

University College London
The Bartlett Faculty of the Built Environment
Development Planning Unit

**Cartographic Calculation and Coordination
in the Urbanisation of the Peripheral Slopes of Lima**

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for the degree of Doctor of Philosophy in Planning Studies
London, 2019

Declaration

I, Rita Lambert confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

..... 2019

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Abstract

The urbanisation of the peripheral slopes of Lima is often referred to in official discourse and the media as an informal/illegal process driven exclusively by the urban poor. However, a close examination of such process defies its understanding as occurring beyond the State, in violation of planning laws, or in the exclusive domain of the poor's agency. Instead close engagements with regulatory frameworks and spatial outcomes compliant with planning norms are central features, since such practices shape local dwellers' entitlements to basic services, as well as their expectations on securing tenure.

Notwithstanding that the slopes have been declared uninhabitable high-risk zones by the State, their occupation is occurring at an unprecedented rate, exposing an increasing number of inhabitants to hazardous living conditions. The thesis examines how and why this mode of urbanisation is enabled and sustained. In so doing, it offers analytical and methodological insights into contemporary urbanisation processes across the Global South.

Borrowing from actor-network theory and institutional ethnography, the research takes a relational and socio-material perspective. It focuses on cartography - the maps and plans used on the slopes of Lima- to provide a transversal reading across 'black boxed' actors such as the 'State, 'communities' and 'land traffickers', and observe the engagement with the regulatory frameworks. Through an ethnography of cartographic practices, the thesis provides a novel methodology for bringing into view the processes, practices, alliances, and agency which are often invisible to policy makers, yet structure outcomes.

The thesis demonstrates that peripheral urbanisation and planning need to be considered as socio-technical assemblages that have numerous and unexpected ways of interlinking. Unintended consequences, such as the production of risk, are outcomes of these assemblages. Consequently, planning research could do more to consider the technical as much as the political aspects of planning and interrogate the agency of materiality in urban processes. For policy makers and planners, a better understanding of the socio-technical configurations can guide their actions to rearrange these toward progressive agendas.

Impact Statement

The research presented in this PhD thesis is expected to be of value to academics working on urban planning, informality and urbanisation, through contributions made to: a) existing debates, b) methodological approaches applicable for interrogating urban processes and planning in different contexts and at different scales; c) informing future research agendas.

The research is also relevant for planning practitioners and policy makers as it provides distinct and policy-relevant contributions by: (a) understanding the relationship between regulatory frameworks, practices and outcomes and how these can give rise to paradoxes that go against intended objectives to produce undesired consequences such as risk; (b) developing a means to observe the micro-politics at play in planning; (c) raising awareness of the importance of considering non-human actors in structuring practices and outcomes; (d) providing entry points to disrupt the production of hazardous living conditions and devise paths towards a better quality of life and environment.

The research intersected in numerous ways with three DPU-led participatory action research projects: Remap Lima, cLima sin Riesgo and Learning Lima which were undertaken in close collaboration with three local NGOs as well as local communities. Consequently, a broad range of stakeholders were reached, from poor women and men, state agencies, infrastructure utilities, academics and students to question assumptions on the production of urban risk and to identify alternative action pathways. The involvement of local leaders has increased local awareness and provided an understanding of the challenges in human settlements in relation to the production of risk.

Findings from the study have already been disseminated through several published papers as well as through teaching engagements at postgraduate level, international workshops, seminars and conferences. Further publications are planned, particularly to share insights into the conceptual approach and the methodology applied alongside a sustained integration of the acquired knowledge into educational activities. In Lima, the dissemination of research findings among policy makers and practitioners to inform better policy and practice is intended through existing contacts and NGO partners.

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Accronyms and Abbreviations

AF	<i>Agrupacion Familiar</i> - Community Organisation
ANT	<i>Actor-Network Theory</i>
CIDAP	Centro de Investigación, Documentación y Asesoría Poblacional
COFOPRI	<i>Comision de Formalizacion de la Propiedad Informal</i> - Commission for the Formalisation of Informal Property
COOPOP	<i>Sistema Nacional de Cooperacion Popular</i> - National System of Popular Cooperation
CRAV	<i>Comisión para la Reforma Agraria y la Vivienda</i> - Commission for the Agrarian and Housing Reform
DESCO	Centre for the Study and Promotion of Development
DPU	Development Planning Unit
DRM	Disaster risk management
EMCI	<i>Empresa Municipal de Catastro Integral</i> - Municipal Office for the Integrated Cadastre
ENACE	<i>Empresa Nacional de Edificaciones</i> - Nacional Construction Company
ESD	MSc in Environment and Sustainable Development
ESRC	Economic and Social Research Council
FONAVI	<i>Fondo Nacional de la Vivienda</i> -National Housing Fund
IE	Institutional Ethnography
IGN	<i>Instituto Nacional Geografico</i> - National Geographic Institute
IMP	Instituto Metropolitano de Planificación - Metropolitan Institute of Planning
ICL	<i>Instituto Cadastral de Lima</i> - Cadastral Institute of Lima
INDECI	<i>Instituto Nacional de Defensa Civil</i> - National Institute for Civil Defence
INEI	<i>Instituto Nacional de Estadística e Informatica</i> - National Institute of Statistics and Informatics
INVI	<i>Instituto Nacional de Vivienda</i> - National Institute of Housing
JCM	José Carlos Mariátegui
JNV	<i>Junta Nacional de Vivienda</i> - National Housing Board
MEF	Ministerio de Economía y Finanzas - Ministry of the Economy and Finance
MML	<i>Municipalidad Metropolitana de Lima</i> - Metropolitan Municipality of Lima
MSJL	District Municipality of San Juan de Lurigancho
NGO	Non-governmental Organisation
ONDEJOV	<i>Oficina Nacional de Barriadas</i> - National Office for Barriadas
ONPU	<i>Oficina Nacional de Planeamiento y Urbanismo</i> - National Office of Planning and Urbanism
OV	<i>Organizaciones vecinales</i> - Neighbourhood Organisations
PUI	<i>Proyectos Urbanos Integrales</i> - Integral Urban Projects
SAN	<i>Servicio Aerofotografico Nacional</i> - National Aerophotographic Service
SEDAPAL	Governmental water utility company
SINAGRED	<i>Sistema Nacional de Gestion del Riesgo de Desastres</i> - the National Disaster Risk Management System
SINAMOS	<i>Sistema Nacional de Movilización Social</i> - National System for Social mobilisation
SJL	San Juan de Lurigancho
SNA	Social Network Analysis

STS Science, Technology and Society studies
SUNARP *Superintendencia de Registros Publicos* - Public Registry
UCL University College London
UPIS *Urbanizaciones Populares de Interes Social* - Low-Income Social Housing

Chapter 1 Introduction

1.1 Introduction

1.1.1 The telling lines on the ground

The staircase stops dead and gives way to bare earth and rocks, even though there are still more houses on either side of the future steps indicated in chalk that lead further into the steep desert. Emilia, the secretary of Portada de Belen- this settlement which marks the end of the city- walked ahead of me. Light on her feet and wearing flip flops, she moved fast, swinging the rolled-up plan held in one hand. The dust rising with every step she took, I stayed a few meters back, struggling to keep up, slipping, sliding, scanning the bare ground for something to hold on to, to heave myself up. Only rocks and loose earth, some better lodged than others. We arrive at the top, a vantage point which allows me to take it all in at once. Here, in the periphery of metropolitan Lima, where the hills meet the sky, a patchwork of colourful houses and newly constructed cabins drape the valleys and slopes. A few meters from where I am standing, a man and a woman are working the land, breaking rocks, shifting earth, flattening the ground, to make way for a house and a life here. Beyond them, the city lies shrouded in a haze of brown dust suspended in microscopic droplets. On the right, the land is torn open, exposing the lighter earth of a rudimentary road. Ahead, where the slope seems to go on no more, a tall snaking wall rises abruptly. Defensive, it delimits the land for a future private university campus planned right here in the middle of the desert. Behind me, the slope continues up, populated by make-shift cabins that, they say, have appeared in the dead of night. They are the work of land traffickers who have claimed the land and will soon sell it off. An unapologetic grid is drawn with chalk on the ground: straight lines, even through large rocks. A similar grid is stamped on many of the slopes in the horizon, marking what is to come. Like many of the settlements here, with their staircases seemingly heading up to the sky, this grid will hold the hopes of many of the men and women in Lima who have no option but to make this place liveable. At my feet there are lines of stones, lines of chalk, and lines drawn by tracing on the earth, all somewhat colliding at different points. Emilia unfolds the plan, pointing at the layout of their expanded settlement: "You see, we've had our engineer draw the layout already, and then we drew it on the ground with chalk. But the others came and placed these stones. They say they also have their own plan already recognised and certified by the municipality. If that is really the case, we will have to retreat and amend our plan. It's difficult to go against these traffickers... also because some of our leaders have been bought with the promise of a plot" (extract from a transect walk with the secretary of Portada de Belen, José Carlos Mariátegui, February 2013).

The observations above, as well as Figure 1.1 and 1.2, captured during one of my first encounters with the peripheral slopes of Lima, provide the starting point for this thesis.

Figure 1.1: The land traffickers' cabins that mushroom in the dead of night in José Carlos Mariátegui.



Photo © R. Lambert (2013)

Figure 1.2: The colliding lines on the ground made by land traffickers and settlement leaders in José Carlos Mariátegui.



Photo © R. Lambert (2013)

1.1.2 The extensions of the extensions in Lima

The focus of this thesis emerged while I was undertaking research in 'the extensions of the extensions', areas on the peripheral steep slopes that keep growing beyond what is considered the edge of Metropolitan Lima. The occupation and construction of neighbourhoods on the slopes is one of the most significant urban phenomena in the last three decades (Limapolis, 2016) which is not only found in Lima but also in other Peruvian cities and the Latin American region. In the absence of affordable land in the city, this mode of urbanisation is a way in which the majority of the urban poor currently access housing, leading to a wave of peripheral expansion (De Mattos, 2002). In Lima, this precarious form of occupation has emerged and grown particularly in the last 25 years during a period of 'seismic silence' with no major earth movements since 1974 (Laos, 2016). Also, landslides are relatively few because of the limited rainfall in Lima's desert conditions contributing to the viability of the occupation of the steep hills. The typical settlements that are formed on the hillsides (Figure 1.3) currently extend over a vast area of the city. In 2016, it was estimated that 30% of Lima's population lived on slopes that are deemed as 'high risk' by the city's authorities (Laos, 2016). This is approximately 2.8 million inhabitants who are disproportionally exposed to the hazards inherent in this form of urbanisation, and who have to incur considerable efforts and investments to make the area habitable (Allen *et al.*, 2017). On a daily basis, inhabitants face health risks stemming from the lack of basic services which might take many years to obtain. Moreover, they have to live with difficult access because of the steep terrain, the risk of building structures collapsing due to their precarious construction, and the danger of rock falls from the continuous opening of new roads and the occupation of areas further upslope.

The competition for land is rife in these areas. Despite the slopes being declared high-risk zones by the central government, the urbanisation is occurring at an unprecedented rate and the planning authorities routinely approve the regularisation of settlements. These areas, where human settlements are being established in increasingly difficult physical conditions, provide the context for this PhD (Figure 1.3 and 1.4).

Figure 1.3: The urbanisation of the steep slopes at the edge of the city in José Carlos Mariátegui - district of San Juan de Lurigancho, Lima.



Photo © R. Lambert (2013)

Figure 1.4: Difficult access and precarious conditions characterise settlements at the interface between the city and the desert in José Carlos Mariátegui.



Photo © R. Lambert (2014)

I first came to 'the extensions of the extensions' in 2012, while accompanying students from the MSc in Environment and Sustainable Development at the Development Planning Unit (DPU)-University College London (UCL). I subsequently travelled frequently over the next five years to undertake a number of activities for several DPU-led action research projects as well as my own PhD research. Between my visits, with intervals of a couple of months, I was most struck by the speed of urbanisation. Entire settlements would come to life on the steep desert slopes: a testament to human engineering and resilience, and to the belief that anything is possible. When I pondered how inhabitants of a settlement with only one very difficult and extremely steep pedestrian access would manage the everyday tasks of carrying building materials, water and daily necessities up the slope, they would tell me: "*We will build a road through these rocks!*". Sceptical that this was even a viable solution, I was astonished upon my return a few months later to find the collective works on Sundays dedicated to breaking large rocks, making way for the imagined road.

Progress is seen as just a matter of time and there is a strong belief, collective as much as individual, that after the occupation of land, staircases, roads, water and land titles will follow. My encounter with a blind lady is but one of the many instances that make this hope tangible. She tells me that she was raised by the nuns for being born blind, and that during her time in the convent, she was given the task of feeding and looking after the rabbits and chickens. She now wished to live on the plot she had just bought and raise her own animals. I followed her to her plot together with her guide. It was located high up on the slope, at the furthest edge of the still undeveloped settlement on barren desert land. Once there, feeling the ground on her hands and knees, she started breaking the rocks and digging at the earth with a metal rod in an attempt to flatten her plot.

The story of these areas is without doubt one of pioneers and auto-constructors¹. But it is also that of many other actors: the speculators or so called land traffickers who capitalise on these areas by claiming desert land, subdividing and selling to those in need of housing; the technicians and the engineers who come to work in these areas supporting various development processes; and the authorities and politicians at different levels of government who deliberate as to what should happen with such processes and places that they discursively position as out of their control.

¹ Auto-constructors is a term translated from the Spanish word '*autoconstructores*' which is often used in the Latin American context to refer to the residents that build their own houses and neighbourhoods. Auto-constructed settlements are those that emerge primarily through the efforts of inhabitants.

