brothers and sisters	She works in a breakfast store from 7-10 after the University. She wants to become a cook					She likes the lomas and the environment, she doesn't believe that urbanisation will affect them in the future.	
Jose	3rd May	A	24 years in QV, he is 36 years old and has three sons. He came from Casa Blanca.	Milli-offices; he is running an internet cafe with his wife in the first floor of his house, he also worked in a chemical cleaning company, security, furniture and electrical installations. In the rush hours he works the motor-taxi.	He owns the land where his house is built on.	The biggest risk for the future is the contamination of ground water resources because of the inadequate sewage system. So, sewage and water are the main challenges, while the Municipality of Pachacamac is responsible to provide them with safe water and sanitation.	Eco-tourism is very important for the area and will contribute to its development. But, there is not enough collaboration between different people and their interests.	There is an Association of motor-taxi drivers in QV, which consists of 15 people. They have organized just so they can get the permission from the Municipality of Pachacamac to work as an organisation. There is a lot of corruption in the public funds that were supposed to be used for public spaces.	He believes that the local CPR Association is not enough to make a change unless they coordinate their actions with the Municipality of Pachacamac.	
Maria	3rd May	B	Patricio's daughter, Jacinto's wife	worked in 2 companies and did accounting; now has store; she was a teacher that used to teach ecotourist guides in very beginning	Supposed to receive water but can only get 1x in three weeks because pipes are broken, etc	Ag land used to be up to lomas; property entitlements are big (coincides with Carros); used to take water from well near ag land; used to have donkeys; have always had livestock; biggest problem with having livestock is no water or food for livestock and no land; agriculture is not profitable at all; have no money for the new well because they spent it improving existing well and distribution pipes	He criticises the water users organisation for bad water distribution		he doesn't know about it but has many ideas for development	
Luis	3rd May	B	Came to QV 12 years ago; three daughters in Germany, California, and Lima stays only 15 days in QV; he worked in the lomas de Lucumo;	Has a transport company and worked for a feminist NGO; works outside of Lima so stays only 15 days in QV; he worked in the lomas de Lucumo;	He bought the house but didn't build it; he has flats; agriculture is not profitable; urban agriculture could be a good strategy; 5-6 people from the old residents of QV own livestock.	No electricity in the gets water only 1 time a week and says water he is getting is not enough in lower parts of QV	He criticises the water users organisation for bad water distribution			
Willy Fernandez	3rd May	B	arrived there 18 years ago; wants to be a doctor	the family owns the restaurant, open only Sunday and holidays; now works in a hospital; takes 5-6 hours a day to go to and come back from where he works		huge issue with the water because same system but have 1,000 more families; have capacity to buy water because of restaurant	vegetation has changed a lot because tourists can go anywhere; lomas is damaged by livestock as well; not really interested in lomas, previously did cycling and saw them but not any more	population has changed a lot since he got there; association is not well organized and he sometimes doesn't know what they do and doesn't like that they sell more and more plots; previously part of football organisation		
Toriba Josefa	3rd May	B	has lived in QV for 8 years but has lived around area for 20 years	sells 10 chickens every week		talked about water use -- 6 cylinders	future vision is a lot of trees in QV and a lot of green	she hasn't participated in any water organization		
Ana	3rd May	B	Aquaponics woman; came to QV 16 years ago because interested in biodiversity in rural env; organic ag now; has 2 sons; learned everything from a lecture a year ago; all water recycling	Her ag is profitable; it is the solution for QV because it is a closed loop system; sells locally and for friends of friends		Main issue is water and wastewater; says there is a lot of diarrhea, digestive parasites, and dengue in water that affects elderly people and children -- says this is why QV is considered to be in extreme poverty	Problem in QV is growth in population especially in context of climate change; organization new association of ecological producers and entrepreneurs; we need to be worried about new expansion to the south; worried about new mayor			

Appendix 3. The questions and results of the workshop

Water Supply

- Where and how do you get your water?
- Does water supply constrain your activities?
- How do you improve water supply?
- Is it affordable?
- Who do you think has the most influence in improving the water supply?