Various officials interviewed for this research frame these areas in the periphery of Lima as 'lawless' and 'no man's lands' where the practices of land traffickers, disenfranchised peasant communities and those seeking a place to dwell in the city converge. The geographic remoteness and somewhat 'hidden' nature of the activities on the hillsides is frequently presented as one of the barriers to State intervention. The urbanisation of the slopes is therefore often misunderstood as a process altogether separate from the State, working 'outside' of the planning system, and criminalised for violating property rights and zoning laws.

Three observations in the field, captured in the extract I presented at the beginning of this chapter, stand in contrast to this dominant framing of areas in the periphery of Lima as lawless and have shaped the focus of this thesis. Firstly, contrary to the belief that this is an entirely independent process, formalised interactions with State institutions and the planning system are entrenched, facilitating the establishment of settlements, their recognition and access to services. They are therefore not consolidating outside of the planning system but enter into dedicated planning processes.

Secondly, the settlements on the slopes evolve through a careful consideration of the urban planning norms and regulations which are encapsulated in the adoption of a gridded layout respecting the expected dimensions of streets and plots. The planning standards are 'performed' by the inhabitants and speculators alike from the onset.

Thirdly, technical plans and maps, in line with conventional planning standards, are important and operative throughout the various stages of the urbanisation process. Not only do these coordinate actors within the planning sphere (such as municipal officials, engineers, technicians within utility companies amongst others) but they are also incorporated in the practices of the various actors operating outside public institutions (such as settlement leaders, and land traffickers).

These initial observations indicate that the urbanisation of the slopes is an outcome of the interactions amongst different actors, operating to claim and defend territory, as well as being a result of extensive engagements with the regulations, instruments such as maps and plans, institutions and procedures of the planning system.

As I embarked in this research, the following questions were on my mind: if the urbanisation of the slopes is partly an outcome of a close engagement with planning professionals, instruments, protocols, procedures of implementation and enforcement, how is it enabled and sustained in the peripheral slopes that have been zoned as uninhabitable and high-risk? Why is

it that despite the inputs from professionals, and inhabitants who have embodied experience and knowledge of the dangers of living in these conditions, undesired outcomes such as the exacerbation of risk are not 'designed out' but have rather become inherent in this form of urbanisation? And how might research into these pervasive processes guide the actions of policy makers, planners and auto-constructors to disrupt the exposure of an increasing number of inhabitants to such dangerous living conditions?

These initial questions have broadly shaped this thesis and led me to focus on the link between regulatory frameworks, practices and outcomes. The outcomes I mainly refer to relate to the production of risk. I understand risk as the interplay between hazards and the vulnerability of people over their coping capacity (see Allen *et al.*, 2015c).

Acknowledging that there are different conceptualisations of risk and being aware of the extensive literature on urban risk governance that has helped to frame risk as a socially constructed process (see for example Lavell, 2012; Oliver-Smith *et al.*, 2016; Pelling, 2012; Rebotier, 2017; Wisner *et al.* 2004), I have here limited my interrogation through a risk lens. I have taken this decision in order to change the entry point for the research, since the various other projects I have been part of (as shown in Figure 3.1) have focused on risk governance and risk accumulation cycles. In this thesis, I place emphasis on the interaction between regulatory frameworks and practices seeking to understand different facets of peripheral urbanisation. I engage with the discursive/constructivist conceptualisation of risk when it evidently came through in the way my interviewees framed risk. In most parts, I focus on a limited aspect of risk as an outcome, thus emphasising the essentialist/realist conceptualisation of risk. Hence, I look at how the interplay between regulatory frameworks and practices determines the spatial layout of settlements in a manner that makes physical access difficult, leading to the risk of falls, rock falls and building collapse; as well as impacting inhabitants' vulnerability, decreasing their coping capacity as they have to incessantly invest even-increasing amounts of resources (income, time and labour) to mitigate the risk that comes with the continuous occupation of the slopes (Allen *et al.*, 2015c; Lambert and Poblet, 2015)

I seek to examine the practices of different actors who play a role in the urbanisation of the slopes as well as the nature of their engagement with the planning system to understand what occurs in this interaction to lead to intended and unintended spatial outcomes. This PhD endeavours to cast light on the actors, relations, processes and practices that are not always visible yet play an important role in supporting the urbanisation process. To arrive at a

transversal reading, that is, a reading that cuts across notional entities, the thesis develops a novel approach starting with cartography. It focuses more specifically on the maps and plans that circulate in the study area, such as the one Emilia holds in the extract at the beginning of this chapter, and are widely used by different actors as well as being important for staking land.

The thesis undertakes an ethnography of cartographic practices as a productive lens to expose the micro-politics at play in the urbanisation of the slopes, and to understand how the production of risk is enabled and sustained. The thesis arrives at the understanding that risk is an outcome of planning and not of its absence. This provides a counterpoint to much of the planning literature that positions planning as a rational activity leading to desired outcomes and addresses the misconceptions that undesired effects are marginal to planning and have little to do with it. Because planning and auto-constructed settlements are socio-technical assemblages that intersect in numerous and unexpected ways, they precipitate outcomes that are not fully controllable. Overall, the thesis contributes to the planning literature by developing an analytical and methodological approach based on an original cartographic analysis suitable for interrogating urbanisation processes, not just in Lima but elsewhere across the Global South.

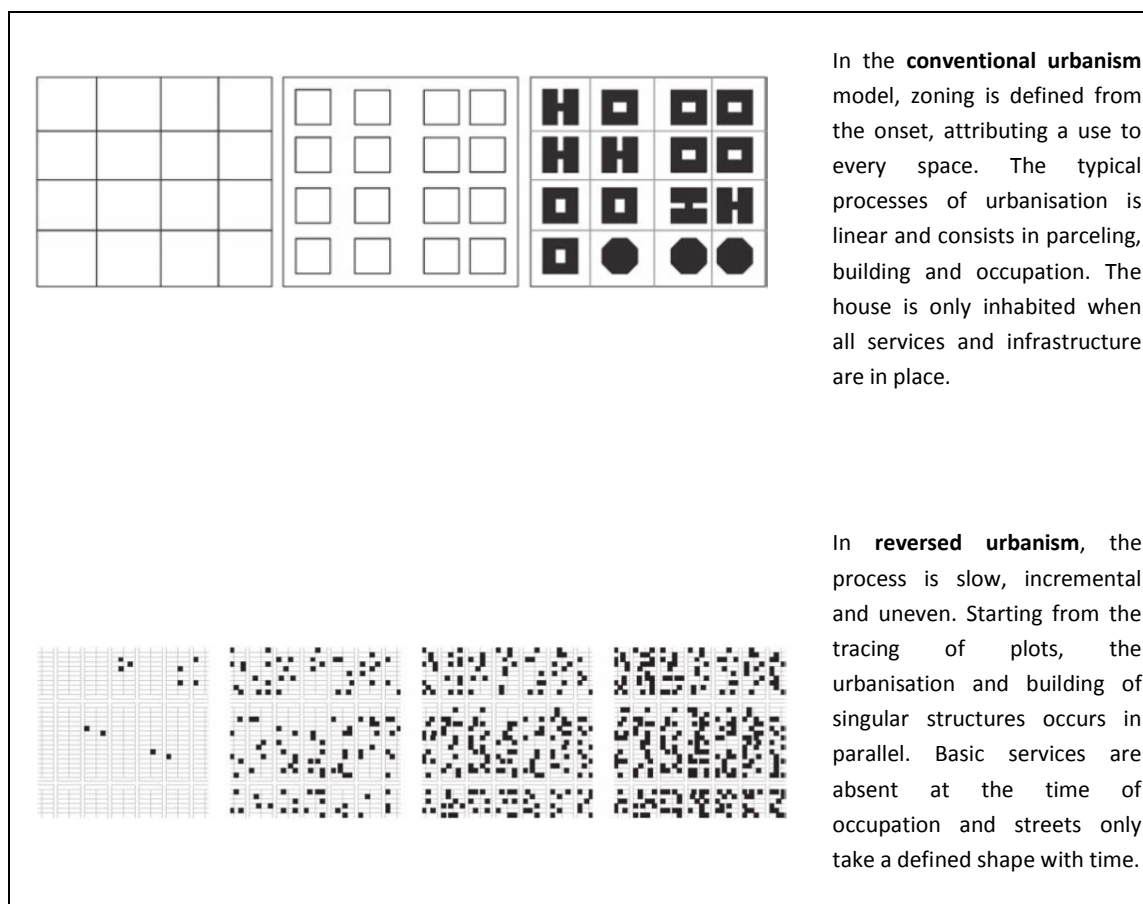
In the following sections, I will first give a background to the way auto-constructed settlements develop on Lima's slopes and explain why the approach through informality is inadequate to gain a better understanding of how they come about. I then briefly locate the case of Lima within the existing scholarship that examines the relationship between auto-constructed settlements and 'formal' institutions and processes. I highlight the contributions made by this thesis and present the research design, and finally give an outline of each chapter in this thesis.

1.2 The case of Lima as a fertile ground for interrogating planning

1.2.1 The modalities of land occupation

The urbanisation of the slopes typically comes about through reversed urbanism, a term used to explain urbanisation which emerges from the ground up, through a slow and incremental process (Figure 1.5).

Figure 1.5: Conventional and reversed urbanism models.



Source: Sáez (2009) found in (Giraldez, Calderón and Peña, 2010)

Auto-constructed settlements can occur on different types of land and through different modalities. There are three property ownership types: **state, communal lands and private**. Depending on what kind of land the *barriada* develops, it relates differently with municipal planning processes.

In the case of **government land**, there are mainly three main modalities for how auto-constructed settlements are first established: **invasion, gradual formation and government authorisation**.

Invasions refer to the seizing of land by a large organised group. Historically, invasions have often occurred at night, on an agreed date (Matos Mar, 2010). The law states that if an occupation goes uncontested after 24 hours, the occupants become *posesionarios* or 'holders'. This mode has been the main form of land acquisition in Lima (Turner, 1969; Collier, 1976; Dietz, 1977) and is common amongst pioneers' accounts. A historical analysis shows that 90% of invasions happened on barren government land. It was deemed easier than to occupy private land since no one was directly being affected and a reaction was less likely (de Soto, 1989). Although some invasions or 'land grabbings' have been framed as an assault on

property rights and were physically violent, not all have been accompanied by conflict. Many have occurred in a peaceful, organised manner and have been tolerated over time (Matos Mar, 2010).

Gradual formation means that there is not a defined moment at which a substantial group of families occupy the land; rather families join in a slower process to form settlements (Riofrio, 1991). As for **government authorisation**, it can be official or unofficial as illustrated by Mangin (1967, 1970), Turner (1969) and Dietz (1977). In some cases, there is an unofficial indication from government officials that a piece of land is available. In historical cases, government authorisation might have been given through official means with a special decree or law. In these instances, people have been taken in army trucks as a group and left in the desert to start the settlement (Matos Mar, 2010). In the last decades, all invasions have had some government support (Caria, 2008) and are not entirely independent since information about available pieces of land, as well as the establishment and consolidation of the settlement is more often than not facilitated by authorities, either acting as individuals or in their institutional roles (interview with official from Ministry of Housing, October 2015).

With *barriadas* forming through invasion on government land, the extralegal system allows invaders to possess the land, build on it, and even use it for economic purposes, but it confers imperfect and relatively vulnerable rights (de Soto, 1989, p. 27). Therefore, settlers reinforce those rights by dealing with the government. A dedicated municipal process, called *Saneamiento Físico Legal*, works with the reversed urbanism model, allowing settlements to acquire recognition, basic services and even land titles provided they were established before the stipulated cut-off date for formalisation. Invasions on government land and the formation of *Agrupaciones Familiares* (AFs) or community organisations are explained in detail in Chapter 6.

Communal land is by definition '*intangible, indivisible and imprescriptible*' according to the 1993 constitution, and is therefore non-urbanisable (Riofrio and Cabrera, 2010, p. 60). However, this type of land is being illegally subdivided and occupied to form the same kind of *barriadas* that occur through invasion on government land. There are different ways through which settlements come about on communal land. Motivated by the genuine need to secure a place to dwell, organised groups can grab land. Others do so, driven by a speculative logic and, acting as informal real estate brokers, subdivide and sell land to those in need of housing. Interviewees have also explained that, in many cases, communal land is unlawfully subdivided and sold by the peasant community leaders themselves. An illegal process exists whereby

communal land is turned into private land through the falsification of documents or land ownership transfers. Often this activity is connected to land traffickers who supposedly 'buy' large areas of land from the peasant community and through a real estate model establish *barriadas*. This modality on peasant community land is covered in Chapter 7.

Barriadas on **private land** can either be through land grabbing or, as explained above, they are in effect on communal land which has been illegally privatised. Developers or informal real estate brokers set up a cooperative or an association 'for housing' or 'of housing' (de Soto, 1989, p. 32; Riofrio, 1991, p. 34). They invest in opening up roads and subdividing plots. Notwithstanding that any development on private land has to, by law, follow the conventional urbanism model with infrastructure and buildings in place before people move in, settlements emerge through the same reversed urbanism model as on government land. Although a dedicated municipal planning process, called *Habilitaciones Urbanas*, must be followed in the case of private property development, it is by-passed when establishing *barriadas* as explained in Chapter 7.

Whether auto-constructed settlements form on government land, communal land or private land, the outcome is the same; that is, the same spatial layout is adopted and the responsibility for the acquisition of services and the amelioration of communal and individual areas is transferred to residents. In all cases, development occurs through a slow, incremental and uneven process.