Water supply from/by	Activities influenced	Ways to improve water supply
<ul style="list-style-type: none"> • well • trucks (summer) • surface (river) • reservoirs • groundwater • piped water • agricultural/ecological areas • once per 1 or 2 weeks 	<ul style="list-style-type: none"> • agriculture + livestock + irrigation • cooking + cloth-washing • hygiene + sanitation • entitlements to services: water, sewage, electricity 	<ul style="list-style-type: none"> • extended water reservoirs • pastilles for quality • less chlorines • collective action through unified communities

Use of Water

- What do you do with water in your house and what proportion of it is used for different activities? Who is in charge of the water management?
- How do you use the water in your house during the week? Do you use the water more than once?
- How do you think this can be improved?
- Who is in charge of the water (within the household)?
- Have you ever gotten sick from using the water?

Use of water	Reuse of water	Improvement
<ul style="list-style-type: none"> • household: bathing, cooking, drinking, cloth-washing, etc. • sanitation: toilets • housing construction • livestock • plants irrigation • women charge 	<ul style="list-style-type: none"> • <i>from</i> cloth-washing • <i>from</i> cooking • <i>for</i> shower • <i>for</i> toilets • <i>for</i> livestock • <i>for</i> garden 	<ul style="list-style-type: none"> • be prudent + increase awareness of saving water • hydroponics • bucket shower • carbolic soap • access to filters

Wastewater

- How do you manage the sanitary resources?
- Have you heard of using wastewater with alternative uses?

Management of wastewater	Alternatives of using wastewater
<ul style="list-style-type: none"> • palm trees • silos and truck services • banos secos (few) • lagunas de oxidation • through the CPR association 	<ul style="list-style-type: none"> • slow sand filter and composting toilets • saving groups

Appendix 4. Semi-structured interviews with different institutions at individual level