As explained by the different modalities above, there are a range of actors that play a role in establishing settlements on the high-risk slopes of Lima. Organised groups driven by genuine need might come to live in an area and establish the settlement through 'invasion'. With time, inhabitants living on the lower parts of the slope might claim a plot either for their children or as an accumulation strategy further up the slope. Invasions are also linked to so called 'mafias', 'large-scale land traffickers'² or 'pirate subdividers who claim a piece of land and fictionally 'invade' it. A group of people is appointed to build a few huts and safeguard the land until it is parcelled and sold to buyers. In some cases, a link is established with existing settlements to avoid conflict while in others, the large-scale land traffickers operate independently and use force should existing inhabitants take any actions to oppose the occupation.

² Recent media accounts link most invasions with land trafficking and mafias and this typology is explicitly referred to in the penal system as usurpations (artículo 202 de la Ley N° 30076) (El Peruano, 2015).

Although the current urbanisation of the slopes follows a similar pattern since the 1940s, there is an increased dominance of land traffickers in the present time. As such, it is the private development model which is responsible for the fast urbanisation of increasingly larger areas of the slopes (Interview with official from Ministry of Housing, April 2014).

1.2.2 The development stages of settlements and their engagement with the planning system

Auto-constructed settlements, as a form of incremental urbanism, have been acknowledged and integrated into the planning system in Peru since the 1960's with the *Law of Barriadas* №13517, which enables the physical and legal formalisation of settlements. In the process of land occupation, the inhabitants organise through the *Agrupaciones familiares* (AF) which are community organisations that de facto govern all collective affairs in the neighbourhood and operate as the interface with governmental institutions and programmes, as well as with neighbouring settlements and land traffickers. The AFs are usually left to their own devices and have to initiate all the processes to ameliorate their living conditions. There are different stages to the development of settlements which are captured in Figure 1.6, 1.7, 1.8 and 1.9 and each stage is carefully planned to abide by the planning standards and regulations because these are linked to future recognition of the settlement, the acquisition of water and electricity and securing land titles.

As explained above, there are essentially two different municipal processes which apply to auto-constructed settlements depending on the type of land on which they occur: the *Saneamiento Fisico Legal* which translates as the physical and legal regularisation for settlement on **government land** and *Habilitaciones Urbanas* for settlements which emerge as housing associations or cooperatives on **private land**. I will discuss these further in chapters 6 and 7. Important to note for now is the existence of different administrative procedures and various technicians and engineers within different levels of government that are involved in verifying the compliance with the planning rules and zoning laws during the various stages of the settlement's creation and consolidation process. Settlements actively engage with the regulatory frameworks and seek to comply with them, and follow stipulated spatial outcomes, because these are linked to a 'ladder of entitlements' as well as local inhabitants' expectations on securing tenure.

From observation in the field, some of the most important devices used by various actors to urbanise the slopes are maps and plans as these are compulsory documents required to

navigate the planning system and advance in the ladder of entitlements. They therefore coordinate different actors within and outside governmental institutions. Moreover, maps and plans are used in this context to claim and defend territory. As key nodes coordinating the urbanisation process, maps and plans are used in this thesis as entry points to bring into view the actors, practices and processes that are involved in the urbanisation of the slopes.

The various ways in which settlements are first established on the slopes and how they develop show that diverse actors and practices overlap and collide in the same geographical space. Such actors do not act alone but enrol others to serve their interests including material artefacts such as maps and plans. It is therefore difficult to attribute responsibility for this form of urbanisation to any one group, rather it needs to be understood as the result of networked actors and maps as 'convenors' of such groups. Moreover, although the practices of various actors lead to the same outcome, there are different interests and rationalities at play and therefore a need to consider diverse networks of actors. In official and popular discourse alike, the actors that are often seen to play a role on the slopes are the State, land traffickers and the urban poor. Although these are more often treated as coherent entities, I am here starting from the premise that these need to be unpacked because they are constituted by heterogeneous actors (human and non-human) and are therefore networks. Unravelling these networks and examining the relations thus becomes an important factor to better understand the urbanisation of the slopes.

Figure 1.6: Tracing of the grid with chalk following urban norms consists the first stage.



Photo © R. Lambert (2013)

Figure 1.7: Flattened plots and retention walls built, followed by huts.



Photo © R. Lambert (2013)

Figure 1.8: Uneven growth of the settlement*.



* The settlement grows unevenly as settlers work their plot individually. Common areas such as access ways are improved through inhabitants' collective efforts.

Photo © R. Lambert (2013)

Figure 1.9: Consolidation of the settlement*.



* Once consolidated in line with planning standards and regulations, the settlement can acquire water and electricity from service providers, provided the settlement has been recognised by the district municipality.

Photo © R. Lambert (2013)

1.2.3 Conceptualising auto-constructed settlements in Lima

The terminology used often gives an indication of the taken for granted assumptions that in themselves guide analytical lenses in research. Various terms have been used in the wider literature to refer to auto-constructed settlements which emerge through the reversed urbanism model and develop without adequate services and infrastructure. Slums, squatter settlement, informal settlements, illegal settlements are all terms often used interchangeably and even bundled together (Datta, 2012). Informal settlements are not necessarily unplanned or even illegal yet the distinction is often obscured (Datta, 2012). As these terms are not neutral but performative (Bhan, 2014) in that they justify action (Bhan, 2016) how one refers to auto-constructed settlements needs careful consideration. Throughout this research in Lima, I have heard many authorities engaged in urban planning refer to these settlements as 'unplanned', 'illegal', 'informal', 'spontaneous' and altogether separate from the 'formal' planning system of the State. Riofrio (1991) notes that for many planners, the best justification for the failures in planning the growth of the city and the lack of provision of social housing, consists in framing auto-constructed settlements as 'spontaneous'. He argues that in this way, planners validate these as occurring outside their own decisions and control and can justify the withholding of any support. Arguably though, as existing accounts make clear, there is nothing 'unplanned' about these settlements; not only do inhabitants carefully plan the process, but they directly engage with the planning system through administrative processes dedicated specifically to governing the establishment of such settlements.

The informal/illegal status of auto-constructed settlements has shifted over time since the State has devised a process to formalise these in Peru. They moreover occur through processes which cannot be characterised as wholly legal or illegal, formal or informal, but borrowing McFarlane's (2012) words, need to be understood as a 'meshwork' where the formal/informal is entangled. Heterogeneous conditions and hybrid situations characterise these settlements such that they cannot easily be referred to with the common terms discussed above. They can occur on private, public or communal lands. They have different levels of precariousness in terms of infrastructure, services, and building structures as well as in relation to tenure security and property rights.

The term 'human settlements' is predominantly used by non-governmental organisations and inhabitants alike and is also found in official documents from 1980 onwards (Driant, 1991, p. 20). Although a more neutral term, that does away with a dualistic understanding between

auto-constructed areas and others, it remains too broad and does not adequately capture the specificity of this mode of uneven and progressive urbanisation.

Teresa Caldeira (2017) offers the notion of peripheral urbanisation to designate the spaces where the residents play a crucial role in their production. She contends that this notion is not to be confused with where it happens, ie in the hinterlands or margins of cities, but rather is peripheral because it follows a different logic and unfolds slowly and transversally in relation to official logics and amidst political contestation. "*Peripheries, are spaces that frequently unsettle official logics, those of legal property, formal labour, state regulation, and market capitalism*" (Caldeira, 2017, p. 7). Drawing on examples from Sao Paulo, Istanbul, Santiago, Mexico City and New Delhi, Caldeira understands peripheral urbanisation to "*a) operate with a specific temporality and agency, b) engage transversally with official logics, c) generate new modes of politics, and d) create highly unequal and heterogeneous cities*" (Caldeira, 2017, p. 1). I here adopt this term as it moves away from the dichotomies which have shaped how such spaces have been understood in the wider literature and rather emphasises the transversal nature across formal/informal, legal/illegal, state/non-state through which they come about.

I also use the context-specific term *barriada* to refer to the settlements under analysis. Although the term *barriada*, colloquially meaning little neighbourhood, is no longer in use in official circles, I maintain it in line with Driant's broad definition, which also does away with categories of formal/informal, legal/illegal, and refers to a hybrid process that can involve the State, is incremental and uneven in terms of the conditions between settlements, and takes into account different development phases. It moreover does not specify the type of land the *barriada* occupies, whether public, private or communal and therefore does not infer notions of violations of property rights. Driant (1991) definition is:

"The *barriada* is a group of houses formed through the occupation of a piece of land by families, through own initiative or that of the government. The land does not have, at the moment of occupation, any urban infrastructure with the exception of, in some cases, a simple trace of plots. The adjudication, the services provision, public facilities and the construction of housing are realised after the occupation of the land, in a slow and diverse process occurring differentially between *barriadas*, and whose initiative and realisation is generally undertaken by the population, in the context of the family or the organisation of the inhabitants" (Translated from Spanish in Driant, 1991, p. 20).

1.3 Cartographic and networked agency

Auto-constructed settlements are pervasive and on the increase, occurring in many cities of the global South, regardless of their different histories of urbanisation and political specificities (Caldeira, 2017). The increasing number of auto-constructed settlements and informality is positioned as one of the key problems facing cities and urban dwellers, but also one of the major challenges to both long-standing and contemporary approaches to planning. Since at least the middle of the 20th century, they have offered poor residents opportunities to live in cities by "maintaining alternative markets and spaces in which housing and urban life are precarious but affordable" (Caldeira, 2017, p. 10). Many cities of the global South get built through this form, yet this mode of urbanisation is predominantly seen to occur outside of, in violation of, or as a failure of planning. As a result, auto-constructed settlements are predominantly approached through an informality lens which, in effect, places them out of focus. On the one hand, this hides the hybridity of conditions involved in such processes of urbanisation; on the other, it positions these settlements tangentially to formal legal structures thus limiting the possibility of advancing an understanding of the relationship between planning and 'informal' urbanisation processes. In such an understanding, it is not clear whether there is a role for planning and what the nature of intervention in such contexts should be (Watson, 2014). As planning is understood as a professional practice in the hands of the State to regulate and enforce, informality seems in many ways to be irreconcilable with mainstream understandings of planning (Porter, 2011).

As a counterpoint to this framing however, a limited but growing scholarship examines the central role that 'formal' mechanisms play in producing and regulating auto-constructed settlements. Socio-legal scholars are calling for a critical engagement with the role of laws and regulations in shaping auto-construction. Contrary to the understanding that these are marginal, they argue that regulatory processes structure the everyday lives of urban dwellers in important ways (see Fernandes and Varley 1998; Van Gelder 2010; Datta 2013). Similarly, from a post-colonial approach (see Roy and AlSayyad 2004; Yiftachel 2006; Watson 2014; Bhan 2016) studies highlight the centrality of planning in producing peripheral urbanisation. For example, accounts highlight the appropriation of the planning system by the elite to dominate and control and thus maintain a large number of urban dwellers in spaces which are deemed illegal/informal. In this way, the State can maintain calculated flexibility to act on these settlements and decide what will thrive and what will not (Roy, 2005). Unlike Roy (2005, 2009a, 2009b), Bhan (2016) argues against such a strategic view of the State which aligns with my own position in this thesis as I question the omnipresent power attributed to the State.

This thesis contributes to the growing literature conceptualising planning as a process which encompasses a range of actors from within and outside government. As rules and regulations do not automatically translate into results but need to be performed, it becomes important to recognise that individual actors have significance as active agents who are enacting or 'performing' planning. I here define 'Planning' as the formulation, content and implementation of spatial public policies and practices. Although I maintain a sense of planning as an institution, I demonstrate in this thesis that it needs to be understood as a socio-technical assemblage. As such it can be enrolled in part by other networks and cannot therefore be seen as entirely insular and coherent, or necessarily the purview of the State.

The thesis moves away from attributing responsibility for outcomes to a particular group providing a counterpoint to existing debates. It positions the urbanisation of the slopes as a result of the interactions between actors (human and non-human) from diverse networks and the regulatory frameworks. I am not here contending that all peripheral urbanisation can be looked at in this way, since it plays out differently in different cities.

Borrowing from actor-network theory (ANT) and institutional ethnography (IE), the research takes a relational and socio-material perspective. IE and ANT are particularly useful in this interrogation because these theoretical perspectives not only bring interactions between people to the fore, but also encourage an understanding of materially mediated practices. Taken together these allow different questions to be asked of planning processes. While ANT provides a conceptual framework for investigating the complex activities that take place across temporal, institutional and spatial boundaries, IE enables one to explore and talk about the ways in which material entities are able to order people's activities. By highlighting the agency of materiality and showing the transactions that take place between the social and material, the thesis moves beyond a disproportionate focus on decision making processes in current planning literature.

Methodologically, there are a few challenges which the research confronts: in this context where ambiguity structures the mode of production of space, how is it possible to research these processes and capture the amount of improvisation, experimentation and contestation shaping the relationships among all those involved? How to untangle actors and their practices and enable a transversal reading across them? The thesis demonstrates that starting with cartography can bring into view the processes, practices, alliances, and agency which are often invisible to policy makers, yet structure outcomes. I particularly pay attention to the maps and plans that are used by various actors to urbanise the slopes and are compulsory documents to

navigate the planning system and advance in the ladder of entitlements. The maps/plans used in this context are adopted to claim and defend territory and to coordinate different actors within and outside of governmental institutions.

In this thesis, I refer to maps and plans jointly. I do not seek to hereby conflate the two as there is a distinction made in the professional fields, but I take them together as they are connected in practice. In the context of Lima, the individual settlement plans (or layout plans) are stitched together to make up the map used by the local municipalities as well as the central government. The main distinction between the map and plan, in this context, is scale; while the plan enframes the settlement boundaries, the map takes on a larger territory capturing geographical features. I focus on conventional maps/plans that have been professionally produced by engineers but commissioned by a range of actors such as settlement leaders, land traffickers, utility companies, which follow conventions and stem from a formalised knowledge system for capturing space, because these types of inscriptions are dominant and mediate the planning system.

When followed, maps and plans can draw attention to the different sites they land in and help to discern and disaggregate actors that are usually bound in notional groupings such as for example, 'the State', 'the municipality', 'the land traffickers'. They can also bring to light some of the more hidden practices they are used in. Moreover, because maps and plans are adopted towards particular ends in line with different rationalities, they are technologies of calculations for the various actors. An examination of how and why they are used reveals the rationalities at play. I argue that an interrogation of the sites of production, use and circulation of the maps and plans under different rationalities is also a means to observe how these rationalities relate to one another if at all.

The approach through instruments of planning is not common in planning studies. A handful of scholars see them as productive, arguing that instrumentation is a significant avenue for reflection, particularly because it produces its own effects (see Lascoumes and Le Galès, 2004; Rydin, 2012; Rydin and Tate, 2016). Lascoumes and Le Gales (2007) position instruments as institutions in that:

"they partly determine the way in which the actors are going to behave; they create uncertainties about the effects of the balance of power; they will eventually privilege certain actors and interests and exclude others; they constrain the actors while offering them possibilities; they drive forward a certain representation of problems. The social and political actors therefore have capacities for action that differ widely according to the instruments chosen" (Lascoumes and Le Gales, 2007, p. 9).

A focus on instruments inevitably leads to a double interrogation: the 'instrumentalisation' - how practices use cartography towards desired outcomes; as well as the 'instrumentation at work' - how cartography itself as an active agent plays a role to precipitate outcomes.

On this basis, the thesis makes significant empirical contributions. The research produces robust and comprehensive primary data on a phenomenon which has received little attention, being in a relatively remote geographical area in the periphery of Lima. Moreover, it exposes actors who are somewhat invisible or seen as neutral, such as engineers and technicians, yet play a important role in determining the development path of settlements. The research has brought to light their practices of which little is known about, and the relations they foster. The thesis also contributes to a better understanding of land traffickers' practices. Since these operate in a shady world, there is limited information on how they work. Finally, the thesis produces empirical evidence on the interactions with the planning system and how planning regulations and procedures are paradoxically involved in promoting the continuous occupation of the slopes and the production of risk. These contributions together provide original insights on the way planning and peripheral urbanisation is to be understood and can be researched.

1.4 Research design

1.4.1 Research question

The main research question I seek to answer is:

How do various actors and their practices interact with the regulatory frameworks within the planning system to enable and sustain a mode of urbanisation that exposes an increasing number of inhabitants to hazardous conditions on the peripheral slopes of Lima?

When referring to regulatory frameworks I hereby limit the observation to those that apply to auto-constructed settlements and are therefore related to the access to and planning of land, and exclude other regulations such as building regulations. Following Payne and Majale (2004) there are 3 categories to consider: administrative procedures, including the institutional set up, planning standards and planning regulations. **Administrative procedures** set out the path and the institutions which the public authorities and citizens have to go through to achieve their aim of providing, or acquiring land, so that at the end, land occupiers are recognised as legal owners and developers of that land. **Planning standards** stipulate what the settlement should look like in terms of 'quality'. They include minimum plot sizes, minimum frontages and

minimum depths, and road widths, and provisions for public, social and economic uses. **Planning regulations** are rules that allow or disallow activities on the plot or in an area; or prescribe the way the plot can be developed or used. They include land use/ zoning controls, plot-use restrictions, and building set-backs.

The following sub-questions guide the research:

RQ1) What interests and rationalities do different networks associated with auto-construction operate under and which actors are enrolled in these networks?

RQ2) What cartographic calculations and coordination are undertaken within different networks to arrive at the desired outcomes of actors?

RQ3) What are the tradeoffs and negotiations that occur between (human and non-human) actors within this process and how do unintended consequences that exacerbate risk for inhabitants come about?

1.4.2 Research approach

I undertake an ethnography of cartographic practices because cartography provides multiple entry points for analysis (explained in detail in Chapter 2). I focus on **cartographic coordination** which refers to the practices of coordination that occur with the map/plan but also within the map/plan as a site of coordination itself; and **cartographic calculation** which refers to the practices of calculation in which the map/plan plays an important role to structure outcomes. While undertaking this ethnography, I have used various methods ranging from transect walks, in depth interviews, focus groups, shadowing and landscape history.

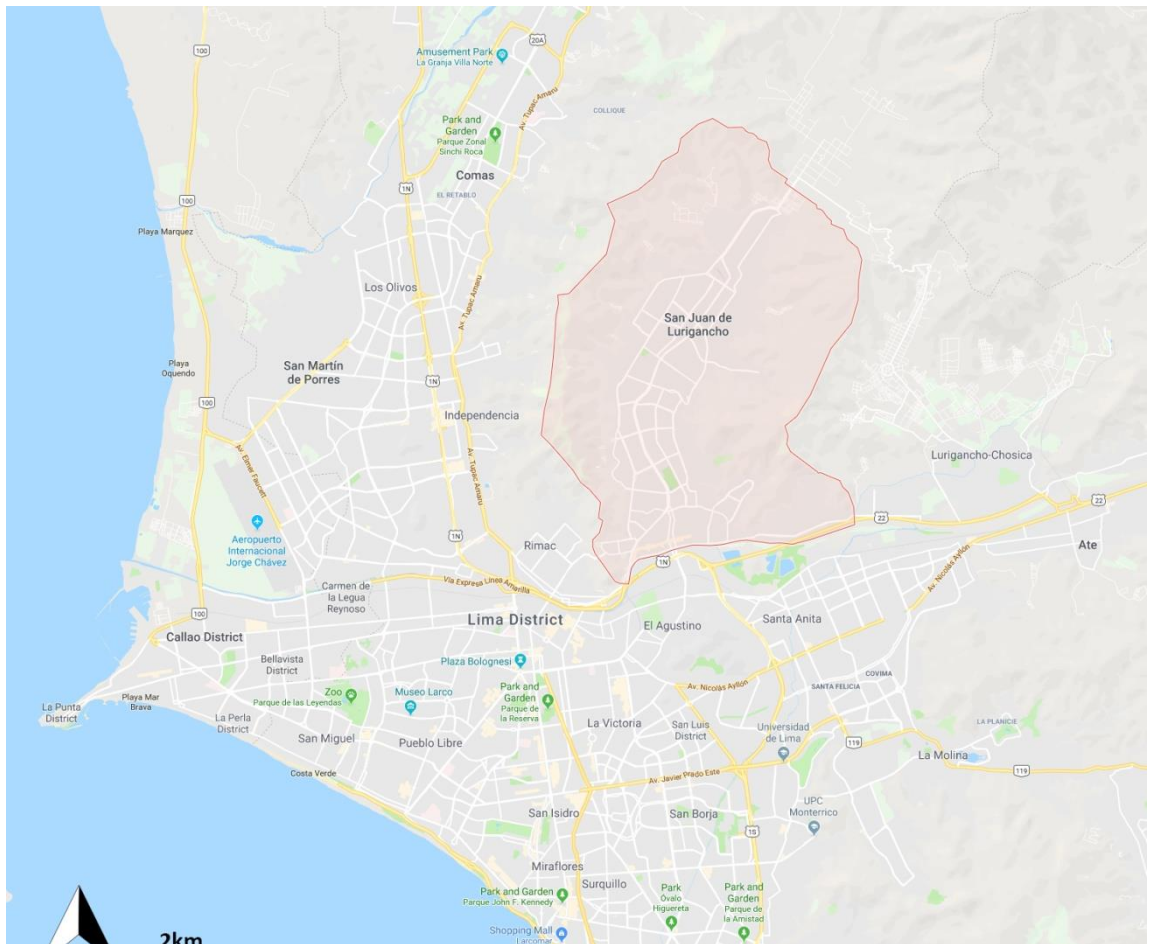
I enter through three self evident entities in the political landscape - the 'State', 'communities' and 'land traffickers'. These operate with different rationalities; namely the State's logic to control invasions but at the same time support the plight of the urban poor; the speculators' logic, seeking to maximise the return on their investments; and the logic of the inhabitants genuinely seeking a place to live. Conceptualising these entities as black boxes, I seek to unpack their practices and the actors they enrol.

1.4.3 Case study

The case studies observed for this thesis are all located in the most populous district of Lima, San Juan de Lurigancho (SJL) (Figure 1.10), with over 1.1 million inhabitants (INEI, 2018a). This

district is growing at a faster rate in terms of the population and urban footprint than the other districts of Lima. The research focuses on the so called 'extensions of the extensions', at the edge between the city and the desert (Figure 1.11), and at the border between SJL with the districts of the Huarochiri Province, outside of Lima. As the delimitations between the districts have been under dispute for several years, a zone has emerged with unclear administrative responsibilities. The unique conditions within the resultant 'grey' zone, is a fertile ground for land trafficking operations. This area is experiencing the rapid urbanisation of different types of land whether public, communal or 'private'³. Here one can find the typical settlement formation on government land, as well as cooperatives or housing association on communal/private land. Concentrating the research in SJL ensures a common institutional context yet enables me to observe different modalities through which *barriadas* are established.

Figure 1.10: District of San Juan de Lurigancho in Lima.



Source: adapted from Google maps.

³ The term private is here in inverted commas because although owners can show paperwork that denoted it as private property, this is often contested for being a scam and illegal appropriation.

Figure 1.11: Extensions of the extensions at the edge of the city in Jose Carlos Mariátegui in the district of San Juan de Lurigancho.



Photo © R. Lambert (2013)

1.5 Thesis structure

In this chapter, I have introduced the focus of the study. I outlined how my interest in the subject matter developed and explained why the case of Lima is a fertile ground for investigating the relationship between planning and peripheral urbanisation. The case of Lima contributes to existing scholarship that considers the central role of planning in producing and regulating peripheral urbanisation. Given that the urbanisation of the slopes comes about through a transversal logic, the thesis takes a relational and socio-material perspective. To arrive at a transversal reading, it proposes an ethnography of cartographic practices, cartography being a productive entry point to reveal the actors, relations, rationalities, practices and processes that contribute to the continuous urbanisation of the slopes and the production of risk. The contributions of this thesis are epistemological- addressing how planning and peripheral urbanisation are to be understood; methodological- as a novel way of researching through cartography is presented; and empirical as new data is brought to light on a subject matter and geographical area with little academic coverage. This interrogation is pertinent given that the claiming of large areas of desert land on the peripheral slopes of Lima is occurring at an alarming rate, exposing an increasing number of low-income settlers to risk. The chapter also indicates the research aim, questions, approach and case study. I have also

provided a brief outline of the research limitations. The remaining chapters are organised as follows:

Chapter 2 provides a conceptual discussion and analytical lens to understand the relationship between peripheral urbanisation and planning. The chapter positions the case of Lima within the existing debates that see peripheral urbanisation as an outcome of planning. It understands this form of urbanisation to be produced through a transversal logic and thus departs from the dichotomous division between formal/informal, legal/illegal, state/non-state often maintained in popular discourse as well as academic scholarship to conceive of urban processes. It positions the urbanisation of the slopes as a result of the interactions amongst actors (human and non-human) from diverse networks. The chapter explains how actor-network theory and institutional ethnography provide useful and complementary theoretical and methodological frames. To operationalise the transversal reading sought, the chapter proposes to examine the cartographic practises of diverse actors that play a role in the urbanisation of the slopes. The chapter explains how cartography can be productive to understand socio-material processes particularly those that cut across pre-given social entities (such as the State, developers and communities). Consequently, the chapter proposes an ethnography of cartographic calculation and coordination and explain what these involve and how they allow an observation of the actors, relations, practices, and processes that enable and sustain the urbanisation of the slopes.

Chapter 3 conveys how the research was carried out. As a starting point, it briefly explains the factors that lead me to engage with Lima and cartography, as well as how my earlier involvements with various research projects have shaped the focus of the PhD. It then explains the information needs and data required to address the different questions of the research. It also explains how the approach taken, combining different conceptualisations of cartography as presented in Chapter 2, has methodological implications. This is then followed by an explanation of how the boundaries were set in the research to limit the scope for the thesis, as well as the process of data collection and analysis. Finally, it offers reflections on the positionality, reflexivity and ethical considerations that emerged during the research, considering in more detail the 'shadowing' technique used to follow maps and actors.

Chapter 4 traces the relationship between the planning system and the *barriadas* from their emergence in the 1940s to the present day. The chapter seeks to understand how the administrative procedure, planning standards and regulations developed with regard to *barriadas* and how, over time, they came to be 'performed' by inhabitants and technicians,

both working outside government institutions to produce a spatial layout on the slopes that exacerbates risk. The chapter pays attention to the formulation of housing policies for the 'urban poor' by successive governments, the changing political discourses regarding *barriadas*, and the technologies used to confine *barriadas* into calculable space. It focuses particularly on cartographic production and use because as a discursive device and technical instrument, cartography accompanied the decisions and actions of many administrations. The historical tracing reveals that different configurations emerged at different times linking politicians, technicians, and instruments of planning, particularly maps and plans. The chapter also reveals how technical devices and professionals' routines devised by the State to govern *barriadas* and control invasions, get used in other networks. This is the case for the settlement layout plans, urban norms, the grid and planning professionals such as engineers and technicians, who get enrolled by inhabitants and speculators alike to paradoxically promote invasions. The chapter shows how official discourses, planning procedures and cartography developed in an interrelated but at times contradictory manner.

The chapter provides the context for the following chapters, explaining the various historical factors, interactions and socio-material assemblages that shape the present practices, and explains why the *barriadas* on the slopes take a spatial layout that exacerbates risk for inhabitants.