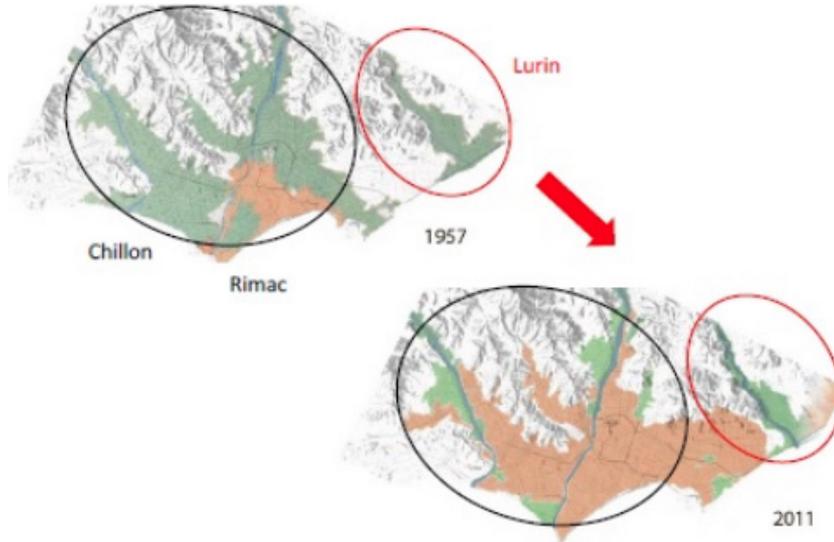
<p>Adolfo Herrera Pachacamac Municipality, Ecotourism Director</p> 	<p>Mr. Herrera explained the role of ecotourism in Pachacamac and Quebrada Verde. He was very positive about the many benefits ecotourism offered. He explained that the region offered sports activities such as rappelling, trekking, and camping, and that these activities could supplement hiking activities in the lomas because they could be offered year-round.</p> <p>He noted that there has been a 700% growth in tourists in Quebrada Verde in the past two years and encouraged a change in mindset that would allow residents to earn income from ecotourism year-round.</p> <p>He also encouraged more professional services be offered to tourists, such as hotels, which he found lacking in Pachacamac. He suggested that a good project for the region would be the development of public-private partnerships, such as a tourism agency that could include Quebrada Verde and the Lomas de Lucumo on one its bus circuits (all year round), and that could also contribute to developing new infrastructure.</p> <p>Mr. Herrera also criticized Cementos Lima. He said that while the company says it protects the environment and the valley, it makes walls and their activities affect tourists who come to the region to do sports.</p>
<p>Miguel Guizado Silveira Subgerencia de Planeamiento, Gestión e Información Ambiental, Metropolitan Municipality of Lima</p> 	<p>Mr. Silveira explained that the Ordinance 1853 was passed in 2014 to protect the lomas in metropolitan Lima (covering all three river basins). It provided a general outline of protection with technical conditions for use, management, and recovery.</p> <p>In his view, the tension between agriculture and urbanization was caused by informal urbanisation, and he considered territorial lines dividing land into particular segments for use as the solution. He saw land zonification as a way of mitigating the damage done by El Niño destruction. He was in favor of PLAM2035 providing for industrial land use, and considered moving industries to peripheral areas the best way to preserve the lomas.</p> <p>Mr. Silveira noted that the environmental department does not have an ecotourism office, but he wholeheartedly supported ecotourism as a method of environmental protection and as a way of getting to know a part of Lima that is not dry.</p> <p>He perceived water problems in Lima as stemming from an insufficient quantity of water, and was in favor of the pumping of water from the Atlantic Ocean.</p>
<p>Maikol Muñoz Oliveros IDMA, Facilitator and Agro- ecology Expert</p>  	<p>He described the Lurin valley as a dry basin with repression of water. In the 1980's there used to be a system for irrigation, which directed water from man made water channels in turns from the upper basin to the lower basins (<i>turnos de riego</i>). He said that with this system there used to be enough water for the farmers until the water flow and capacity decreased and some farmers didn't get enough water when it was their turn to get it. Afterwards the <i>La Autoridad del Agua Junta del Riego</i> started managing the water in the upper basin. In Pachacamac there is a combined system today of an irrigation system plus water channels. Water in the basin is managed by the mayors in the <i>Mancomunidades del Rio Lurin</i>.</p> <p>IDMA helps small scale farmers and farmers that practice urban agriculture with the commercialization of their products and helps them in the process of acquiring an organic certification, which is valid for Peru only. IDMA works on projects around urban agriculture with women that are pregnant and with women with children under 5 years of age. IDMA started an urban agriculture pilot project in 2006 and implemented the bigger scale project in 2008. The project started with the health center and women being concerned about the health of their children who suffered from bad nutrition and anemia. This was the starting point and how the topic of food emerged. Agriculture was therefore seen as a way to solve their own issues. As a result Red Prausa came into existence in Quebrada Verde, Pica Piedra and Manchay.</p> <p>Maikol identified Villa Maria as an interesting case study for community urban agriculture. Their inhabitant's organized community gardening in public spaces because they lacked space on a household level. They convinced an electricity company to let them use the free space around the electricity towers for urban agriculture. The community gardens are successful, however Maikol mentioned that a reason for this is partly because people were more or less forced to collaborate because of own land constraints and he sees this as a main driver for the success in Villa Maria.</p> <p>He also mentioned that in 2008 food production should have been included in the Development Plan of Pachacamac. This however did not happen because local authorities had their focus rather on ecotourism.</p>
<p>Alfonso Salcedo Rubio - Former Presidential Advisor and Director of the Water Committee of the Lurin Basin for three terms.</p>	<p>Water is the critical element of the table of the Lurin Basin. He said: "On top of the political geography of a region, there is a physical geography that needs to be understood" The main aim of the Committee is to insert the physical criteria of the region in the political agenda. In this way, all the Municipalities should agree on the management of water and work together in projects for the reuse and recycle of water in the basin.</p> <p>When was the Committee created and why? The table was created in 2007 due to a social conflict between a community in the medium basin and higher basin. People from the higher basin were</p>