Chapter 5 examines the cartographic calculation and coordination within the State's institutions at the national and municipal district levels which are involved in planning and governing the territory. The chapter exposes how cartography is produced by different government institutions for risk management, regularisation and control of 'informal' settlements. It examines what is included/excluded on maps and plans when representing settlements on the slopes, and how cartography is used and circulates. The research reveals the different rationalities at play and how these are not always working towards shared governmental objectives but are in effect often conflicting and competing. The chapter explains the tradeoffs that occur and the undesired outcomes that are precipitated through these institutional cartographic practices. The findings demonstrate how different institutions and officials are involved in seeking to govern through cartography, as well as to govern cartography, but how paradoxically the rules, regulations, standards and instruments they abide to play a part in creating and maintaining a chaotic cartographic landscape ridden with inconsistencies, errors, and absences. The internalisation of these undesired outcomes becomes an ever-increasing challenge which makes muddling through not only inevitable, but the status quo and the work of government. The state of the city's cartography has

implications for planning as it makes it increasingly difficult to work towards what many authorities verbalise as a desirable goal: to plan with an integrated vision of the territory.

Chapter 6 explores the *Agrupacion Familiar* (AF) or community-based organisation of settlements as another important black boxed entity that drives the occupation of government land. The chapter sets out the various stages of development of the process of '*Saneamiento Fisico Legal*'. It examines the protocols and institutional procedures from recognition to formalisation and contrasts the formal expectations with what takes place within different stages. An examination of the cartographic coordination brings the various actors involved in this process into view as well as the different rationalities. Though an ethnography of the cartographic calculations, the transactions that occur between actors are made observable, and the chapter explains how these lead to outcomes that produce hazardous living conditions. By tracing maps and cartographic practices, the findings demonstrate how alliances are formed between technicians, authorities and inhabitants as well as material things to constitute socio-technical assemblages that help to explain how the continuous occupation of the slope is sustained. The chapter demonstrates the contradictions and paradoxes which emerge; this is seen in how inhabitants, driven by the genuine need to find a place to live in the city, resort to a speculative logic and continue subdividing plots further upslope to secure the funds for their own development, in doing so producing further risk for themselves which they have to mitigate at great cost.

Chapter 7 interrogates large-scale land traffickers or pirate subdividers as another starting point to trace the networks claiming the periphery of Lima. The chapter focuses on the real estate development model which involves the illegal acquisition and subdivision of relatively large pieces of peasant community land by pirate subdividers, and subsequent forming of cooperatives or housing associations. To gain an understanding of the unique conditions of the study area that enable the pirate subdividers to operate, the chapter first explains the nature of land rights for peasant community land, the illegal change of land ownership from communal to private property, and the exceptional conditions within the contested grey zone between municipal districts. This is followed by an analysis of the various cartographic calculations and coordination that are undertaken by the actors within the network. The chapter demonstrates how entities from other networks are drawn in to support the land trafficking system. Mutual interests and strong alliances are built to make this modality stable. The chapter also reveals how the activities of pirate subdividers augment the risk relative to those of AFs. Inhabitants of these properties have to incur extensive costs as pirates retreat after selling all the plots without delivering the promised services to buyers, leaving residents

in worse off predicaments. Not being able to receive basic services with State help under the status of private property, the administration has devised a way to revert such properties into public land to enable inhabitants to follow the process of *Saneamiento Físico Legal* devised for conventional *barriadas* on public land to acquire basic services. However, by so doing, the continuous activities of land traffickers are indirectly promoted. Thus, while hope is renewed for settlements which have emerged through land trafficking, it also fuels the continuous occupation of the slopes. This mode of urbanisation is made durable through the strong alliances that are built by drawing in part of other networks but also by the ease with which the land traffickers' network can shift and change, after some time, to that of the AF.

Chapter 8 provides a summary of the key research findings, the main contributions of the thesis to the planning field and the implications for future research. Firstly, it discusses how cartography yields analytical and methodological insights to planning studies. It demonstrates how the approach through cartography and ethnographic methods has opened a new window for studying planning in practice. Secondly, it shows that peripheral urbanisation and planning cannot be conceived as separate realms but are interconnected as the achievement of socio-technical assemblages. The research has demonstrated the numerous and unexpected ways they interlink and produce unintended outcomes. There is thus here a call to better understand the assemblages which produce both urbanisation and planning and the micro-politics at play in shaping outcomes. Thirdly, the research reveals that conflating rationalities, as much as conflicting and competing rationalities drive the urbanisation of the slopes. Various moments of mutual benefit across diverse actors characterise the urbanisation process with economic and political gains, as well as humanitarian aspirations. The chapter concludes by highlighting three possible areas for change to address the production of undesired outcomes on the slopes of Lima which can also be more broadly applied to other urbanisation processes. These speak to the actions of planners and policy makers seeking to intervene in and reshape the socio-technical configurations towards progressive agendas; identifying nodes within networks that have structuring ability on the development path and using them as entry points for change; and addressing change through the technical/material as much as the political/social.

Chapter 2 A transversal reading to interrogate peripheral urbanisation and its interaction with planning

2.1 Introduction

The urbanisation of the peripheral slopes of Lima is more often than not understood to occur 'outside' planning. The continuous formation of *barriadas* is seen to go uninterrupted because it occurs in far off areas, away from the State's field of vision and control (Riofrio, 1991). The dominant narrative of officials interviewed in this research highlights the illegal and informal occupation of land by the urban poor in areas labelled as high risk by the national government. The responsibility for the occupation of the slopes is attributed to 'unruly law breakers' acting in the absence of the State's capacity to guide urban growth and enforce the law. Despite being criminalised and framed as an independent process, the *barriadas*' interaction with planning is apparent even at first sight. The spatial layout of the settlements on the slopes resembles planned settlements for they comply with planning standards. Moreover, they involve professionals such as architects and civil engineers and use maps and plans that follow planning conventions. Notwithstanding that these auto-constructed settlements are considered to violate property rights and zoning laws, a dedicated municipal process has been formulated to enable inhabitants to acquire basic services and secure their land tenure. Acknowledging that there is indeed an engagement with the planning system, the resultant spatial outcome is one that nevertheless produces risk for low income settlers.

Seeking to understand the relationship between planning and the practices of various actors who play a role in the urbanisation of the slopes, the main research question which this thesis seeks to answer is:

How do various actors and their practices interact with the regulatory frameworks within the planning system to enable and sustain a mode of urbanisation that exposes an increasing number of inhabitants to hazardous conditions on the peripheral slopes of Lima?

This chapter sets the analytical frame to answer this question. Drawing on the literature from geography, urban planning and urban studies, I first explore the relationship between informality, urbanisation and planning. I pay particular attention to how these terms have been understood in relation to one another and consequently, how their interaction is framed in existing scholarship. Two divergent positions can be identified: one that places peripheral

urbanisation 'outside' the realm of planning and therefore negates the existence of a direct connection; and the other that acknowledges a close interaction and understands peripheral urbanisation as produced and regulated within planning. In conversation with this literature, I highlight the contextual specificities of *barriadas* on the slopes of Lima that challenge simple diagnoses of the failure and irrelevance of planning, and briefly outline how the unique conditions of such *barriadas* provide a fertile ground to contribute to current debates in urban theory.

Taking a relational and socio-material perspective, I explain how Actor-Network Theory (ANT) and Institutional Ethnography (IE), taken together, provide a useful theoretical and methodological frame for this thesis. Understanding the urbanisation of the slopes of Lima as a product of diverse networks pursuing their interests, while still engaging with the planning system, I seek to find a means to read transversally across these networks. I propose to enter the interrogation through cartography, that is, the maps and plans that are used in the context to coordinate actions and advance interests. I explain how cartography can yield useful analytical and methodological insights to observe the engagements with regulatory frameworks, and bring into view the actors within networks, their relations, practices and rationalities that help to explain how and why the urbanisation of the slopes is enabled and sustained.

2.2 The Relationship between planning, informality and urbanisation

2.2.1 Peripheral urbanisation as occurring 'outside' planning and the State

Acknowledging that many cities of the global South are being urbanised through processes considered 'informal', planning theory and practice sit uncomfortably with regards to the inclusion of such processes as part of the remit of planning. Apart from a small number of authors who draw from global South contexts, planning scholarship engages little with auto-constructed settlements. Noticeably the contributions that do so, mainly stem from the disciplines of geography and urban studies. Although valuable, these speak little to planning and action. I here argue that in part the recognition that there is indeed a relationship to be examined between planning and 'informal' urbanisation stems from their respective conceptualisation.

As many have contended (see Roy 2005; Watson 2009a; Porter 2011), it can be difficult to see the link between planning and informality. This is due in part to the way planning is

understood, with a strong base in its historical roots. Urban planning emerged in the public domain as a response to social reform in the light of unsanitary conditions and the need to govern the population for political stability (Söderström, 1996). It is therefore seen as an arm of the modern nation State (Robinson, 1995), with its legitimacy and statutory empowerment given by the State's legislature and judiciary (Friedmann, 1987). Planning activity is centralised in the hands of specialised professionals, who employ a combination of public inputs and technical expertise and are entrusted with shaping the urban environment through enacting municipal laws and regulations. With this positioning of planning, "informality seems in many ways to be irreconcilable with mainstream planning theory" (Devlin, 2011, p. 146).

In many accounts, planning in cities is perceived to exist in distinct territorial pockets with reference to the 'planned' and the 'unplanned' city as two distinct categories. This distinction is also coupled with the 'formal' city, where planning and the State are present, and the 'informal' city which is seen to develop through entirely separate processes. Despite decades of research suggesting that 'formal' and 'informal' sectors are interconnected (see Bromley, 1978; Moser, 1994; Ward, 2004; McFarlane, 2012; Roy, 2009a; Van Assche *et al.*, 2014; Watson, 2009a) there is a continued emphasis in academic and policy discourses on the division between the 'formal' and 'informal' city. Auto-constructed settlements are included in the 'informal' city and are therefore positioned outside 'normal' urban considerations (Roy, 2005). Although not always entirely spontaneous and unplanned, as a form of incremental urbanism that occurs from the ground up, these settlements are often defined through their lack of compliance with the norms that govern urban development (Connolly and Wigle 2017). As such, they are believed to operate outside of laws regulating space (Duhau and Cruz, 2006) and to even be defiant vis-a-vis planning for infringing such laws (see Azuela, 1989; de Soto, 1989; Connolly, 2009). Classic planning approaches, due largely to their modernist underpinnings, have difficulty in recognising informal space claims as valid adaptations of low-income immigrants to challenging socio-economic conditions. Informality is thus conceptualised as rule breaking, with only a limited number of possible solutions: either better enforcement of rules or the passing of new rules to bring 'informal' actors into compliance (Briggs, 2011).

The dominant framings of auto-constructed settlements, through informality, irregularity and illegality can hide engagement with processes labelled as 'formal'. These settlements are not necessarily unplanned or even illegal yet these distinctions are often obscured (Datta, 2012). Many terms used to refer to them rule out the possibility of any interaction they might have with laws and regulations besides their violation. Likewise, various terms such as slums,

squatter settlement, informal settlements, illegal settlements are bundled together, conflated, and often used interchangeably (Datta, 2012). Moreover these settlements are also homogenised, with an over-simplified universal image, often negative, associated with spaces of poverty, disorder, unsanitary conditions and criminality (Gilbert, 2007; Varley, 2013). Under the informality label, the diverse and complex situations one encounters in the wider context of cities, particularly in the global South are concealed (Lombard, 2014).

In reaction, urban theory has in many ways challenged the reduction of poverty to the 'slum' as well as re-cast 'informal' urban spaces and lives not just as sites of marginalisation but enterprise, resistance and resilience (see for example Kudva, 2009; McFarlane, 2012; Varley, 2013). Arguably, although much work has been done by scholars to reframe the way we think and speak about peripheral urbanisation, moving away from the negative image it is often portrayed with, there is still a tendency to separate it from 'formal' institutions and processes. This can be said of studies across various contexts from Asia, Africa and Latin America, as much as specific studies on the *barriadas* of Lima.

The scholarship that has focused on the *barriadas* of Lima has had considerable influence and international reach in urban theory as well as policy making. It has challenged the *barriada's* conception as a problem and a space of criminality, reframing this mode of urbanisation as the consequence of the process of modernisation that comes with the growth of cities. Rather than a problem to the city, the *barriada* has been positioned as a solution to the housing shortage. Early studies include the documentation of the housing problem and emergence of *barriadas* to solve the housing demand of the urban poor (Cordova, 1958; Matos Mar, 1967), with a focus on self-help (see Mangin, 1967; Turner, 1969; Turner, 1966).

As much as the *barriada* was seen as a place for the germination of a proletarian revolution by some, it was framed by the likes of Mangin (1967, 1970) as a place with a nascent market economy, where inhabitants gave creative responses within legal obstacles, openly challenging the State that was incapable of delivering the services under its obligation. The *barriada* has also been explored for being the result of the efforts of a highly organised community (see Robles, 1975). Adding to this framing, the influential writings of Hernando De Soto (1989), also emphasised the entrepreneurial capabilities of the 'informals' (as he referred to the inhabitants). De Soto called for land titling as a means to release the economic potential of the poor and end terrorism. He explicitly argued that ending terrorism associated with the Shining

Path⁴ would be achieved through an economic answer⁵. He contended that formalising the 'informals' would enable them to play a fuller role in economic life, and in turn bring social and political stability. His ideas, promoting formalisation, have had considerable resonance in policy making circles across the globe⁶. Taking a Marxist approach and focusing on marginalisation, earlier scholars such as Rodriguez (1969), Jaworski (1969) and Delgado (1968) emphasised the relations of exploitation and the strong spatial segregation that resulted in the city. Focusing on Peru and Lima, Castells (1977, 1978), Lojkine (1976) and Henry (1978, 1981) framed the phenomenon of *barriadas* as a popular movement, independent from the powers in place and in open opposition to it.

Although important contributions have been made to understand how cities come to be produced through popular sectors of society, the emphasis has predominantly been placed on the internal workings and the practices of the 'informals'. This insular treatment, placing auto-constructed settlement outside the State and its institutions and processes, is also evident in academic literature that draws from other contexts. Scholars recount the coping strategies of the urban poor (see Chatterjee, 2004; Scott, 1985); the self-help, inventive entrepreneurial spaces of courage and endurance (see Koolhaas 2007 on Lagos); they show how inhabitants manage to survive in cities by subverting the State apparatus using their communal and political capital (see Appadurai, 2000; Appadurai, 2001; Satterthwaite, 2001; Satterthwaite, 2008) and how their spaces are fertile ground for insurgence exploring citizens' resistance strategies and tactics to planning and to the State (see Holston 1998; Holston 2008; Mirafab 2009; Meth 2010). Different debates focus on the violations of laws and rules highlighting them as forms of resistance, subversion, politics of the subalterns against their marginalisation, or as creative responses in overregulated environments (see Chatterjee, 2004; Benjamin, 2004; Scott, 1985; de Soto, 1989; de Soto, 2001).

⁴ The Shining Path or *Sendero Luminoso* in Spanish, is the common name used for the Communist Party of Peru led by a Maoist guerrilla group in Peru. When it first launched the internal conflict in 1980, its goal was to overthrow the State and instil communism.

⁵ In line with this belief, the full title of De Soto's influential book released in 1989 is '*The other path: the economic answer to terrorism*'.

⁶ Various studies have emerged to support his theories including a World bank report of a pilot land titling program in Peru indicating that strengthening tenure security through property formalisation in 'urban squatter settlements' has a large positive effect on investment (Cantuarias and Delgado, 2004). Nonetheless many other studies have also contended to the contrary, highlighting the fact that land titles have not achieved their desired effect of enabling the poor to access credits and paradoxically produced negative outcomes.

Arguably, this literature approaches auto-constructed settlements through an informality lens, taking the violation of law and regulation as given, and treating this form of urbanisation as an insular process solely occurring through the practices of inhabitants, positioned outside the plan, the planning system and planning practice. To a large extent, the everyday and continuous interactions with the regulatory frameworks within the planning system, and the not so obvious ways these impact the lives of dwellers, are overlooked.

2.2.2 Peripheral urbanisation as produced and regulated within planning

Counteracting the position which sees a tenuous relationship between planning and auto-constructed settlements, a number of authors from a Southern perspective have argued that planning is not marginal but heavily implicated in producing 'informal' urbanisation (see for example Porter, 2011; Bhan, 2016; De Satge and Watson, 2018). Debates emphasise the failures of planning for being inoperative and unable to address the needs of the urban poor, and in some regions, for being directly implicated in worsening poverty, inequality and the environment (Watson, 2009b). In the 2009 Global Report on Human Settlements, UN-Habitat (2009) placed the challenge, and much of the cause, of the population characterised as 'a billion squatters' (Neuwirth, 2005) squarely at the feet of weak and failing planning (Porter, 2011). The lack of capacity, institutional coordination and resources, and the weakness of central and particularly local governments, are highlighted as causes of peripheral urbanisation. These are understood to hinder the possibility of guiding the growth of cities and tackling 'informality' because *"in practice, [governments'] functions are limited to the authorisation of new developments in the formal city, but there is a lack of control and management of public land"* (Calderón, 2009, p. 49).

It is not only the lack of capacity and inaction of government institutions which is seen to produce peripheral urbanisation, but also the adoption, by city governments, of inappropriate laws and regulations that produce social and spatial exclusion. Thus auto-constructed settlements are not to be seen as an affront to planning in their violations of laws and regulations. Rather they are a result of the regulatory frameworks within the planning system; the latter being seen as too bureaucratic, unrealistic, and onerous to comply with, thus forcing inhabitants to establish an extralegal system (de Soto, 1989). Therefore auto-constructed settlements are understood as a result of such regulations. In a study of nine cities in Africa, Asia and Latin America, Devas (2001) found that in most cases, cities have inherited a collection of repressive by-laws, as well as planning and building standards, which are unsuited to the needs and ability to pay of the poor. Similarly, other studies (see de Soto, 1989; Payne,

2000; Dowall, 2003; Lusugga Kironde, 2006) have demonstrated that regulatory frameworks unnecessarily increase the cost of access to legal shelter especially for poor households. Scholars highlight the inappropriateness of concepts and standards received from the colonial era (Okpala, 1987); their elitist character, unrelated to social and economic realities and the difficulty of enforcement (see Farvacque & McAuslan, 1991; Payne, 2005). The discriminatory nature of urban land laws, means that people have to step outside the law in order to secure land and shelter (Fernandes, 2003). Therefore the inappropriate and 'first world' zoning ordinances are seen to be instrumental in creating 'informal' settlement and peri-urban sprawl and directly responsible for spatial and social marginalisation (Watson, 2009b).

A small but growing number of socio-legal scholars are calling for a critical engagement with laws and regulations and an exploration of how everyday urban life is governed by them (Valverde, 2009). Das (2004) argues that "*struggles for legitimacy for those living on the borders of law/illegality, cannot now be fully realised through active resistance or political organisation, but through explicit engagements with formal and legal processes*" (Das, 2004, p. 226). In her critique of the theorisation of slum urbanism through informality, Datta (2012) argues that there is a misrecognition of the actual effect and impact that law and legal geographies have on the lives of the urban poor through the issue of rights to property and the violence inherent in property relations. Varley (1998) highlights that in all auto-constructed settlements, there is a degrees of coordination with authorities and an interaction with regulatory frameworks whether it be for land, building homes or accessing basic services. The dependency on State actors and agencies is made evident. For example, Van Gelder (2010) shows how 'squatters' informal normative orders' are incapable of replacing all the vital functions of the State, and the power of settlement institutions is limited and confined to specific areas. He highlights how squatters now find themselves subordinated to and subsumed within the regulatory frameworks of 'formal' and legal mechanisms in the city. Datta (2012) argues that informality scholarship does not distinguish illegality from informality in that both 'legal' and 'illegal' slums are included within the same frame of analysis. She notes that "*illegality is often subsumed within the practices of informality both in the examination of everyday lives of squatters and in the practices of the State. Informality (and not illegality) therefore is often seen as the defining condition of everyday life within squatter settlements through which state-citizen relationships are negotiated*" (Ibid, p. 7). Similarly, in reaction to the designation of settlements as either legal or illegal, Van Gelder (2010) argues that this distinction obscures the legality within 'informal' settlements, and the often complex, contradictory, and dynamic relationships they entertain with the State's legal system.

The exclusion of law and regulations from the analysis of peripheral urbanisation can also be explained by the fact that if engagements are not visible and overtly present, they are neglected. I therefore here contend the need to understand the covert as much as the overt engagements that take place to structure outcomes.

On another front, a growing scholarship from a post-colonial perspective centring around inequality and conflicts in cities of the global South (see Roy and AlSayyad 2004; Yiftachel 2006; Watson 2014), argues that negative impacts of planning regulations on the urban poor are not just a result of wrongly appropriated, misunderstood or inefficient planning systems, but may in many cases be due to corrupt manipulation or use of the system for political domination. The emphasis is not so much on the planning system itself but rather on the appropriation and abuse of the planning system by the elite to secure their interests. Of particular weight due to the number of academic contributions is the hegemony of the State in its use of planning (see Yiftachel 1998 for a detailed discussion). Planning as a 'rationality of government' is on the one hand seen to offer the possibility to achieve societal reform, but also to control and shape society to particular political and economic ends. There is therefore the potential for planning to be used by political and economic elites to create and protect property values, and to spatially marginalise those who might threaten them. In David Harvey's (1973, 1985) words it is a means for "accumulation through dispossession" that is, a form of elite capture and a mean of control with repeated reproduction of class inequalities and negative outcomes for residents of human settlements, such as displacement, eviction, the withholding of investments or unwanted development.

The actions taken themselves need not be overtly violent to control and oppress. Yiftachel (1998) points to the 'dark side' of planning: the ability of the urban elite to represent urban government as open, civil and democratic through their use of planning while at the same time, denying urban residents and workers basic rights and services. For example, in the case of Israel, Yiftachel and Yacobi (2003) refer to the State as ethnocratic where the withholding of services is used as a deliberate tactic of political exclusion. The planning response is allowing, condoning and even facilitating urban informality, and thus "*indirectly containing the 'ungovernable'*" (Watson, 2009b, p. 177). The tactic is avoidance and distant repression; but the result is the condemnation of many inhabitants to subserviced, deprived and stigmatised urban fringes.

In the same line, actions such as regularisation and land titling of 'informal' settlements that might be viewed as pro-poor, have also been reframed as a form of domination. In various

accounts from Latin America, auto-constructed settlements have been positioned as a vehicle of political control through clientelistic co-option that reproduces social inequalities (see Collier 1976; Driant 1991; Varley 1998; Ramírez and Riofrío 2005; Connolly and Wigle 2017). Connolly and Wigle (2017) explore the role that everyday land use planning practices play in governing 'informal' settlement and regularisation processes and argue that plans, regulations and practices contribute to the re-construction of informality, in as much as these are directly linked to the discursive and material enactments of regularisation by government agencies. Urban informality and marginality are positioned as discursive strategies contingently defined and constructed by national governments to justify their actions (Bhan, 2016; Galland and Elinbaum, 2018). Bhan (2016) shows how practices of planning framed in the 'public interest' determine which settlements will be legal and which illegal, and which will be eradicated. Planning is therefore taken as a technique of rule. Borrowing from Roy (2009, 82), Bhan sees it as a 'spatial mode of governance' where the State exercises a 'calculated informality' to decide what is informal and what will thrive. He argues that the production and regulation of illegality is thus part of planning and not 'outside of it or a mark of its 'failure' (Bhan, 2016).

Acknowledging the important contributions that the above literature has made in advancing a better understanding of the nature of the interactions between peripheral urbanisation and planning, one notes that the outcome is understood from two different angles. On the one hand, auto-constructed settlements, are understood as 'overflows' or externalities of the planning laws and regulations; that is, there is no intentionality necessarily at play. While, on the other hand, the emphasis is placed on such settlements as outcomes of the purposeful adoption of the planning system towards exclusionary ends. As a starting point, this thesis locates itself between these two positions, remaining uncertain about the attribution of responsibility. It seeks to trace how things come to be, focusing on making visible the everyday engagements with planning laws and regulations. It refrains from locating power with a particular group, or from adopting an explanatory lens right from the onset. The potential contribution of the case of Lima to the debates outlined above stems from its contextual particularities which I explain in the following section.

2.2.3 The particularities of Lima's *barriadas* and the contribution to planning and informality studies

The city of Lima has historically provided a fertile ground for the conceptual understanding of urban processes through research on *barriadas*, since the city has predominantly grown through them. In comparison to other Latin American countries with similar processes of

accelerated urbanisation, in Lima, urbanisation through *barriadas* has been more extensive, more organised and has stimulated reflections on urban processes in a more profound way (Maldonado, 2015). During successive decades, *barriadas* have been widely considered as much by authorities as by low income populations as the local alternative for access to housing (Matos Mar, 1967; Collier, 1976; Driant, 1991; Riofrio, 1991). The *barriada*, as an urban and social process, has also served as an empirical basis for a large number of studies from different disciplines, providing at the same time less orthodox and influential inspirations in the housing and the urban economy sectors (Maldonado, 2015). There are several unique conditions that make the *barriadas* of Lima a worthwhile site for interrogating the relationship between planning and peripheral urbanisation.

The planning system and barriadas have a historically co-constructed relationship

Although *barriadas* in Lima have gone through different stages of eviction, tolerance, support and even promotion⁷, since their emergence in the 1940s (see Chapter 4), one notes that they present a long history of engagement with planning and the State (see Collier 1976; Riofrio 1978; de Soto 1989). David Collier's book *Squatters and Oligarchs* (1976), traces the various administrations over time, highlighting the role that each played in settlement formation. He notes that the government's role was crucial in the formation of more than a quarter of the settlements in Lima. Similarly, Gustavo Riofrio (1978), in his book *Se Busca Terreno para Proxima Barriada* (translated to *Searching for Land for the next Barriada*), analyses the public policies that produced or/and accompanied *barriadas*. He shows how the State permitted and facilitated the creation of *barriadas* despite the difficult living conditions characterised by the lack of adequate services. The State itself adopted the modality of the *barriada* as a form of social housing; as the former head of the Institute of Planning (IMP) notes: "*In Lima, access to cheap land was facilitated by the public sector more than in any of the other Latin American cities. Originally associated with organised invasions, land invasion become over time the city's only housing policy for the poor*" (interview with head of IMP, May 2013).

Thus, the *barriadas* of Lima cannot be interrogated in isolation and 'outside' of planning but present a situation where their development over time goes hand in hand with that of the

⁷ The government had to consider the allocation of land within its political motivations because the usurpation of government property could also be presented as the spontaneous act of redistributive justice and it could therefore win support from the population if occupiers of land justified their action in this way (de Soto, 1989).

planning system. Arguably *barriadas* and the planning system in Lima have co-constructed one another. The State has been involved in various degrees and responded through the application of existing norms and institutions. The different phases from repression, tolerance, concession of rights and finally recognition, have themselves developed the existing institutional framework (de Soto, 1989; Eyzaguirre, 1996, 1998; Mosqueira, 2000). The planning system evolved through an engagement with *barriadas* and the acceptance that planning processes had to support and integrate incremental urbanism. This mode of urbanisation was formally acknowledged and integrated into the planning system with the *Law of Barriadas* № 13517 of 1961 which enabled the physical and legal formalisation of auto-constructed settlements. The *barriada* thus developed, since the 1960s, in a manner that complied with planning standards and regulations because these were tied to recognition, regularisation, and the provision of basic services.