	<p>protesting because the people from the lower parts were taking their water. Solution: The water table was conformed to the 12 Municipalities of the Lurin Basin and projects for the cultivation of water started in the higher basin. They started building water reservoirs in the higher basin using ancestral techniques, also, they started with reforestation projects.</p> <p>What are the major difficulties that the Committee has faced? The major difficulty is the different interests of the Municipalities that change every time the Major changes. Some of the projects that were thought at the beginning haven't been implemented because of the lack of continuity. In addition, the medium and higher parts formed Mancomunidades which included the social participation of the community. Although, the lower basin has not created their own Mancomunidad. The communication between the three basins is fragmented. What needs to be understood is that the water is the key element to articulate all the basin.</p> <p>Process of Urbanization and Promotion of Local Economy The process of urbanization in Lima Sur has reduced a lot the agricultural land in the lower basin, although, in the medium and higher basin, agriculture is still present. Today, Lurin is part of Lima, and what was used as agricultural land before, is now part of urbanization or industrialization land. The major problem of this, is the loss of cultural identity.</p> <p>How can this be solved? It can be solved through the promotion of local economy, for example "Experimental Rural Tourism" (Turismo rural vivencial). The communities should sell the products to the tourists including food and handicrafts. Also, they should offer the option for tourist to stay at their houses and participate in their everyday practices (e.g milking cows, taking care of animals).</p> <p>Do you think that the tourist activities could increase water scarcity? No, because it will respect local practices and will not include fancy accommodation.</p>
<p><i>Gladiz Macizo - Technical Secretariat of the Lurin Basin - Housing Ministry</i></p>	<p>The Water Committee for the integrated management of the Lurin Basin includes the 12 Municipalities of the Lurin Basin which are located along the river in the lower, medium and higher basin. It tries to promote a sustainable management of the water to reduce the water stress of the basin.</p> <p>During the rainy season, the idea is to store water in dams in the upper part of the basin. Also, to manage water with the ancestral techniques to reduce erosion and loss of water. e.g The ancestrals used water channels for irrigation.</p> <p>The water scarcity problem, needs to be tackled from the upper basin, because it is here where the water births are located.</p> <p>There has been projects for Adaptation to climate change in the Lurin Basin. The projects were supported by the CAF, WB.</p> <p>What do you think about the urbanization process and agricultural land in the Lurin Basin? The agricultural land is being displaced because of the urbanization process. Today, agriculture in the lower basin is precarious and people should diversify their income, for example with the promotion of tourism. The agrarian zone is in the medium and upper valley.</p> <p>We need to understand that what we are seeing in the Lower Basin, will disappear in 5 years because the urbanization and industrialization projects. This is part of the transformation of the city, and is a natural processes of urbanization, as it has been throughout the whole history of the city. The economic model of the area will change for other purposes and people will find jobs in other economic sectors.</p> <p>The investment plans of the Housing Ministry took into account the water availability for urbanization and industrialization processes. The current situation is not as dramatic as it has been said.</p> <p>On the other hand, the local communities should not wait for the government to protect their resources. They have the potential to do it by themselves. For Example, the community of Villa María del Triunfo is using "atrapanieblas" to catch water for agriculture. The problem with the government is the long time it takes to implement an ordinance. For example, the former mayor Susana Villarán, created the ordinance to protect the ecological infrastructure of the Lurin Basin. However, this ordinance hasn't been implemented.</p>
<p><i>Rosalía Dávila - Junta de Usuarios del Distrito de Riego de Lurín y Chilca</i></p>	<p>The "Junta de Usuarios del Distrito de Riego de Lurín y Chilca" was created in 1982. It is conformed by the users of the agricultural land in Lurin and Chilca. It managed the water resource for agriculture. Every time a farmer wants to plant something, he needs to go to the Junta and give and advice of the water quantity he will use. Then, they can estimate the water that will be used during every season.</p> <p>The agrarian sector does not have enough support from the government. There is a huge proliferation of real estate companies in the lower basin of the Lurin River.</p> <p>The different Ministries of Peru are not working towards the same objective. For example the Ministry of Agriculture has different interests than the Mining Ministry. All the ministries should take care of the water resource, because is fundamental for all the activities. Today, the water quality in the lower basin is very poor the industries dump the waste water without any treatment.</p>