The institutionalisation of regularisation programs underlines the pervasive nature of State intervention in *barriadas* and in many human settlements in Latin American cities (Connolly and Wigle, 2017). Although such interventions by successive governments have been framed as a form of political co-optation, a means of control in the face of threats to political stability, and a tactic adopted for incorporating the political and economic participation of the urban poor (see Azuela, 1989; Ramírez and Riofrío, 2005; Duhau and Cruz, 2006; Ramirez and Riofrío, 2006; J. Calderón, 2012), arguably the case of *barriadas*, examined through a longitudinal lens, also presents a humanitarian side to the planning system. It enables the urban poor to be part of the city by shifting their status: informality and illegality are temporary states reverted through regularisation mechanisms tied to planning processes. This presents a counterpoint to some of the scholarship presented in section 2.2.2, where informality is maintained as a form of domination. Although considered 'informal' for violating property rights, *barriadas* are ultimately formalised. Similarly, their status is also legalised even though they are violating zoning laws by occupying areas of high risk. There is thus an unspoken assumption from all involved that precariousness, irregularity, and illegality, under which large areas of the city are urbanised, are not permanent conditions. As Caldeira notes, "*They are rather a matter of struggle, negotiation, and especially of transformation; in short, of politics*" (Caldeira, 2017, p. 15). Overriding existing rules and the possibility of change from illegal to legal and from informal to formal are intrinsically built into the administrative procedures. For many of the inhabitants I interviewed, this is a mark of the benevolent side of the planning system, since it allows them to ameliorate their standards of living, even if slowly. In contrast to many

accounts in the planning literature, the relationship between inhabitants and State authorities is not always overtly conflictual but can also be characterised by cooperation.

Besides the fact that the interaction between *barriadas* and the planning system has a historical base, an examination of the different development stages of the *barriada* also reveals that there is an everyday consideration of planning laws and regulations even before the land is occupied, as inhabitation always occurs in line with the urban planning norms. In this respect, the case of *barriadas* reveals a continuous engagement with the regulatory framework which is often overlooked in literature examining peripheral urbanisation. More often than not, the interaction between inhabitants of human settlements with the planning apparatus of the State is seen to occur at specific and intermittent stages when certain rights are demanded by inhabitants, namely the acquisition of services and formalisation of tenure. For example, in the context of 'squatter settlements' in Buenos Aires, Van Gelder (2010) notes how there are two distinct stages which have conflicting interactions with the planning system. In the first stage of occupation, settlers' violate or work outside regulatory frameworks in order to control the land and deal with repression and threats by State actors; while in the second stage, the settlers, becoming conversant in the State's laws and policies, navigate and adapt to the planning system, to meet the requirements it poses for legalisation. As such, he argues, the settlement's strategy shifts from resistance and noncompliance in the early phases of development, to adaptation and adjustment in subsequent stages. Similarly Caldeira (2017), drawing on various cases in the Global South also highlights the fact that the State is present in numerous ways but frequently acts "*after the fact to modify spaces that are already built and inhabited*" (Caldeira, 2017, p. 7). In the urbanisation of the slopes of Lima, although the occupation of land as such is extra-legal, it is done with the urban norms in mind and anticipating the need to comply with the regulations. These particularities of the case of Lima add to the existing literature in making an explicit link to regulatory frameworks which present, from the onset, the underlying field in which different actors operate and have to negotiate to arrive at their desired goals.

Regulatory frameworks and stipulated outcomes structure entitlements

In the case of *barriadas*, the continuous interaction with authorities and the regulatory framework is compulsory to progress. Planning standards and regulations must be translated into compliant spatial outcomes as such practices shape the entitlements of settlements to basic services, as well as local inhabitants' expectations on securing tenure. Each progressive development stage is effectively linked to a ladder of entitlements. For example, to get

recognition, inhabitants need to show that the plot sizes and streets of their settlement follow urban norms. To ensure that their settlement develops in line with planning standards and avoid difficulties once they enter the different administrative processes, settlement leaders commission certified engineers or architects to draw a layout plan compliant with the planning standards to guide the physical occupation of the land. This plan is then applied and abided to, guiding the division of plots and the general spatial occupation of the slope. Similarly, before settlements can apply for water and electricity, they need to demonstrate that they have mitigated risk on the slope through the construction of retention walls and concrete staircases. Only then is their settlement layout plan certified by the district municipality which subsequently enables them to apply for basic services from service providers. Therefore, spatial outcomes which comply with planning standards are not set as an end point but are milestones to be overcome at different moments in the process of entitlements. Consequently, the regulatory framework and spatial outcomes need to be examined together. Echoing a number of scholars (see Fernandes and Varley 1998; Van Gelder 2010; Datta 2013), laws and regulations in the case of the *barriadas* of Lima play a central role in the lives of inhabitants, and thus need to be examined with regards to the everyday engagements.

Although I have thus far placed emphasis on how inhabitants have to follow the regulatory framework and specific spatial outcomes, I acknowledge that actors do not operate in what I might have here presented as an entirely regulated environment. Laws and rules are not systematically followed. Auto-constructors and developers try to comply with city ordinances and regulations but usually do this unevenly (Caldeira, 2017). The conditions of irregularity regarding land tenure and construction vary widely (see Bhan, 2016; Holston, 2008; Payne & Durand-Lasserve, 2012; Varley, 2002). As Holston (1991) has also shown, each phase involves a great amount of improvisation and bricolage; complex strategies and calculations. There is thus a degree of emergence. In the process through which the practices of various actors translate the regulatory framework into stipulated outcomes, unintended outcomes, such as the hazardous conditions, are also produced. There is therefore a need to better understand the connection between regulatory frameworks, practices and outcomes (intended and unintended). The examination of these three together fills a gap in the existing literature.

Diverse range of actors interact with the planning system in pursuit of their goals

Peripheral urbanisation is predominantly attributed to the efforts of auto-constructors seeking a place to dwell in the city (Caldeira, 2017). The case of Lima brings out several other actors, converging in the same space and operating under different rationalities and interests to drive

the urbanisation of the slopes. These cannot entirely be divided into separate groups working independently.

As explained earlier, the State institutions at the local and national level are implicated, supporting the establishment of *barriadas*. Furthermore, land traffickers who pose as developers also operate on the slopes, appropriating large areas of public land, subdividing, and selling to those in search of an affordable place to live in the city. 'Land traffickers', the 'urban poor' and the 'State' are often maintained as monolithic categories in official discourse. Each is seen to operate within its own realm and in isolation and arguably, this treatment is also present in many academic accounts. For example, the State is often treated as an all-powerful and coherent actor that is able to exercise power over the poor (see for example Roy and AlSayyad 2004). Curiously this is also evident in the literature that seeks to show the entanglement of the State in formal/informal relations (Sundaresan, 2019). For example, Roy maintains the State is a powerful, homogeneous actor who can purposefully suspend its own rules and regulations to enable it to wield considerable power (see Roy, 2009a; Roy, 2005).

In the same way, other actors referred to as the 'informals' or 'the community' that inhabit human settlements are also taken as a homogeneous group and more often than not incorrectly equated with the 'urban poor' (AlSayyad, 2004). The 'urban poor' as a category to refer to those that play a role in the urbanisation of the slopes in Lima, is problematic for it bundles together various groups with differing practices. As explained in Chapter 1, invasions are not solely a practice of the poor in search of a place to live but are also a practice of 'land traffickers'. The term land trafficking encompasses a range of practices: from the individual who already has a place to live but takes another plot to sell on, to organised groups that capitalise on large areas of desert land. These groups neither work in complete isolation from one another and the State's apparatus, nor can they be thought of in the domain of the poor. In the most evident of cases, organised land traffickers, also referred to as 'mafias', are constituted by actors from different spheres. As journalistic accounts have exposed in multiple reports, these 'mafias' may involve powerful individuals within the administration such as district mayors (Andina, 2013; Diario Uno, 2014a; El Peruano, 2015).

With the understanding that there are diverse actors involved and their practices intersect, one is drawn to interrogate their relation. The relationship between the State and the 'urban poor' is seen to be characterised by conflict. Watson (2003) terms the notion 'conflicting rationalities' which has had traction in planning studies (De Satge and Watson, 2018). In the context of informal settlements in Cape Town, she argues that State, civil society and markets

are seen to operate through different and conflicting rationalities which structure planning processes (Watson, 2003). Considering the emphasis on conflict between actors in different camps, and a binary understanding of State and community rationality, the case of Lima demands a recognition of the complex nature of state-society relations in planning. The notion of conflict is to be challenged and remains an open question in this thesis and not an assumption from the onset. An interrogation of the *barriadas* requires the disaggregation of actors, a better understanding of the interaction between them and an exploration of their differential engagements with laws and regulations since there are also different interests at play. In this context, research needs to consider the complex set of interacting actors and practices and acknowledge that responsibility for outcomes is distributed.

2.3 Networked actors and the transversal logic of peripheral urbanisation

Although the *barriada* mainly develops through the efforts of its inhabitants, it consists of a set of interrelated processes in which various actors and their practices are entangled to enable and sustain the urbanisation of the slopes. The divide between the 'formal' associated with the State, and the 'informal' cannot realistically be maintained. The *barriada* therefore unsettles the established categories and pervasive dichotomies we use to think and speak about the city, such as the planned/unplanned, legal/illegal, state/non-state. When researching *barriadas*, I argue that such categorisations hide the temporal flux, the hybridity of conditions and the spectrum of interactions that characterise the processes through which these settlements develop. Moreover these distinctions fail to lead to an in-depth examination of the processes that engage with planning, as well as planning itself within the context of empirical realities (Sundaresan, 2019).

Scholarly advancements have explored the entangled relationships between these dichotomies (Roy, 2009b; Watson, 2009a; McFarlane, 2012; Van Assche, Beunen and Duineveld, 2014). The 'practice' and 'institutional' turns in the planning literature (see Gualini, 2001; Healey, 1999) have demonstrated, more specifically with regards to the State, how the various institutions that constitute it might not be aligned in their objectives (Dean, 2009). Officials inhabit different identities and do not therefore unequivocally operate in accordance with the rules, procedures and roles they take on (Flyvbjerg, 2001; Watson, 2002; Cleaver, 2007). McFarlane (2012) asserts that people, officials, residents and so on, move between the informal and the formal quite seamlessly in cities on a daily basis. He argues that in the

progress of urban life, people construct, compose, collaborate and speculate on different forms of relationship between formal and informal domains. In that process, urban life emerges as a collection of networks and relationships that form the meshwork of urban life (McFarlane, 2012; McFarlane and Waibel, 2012). Building on this scholarship, it becomes important to disaggregate the notional groupings and also acknowledge that people have mobility in terms of their identities and capacities. Moreover, actors do not act alone to support their activities, and it is therefore pertinent to pay attention to who and what they mobilise or draw-in, and how they interact in order to precipitate outcomes.

Teresa Caldeira's explains how the production of space in peripheral urbanisation comes about through a transversal logic. Caldeira argues that "*residents, government officials at various levels, developers, speculators, activists, engage with each other not necessarily outside of mainstream logics, but rather by taking them transversally as matter of negotiation and transformation*" (Caldeira, 2017, p. 15). This form of urbanisation unsettles official logics such as those of legal property, formal labour, state regulation, and market capitalism (Caldeira, 2017). As Caldeira notes, peripheral urbanisation does not contest these logics directly, as much as works with them in a transversal way, "*by engaging the many problems of legalisation, regulation, occupation, planning, and speculation, they redefine those logics and, in so doing, generate urbanisations of heterogeneous types and remarkable political consequences*" (Caldeira, 2017, p. 7). Transversal logics generate modes of political engagements that are a field of contestation and transactions (Ibid).

Considering that the urbanisation of the slopes in enables and sustained through a transversal logic, I here find McFarlane's notion of meshwork or network useful as a metaphor to conceive actors and their practices. Such a conceptualisation means that instead of focusing on distinct entities, one is called to undertake a crosscutting analysis, examining the complex ways in which actors and their practices interrelate.

Because there are different rationalities and interests at play, I here consider the existence of different networks. For example, the aspiration of inhabitants is to establish a secure place to dwell and climb the ladder of entitlements until their formalisation. As Li (2007) contends, they are driven by the rationality to 'thrive and survive'. As for land traffickers, the interest is primarily economic as they seek to maximise their returns with minimum inputs. As for the State it is driven by the rationality of the 'will to govern and improve' (Li, 2007). These entities have different fields of action determined by a number of contextual conditions which give shape to the networks they constitute. For example, the calculations that settlements on State

land have to undertake to arrive at their desired goals are determined to an extent by the administrative procedures of *Saneamiento Físico Legal*⁸. These are different from those of large-scale land traffickers that operate on 'privatised' land and have to engage with the process of *Habilitaciones Urbanas*⁹. Moreover, the final goal and time frames are different. Inhabitants make long term investments of time, resources and labour to secure a place to dwell. Land traffickers on the other hand, make short term investments for a fast return through the capitalisation of virgin desert land. Actors are enrolled within networks and operate within specific frameworks of assumptions, constraints on decision-making, sets of rules, ranges of ideas and access to resources, all of which govern their action (Healey, 1990).

Various analytical approaches bring forth the notion of networks or complex relations, namely social network analysis (SNA) and actor-network theory (ANT). Having developed over the last five decades in social science analysis, SNA is more established (Sundaresan, 2019) and defines a network either based on a specific tie, for example friendship, or a social group (Borgatti and Lopez-Kidwell, 2011). The notion of a network in SNA is used as a perspective, a metaphor or a paradigm that could facilitate the identification of interconnectedness or ties that explain social process or outcomes. While SNA focuses exclusively on human actors, ANT on the other hand, recognises that social actors and social relationships do not exist without non-human actors (Whittle and Spicer, 2008). As Verbeek (2005) states, they are inextricably linked as the subject and object are mutually constituted in their interrelation. Therefore if human and non-human actors are studied in isolation from each other, important dynamics can be missed (Montenegro and Bulgacov, 2014). ANT is relevant to this thesis because I here acknowledge the active role that artefacts, regulations, standards, routines and other non-human actors play in producing effects. As pointed out in Chapter 1, the observation in the field of the presence and use of maps and plans and their hybrid function, has influenced the consideration of such artefacts in this research.