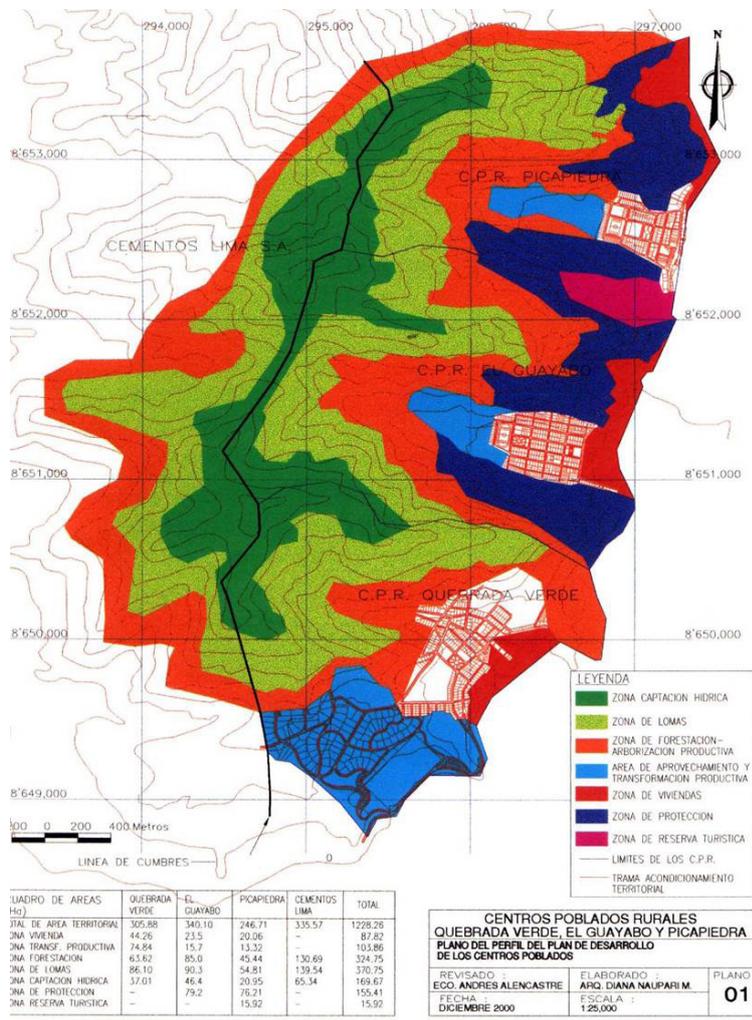
	<p>Moreover, the municipalities in the Lurin Basin are not coordinated with the management of water. The only way to reduce water scarcity is to protect water in the upper part but also to stop the urbanization process in the lower part.</p> <p>The National Authority of Water (ANA) is not clear with the legal framework for the management of water. The regulations are not respected by any actor. The legal framework includes: Law 3057 and Law 2938.</p>
<p>Carlos Franco - Red Agua Segura</p>	<p>The Lurin Basin is divided in 3 sub-basins: High, Medium and lower basin. The problem with the management of water comes from the fragmentation between the sub-basins. There is an urgent need to better coordinate the different authorities involved in the basin, to have an harmonic management of the water.</p> <p>There is a lack of public policies for the management of the Lurin Basin which difficult even more the management of the water. It is not clear how much water is available and how much can be used. Moreover, the industry sector is the one that receive more advantage in water distribution.</p> <p>Another problem with water supply is the problem with the land titles.</p> <ol style="list-style-type: none"> 1. Every time there is a confrontation between a land owner and a land trafficker a legal process starts. This process can take a lot of time. During the legal process, any authority can intervene. In this way, SEDAPAL will not be available to put the water supply, until the legal process is ended. 2. SEDAPAL is not allowed to put water supply for plots with more than 500 m2. This plots are considered for other use different than household. E.g. In QV there are a lot of plots with this size. People are sub-dividing this plots which will intensify the urbanization process. <p>In the Lurin Basin, there are a lot of groundwater wells that are already dry and that even have sea water. Ideally, in order to have a well you should have a permit. Even though, there are insufficient policies to control water extraction.</p> <p>The housing ministry is also part of the problem. It is focus on urbanizing the South of Lima. The ordinance 1841 allows the inclusion of the Lurin in the Urban area of Lima. The Lurin Basin is dominated by the real estate interests, by groups with high levels of power and by high class people. The support that the Major of Lima gives to the Municipality of Pachacamac is little.</p> <p>How do you think this situation can be solved?</p> <p>The Lurin River has water but does not have enough management. In all, it's a problem of governance that should be solved through the strengthening of institutions and creation of more spaces for dialogue between actors. The first thing to improve is communication.</p>

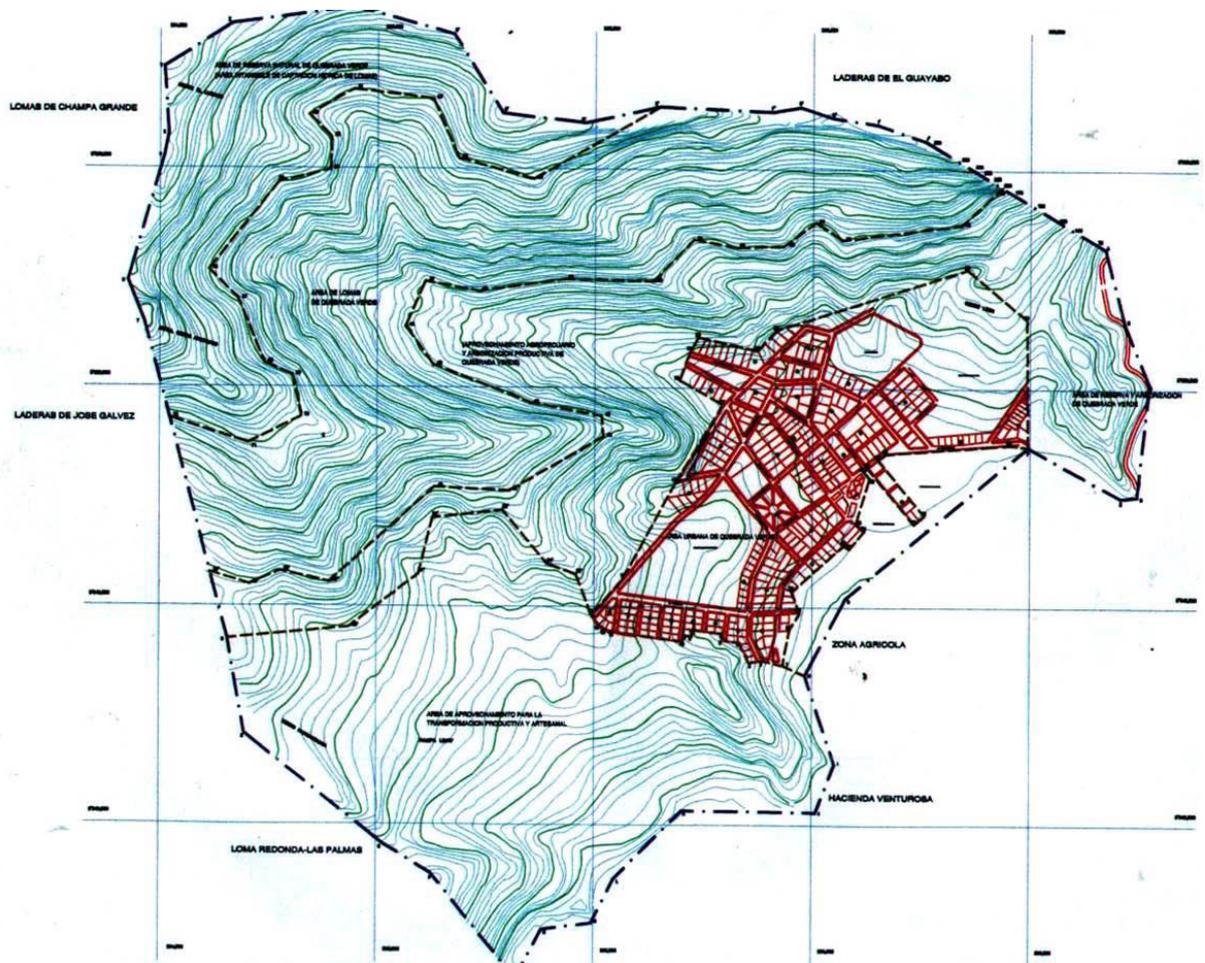
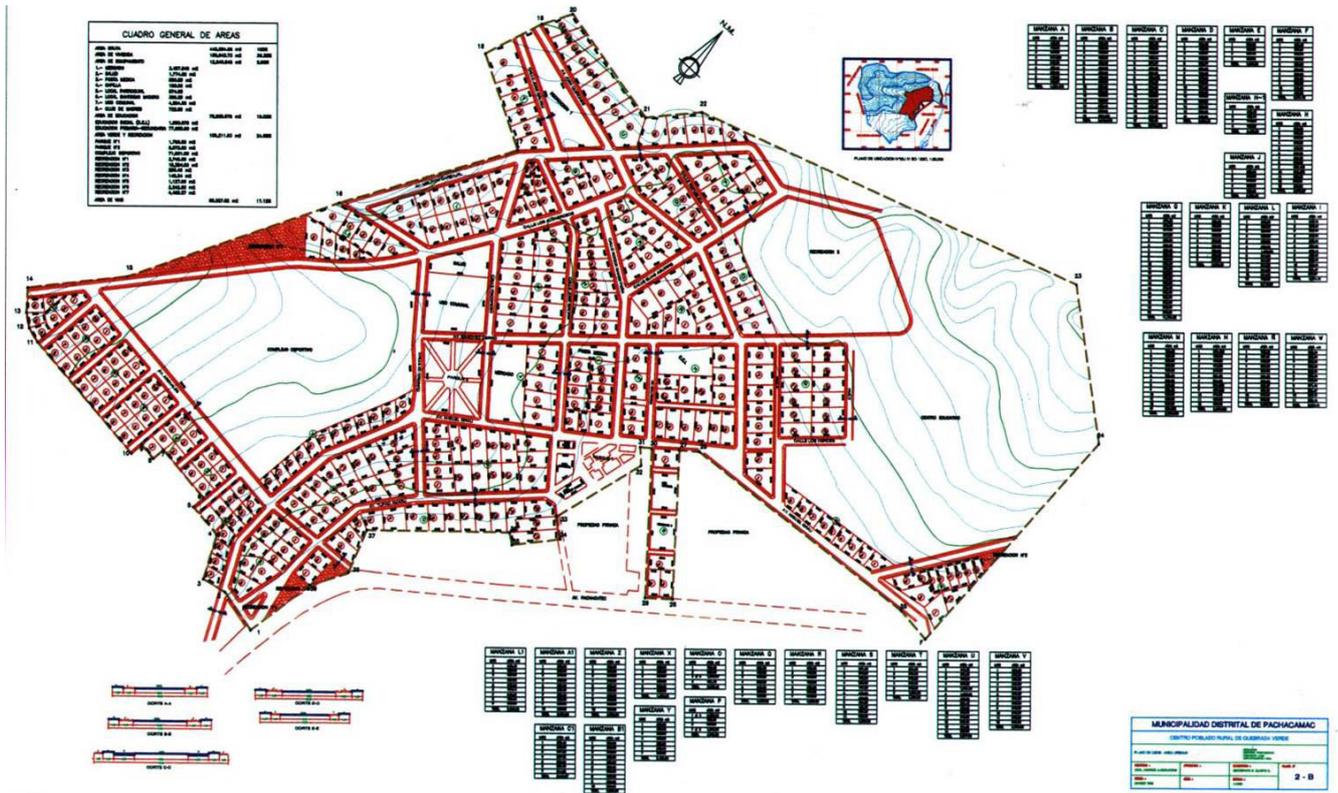
Appendix 5. Additional Pictures/Photos

Gradual disappearance of the three valleys of Lima. Source: Eisenberg and Poblet, 2013.



Development Plan of Pachacamac & CPRs & QV (respectively). Source: Municipality of Pachacamac, 2008.





Green Valley (source: Authors, 2015); Lurin River. Sources: Authors, 2015.



Appendix 6. Methodology

Transect Walks with Semi-structured interviews (sources: Authors, 2015)



Appendix 7. Historical Context of Quebrada Verde

Urban expansion of QV from 1910 to 2008. Sources: Chong, 2009.



Appendix 8. Water Provision and Management

Water container and pot in QV; One of the first wells in QV. Sources: Authors, 2015.



Canal running along parallel to the river. Sources: Authors, 2015.



The broken sewage pipe in QV. Sources: Authors, 2015.



ESD Students Report - DPU

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