As explained in detail in the next section, I adopt ANT together with institutional ethnography (IE), as these provide complementary and useful theoretical and methodological lenses for this thesis. Although they stem from different ontological bases, their differences enable a fuller

⁸ The *Saneamiento Físico Legal* is the dedicated municipal process that settlements on government land have to go through for their physical and legal regularisation.

⁹ The process of *Habilitaciones Urbanas*' applies to the development on private property land where the applicants have to following the conventional urbanism model.

analysis. As relational ontologies, they bring not only interactions between people to the fore, but also an understanding of materially mediated practices. IE and ANT researchers attend to work that is going on to maintain practices, activities and entities and therefore seek to explain how something comes to be stabilised. This is in line with the main research question which seeks to find an explanation for how and why the urbanisation of the slopes, and the production of risk, come to be sustained in time and space.

2.4 Drawing from relational and socio-material perspectives

2.4.1 Actor-network theory and its relevance to planning research

ANT is a sociology of association (Latour, 2005) and is particularly attributed to Michel Callon, Bruno Latour and John Law (see, for instance, Callon, 1986; Latour, 1987; Law, 1994). It is a framework for investigating society-technology interactions, developed by Science, Technology and Society studies (STS). The focus is on tracing heterogeneous networks of actors and their interactions, involved in the production of science and technology (Latour, 1987; Callon, Law and Rip, 1996). ANT conceptualises 'the social' as a network of entities (human and non-human) named 'actants' (Latour, 2005). Actants are understood as open-ended entities brought into existence through an association mechanism conceptualised as 'translation'. Agency is understood as produced through this mechanism of translation and therefore outcomes are seen to be the result of the association between actants. In ANT what is stable is what needs to be explained (Latour, 2005; Law, 2009). Thus, the effort is in describing how particular associations come about and hold for a period of time and, with them, the effects produced.

In explaining ANT, Latour, drawing from Foucault, conceptualised power as that which acts on people's actions. It is the relational dimension that generates instances of action, as actors do not embody action or actantiality (potential for action) (Cordella and Shaikh, 2006, p. 11). Here the agency is localised in the 'actant', i.e. in the relation of human and non-human entities. Because action exists only through interaction and association, its origins are uncertain since responsibility becomes distributed along the chain of humans and non-humans (Murdoch, 1997). As agency is granted to 'actants', Latour (and ANT) moves away from the binary opposition between individual agency and social structures (Laurier, 2010). This perspective has three points of convergence with governmentality (Rose, O'Malley and Valverde, 2006). It rejects structuralist explanations, focusing instead on showing in detail how knowledge and

other resources flow and get used in particular networks; it studies how things get done, moving away from questions looking at "why" and "in whose interests"; and *"[it] refuses to privilege not only Great Men but even Great Movements, considering instead the possibility that material things and processes might play an active role in many important processes"* (Rose, O'Malley and Valverde, 2006, p. 93).

From this perspective, if one wants to know the origins of power and structure, then a broader range of components must be taken into account that *"collaborate and cooperate in their creation, proliferation and persistence"* (Martin, 2000, p. 717). As Callon notes:

"the agency of any human being, his ability to conceive of actions, to plan them and to accomplish them by following the plan; the ability to have ideas and to associate them; the ability to be moved or gripped by compassion, the capacity to define his expectations and needs, all that depends on the arrangements, the socio-technical niches in which she or he is situated" (Callon, 2004, p. 7).

ANT offers two unique entry points for this research: firstly, it emphasises how anything emerges as the effect of a network of relations between entities, and how these networks include people, objects, ideas and practices; secondly ANT brings forth the idea of "technologies" as actants entwined in relation with other human and non-human actors. As a way of approaching the problematic in this thesis, tracing flows and work happening within networks of people and objects and studying the relations, one can better understand the socio-materiality of the practices and processes which drive the urbanisation of the slopes.

In this thesis, the 'State', 'land traffickers' and the 'community organisations' are understood as diverse entities, each actively pursuing its own network configurations. As actants enrol others to produce a reality conducive to their own ends, a potential arena of struggle over strategy is created (McGuirk, 2000). These three entities can be considered black boxes, borrowing Latour's terminology, in that they appear and are accepted as coherent groups. Their workings cannot entirely be deciphered as their parts and functions are hidden, which also means that their relations are not considered or interrogated. The aim of this thesis is therefore to open these black boxes and offer a transversal reading across them.

Although in ANT the intention is to start with a flat ontology, entities within the network take on particular functions (Latour, 1996). These entities cannot be recognised a priori, since their function comes about in relation. Thus the associations have to first be 'stitched together' (Jones and Latour, 2005) and *"it is only at the end of the period of network stabilisation that the actors/agents/actants can be distinguished from the lesser entities which by now are*

simple intermediaries, that is, links in a network" (Fuller (1994, p. 746) referred to in Murdoch, 1997). Below are some ANT terms I find useful for differentiating actors within a network.

An **intermediary** is that which transports meaning or force without transformation. Callon (1991) has identified four main types of intermediaries that circulate, align and define networks: texts, technical artefacts, human beings and money. These flow in the network but do not change relations. On the other hand, **mediators** transform, translate, distort, and modify the meaning or the elements they are supposed to carry (Latour, 1996). Recognising actants as mediators rather than passive intermediaries allows networks to develop in unexpected ways (Cowan, Morgan and McDermont, 2009) and also opens the door to recognising the multiple sites of translation or 'flows of translations' that enable network change (Latour, 2005). For Latour, the uncertainty around whether entities are acting as intermediaries or mediators is central to any ANT analysis (Rydin and Tate, 2016).

The obligatory point of passage (OPP) refers to a node which is indispensable in the network that is being constituted. It acts as an intermediary between networks or network components. A strong obligatory point of passage exercises control over resources and is able to claim responsibility for the success of the network (Law and Callon, 1992, p. 46). As a connecting and controlling feature, the presence and function of an obligatory point of passage varies from network to network yet plays an important role in alignment and durability (Martin, 2000, p. 719).

When networks are black boxed, the complex interactions between actors are rendered unchallengeable. Their stabilisation conceals the internal processes and the relations, transactions and conflicts hidden behind a coherent actor. Opening black boxes, making visible intermediaries, mediators, and obligatory points of passage is particularly relevant for planning practice. In such a complex landscape where responsibility is hard to attribute, identifying these key functions, their locations, and observing the tradeoffs and negotiations that occur to stabilise unwanted outcomes, becomes important to guide action towards transformative change.

The use of ANT in planning theory is uncommon and only recently, are a handful of scholars considering the productive application of ANT (see Rydin and Tate (2016) for an in-depth discussion). Rydin (2010) argues that ANT allows planning policy, practice and scholarship to recognise the complexity of actant interactions that produce "*outcomes which are a mix of the desired and un-desired, the intended and the unintended*" (Rydin, 2010, p. 267). ANT is useful for planning research because it offers insights into the formation of assemblages and rejects a

divide between formality and informality (Lieto and Beauregard, 2016). Moreover, it recognises the profound materiality of the world, drawing attention on how humans delegate tasks and responsibilities to non-human things. For planning scholarship, the consideration of non-human actors can capture important dynamics that might otherwise be missed (Whittle and Spicer, 2008).

Although the use of ANT is at its infancy in planning studies, it has contributed to rich urban analysis in geography and urban studies (Farias and Bender, 2010). At the same time, it has also come under attack for being heavily descriptive rather than foundational in explanatory terms. ANT relies on thick description which means that it is often seen as a disappointment for those seeking strong theoretical accounts. Furthermore, it has been criticised for its apparent apolitical stance. Latour's version of ANT has been condemned by scholars (see for example Swyngedouw & Heynen 2003; Hartwick 2000; Rudy 2005) as "*a status quo approach that ignores inequalities, differences and power relations; focuses its attention not on marginalised communities but on scientists and bureaucrats; produces only descriptions rather than powerful theoretical explanations; and remains stubbornly allergic to critique*" (Holifield, Porter and Walker, 2010, p. 48). However as Holifield (Holifield, 2010) argues, actor-network approaches "*instead of explaining inequalities by contextualising and situating them...[it] turn our attention to the forms and standards that make it possible to circulate new associations of entities, to generalise social order, and to situate actors within a social context- that is to socialise them in particular ways*" (Holifield, Porter and Walker, 2010, p. 49).

ANT is also critiqued for positioning human and non-human agency at par, even equating the two and obliterating the important differences between them (Kirsch and Mitchell, 2004). However, Latour's argument is not that the same kind of agency is exercised by humans and non-humans and that these are ontologically equivalent. Rather, he emphasises that the question of agency is 'profound uncertainty': "*...the human-non-human pair does not refer us to a distribution of the beings of the pluriverse, but to an uncertainty, to a profound doubt about the nature of action, to a whole gamut of positions regarding the trials that make it possible to define an actor*" (Latour, 2004a, p. 73). There are competing accounts of agency in the production of domination, and ANT analysis bring these to light, as Holifield (Holifield, 2010) notes: "*from accounts in which nonhuman agency takes a deterministic form, to those in which nonhumans are simply passive objects of social mobilisation, to those which lie somewhere in between*" (Holifield, Porter and Walker, 2010, p. 57).

ANT sits uncomfortably with a planner's perspective with regards to the subject as an active agent and discounts intentionality and coordination (Beauregard and Lieto, 2016). These same aspects are central to how planners see the role they can play and how change can be brought about. ANT discounts motivations and intentions and the psychological states of actors (Latour, 1992, p. 353; Law, 2009, p. 148). This is because the main concern is the interaction amongst actors, defined as anything that brings out a response within a network (Latour, 2005). Moreover, intentions are of little theoretical interest for ANT because agency is understood to be distributed across multiple actors; action is "*always dislocated, articulated, delegated, translated*" (Latour, 2005, p. 166). The subject is therefore negated as a thinking and strategising actor. Hence an outcome or effect is the product of this association and not the doing of an actor acting with a will and a defined goal. Beauregard and Lieto (2016) explain how focusing on intentions of distinct actors precludes the very notion of a network. They note that intention is based on a self-validating mind intending to act whether that mind is individual or collective. But they argue that such a 'distinct state of mind' dissolves when actions and intentions are dislocated. Another reason intentionality is seen to be at odds with ANT is that it is seen to privilege humans over non-human actors thus going against the flat ontology ANT seeks to establish and equivalence between the two (Beauregard and Lieto, 2016). Latour (1992) argues that privileging humans directs the attention away from the material world, and in order to understand stability and change one should "*follow what actors do and the responses they engender, do not ask about their intentions*" (Beauregard and Lieto, 2016, p. 168). Coordination is also discarded by ANT because it almost always requires a concentration of power and control and is therefore discordant with the flat ontology of ANT (Latour, 2005, p. 171).

I diverge from ANT in the three aspects discussed above: the position towards the subject, and the consideration of coordination and intentionality. I take subjects as active agents that can engage in active coordination. What actors do and achieve is partly determined by their intentions as well as the discourses they adopt or are embedded in. As a counter position to Latour (1992), I argue here that a consideration of intentionality does not systematically suppress the material world as it is still possible to acknowledge the part that non-human actors play in producing actions and precipitating outcomes.

From a planner's perspective, despite the existence of disjunctures with ANT, the latter is adaptable (Rydin and Tate, 2016). Barry (2013) highlights the openness within ANT as he notes that it should be taken as "*a range of pieces of theoretical equipment, which may need to be tried out, modified or abandoned, but never simply applied*" (Barry, 2013, p. 418). As he notes,

part of the difficulty of formulating ANT as a set of principles or concepts is that it should be adjusted in response to the experience of empirical research. In this thesis, I adopt ANT more as a sensitivity to particular relations and combine it with Institutional Ethnography (IE) to enable me to maintain aspects I deem important for a fuller analysis. Both ANT and IE, although often referred to as theories, are better understood as methodologies and therefore provide a way to go about the research.

2.4.2 Institutional ethnography with actor-network theory

IE developed by Dorothy Smith in the early 80s, is an approach used to investigate the social, focusing on textually-mediated social organisation. 'Institution' in IE is not another word for organisation or establishment, nor is it an objective entity that intervenes in people's lives. It refers to the complexes of activities organised around a distinctive function such as law, education, health amongst others. Institution is understood as part of a mode of ruling that includes institutional discourses and technologies. Therefore, IE refers to the investigation of empirical linkages among local settings of everyday life, organisations, and trans-local processes of administration and governance.

Dorothy Smith argues that technologies of social control are increasingly and pervasively textual and discursive and that these play a central role in shaping people's everyday lives (Smith, 1999). Thus, IE examines work processes and studies how they are coordinated, typically through texts and discourses of various sorts. Texts refer to documents or any type of representation that has a "*relatively fixed and replicable character*" (Devault and McCoy, 2002, p. 765). IE starts off with researching the everyday not to remain at that level, but as a way of looking beyond the everyday to discover how it came to happen as it does, and be able to make observable the discourses, technical and social factors which structure the everyday. So the researcher moves analytically from the ethnographic description of the local to the explication of the ruling relations that coordinate people's knowledge and activities.

Both IE and ANT provide a way of thinking about how people are made to do things across networks of geography or time, or across institutional boundaries. For ANT interactions bring aspects from other times, spaces, and agents, thus every site is the "*result of the action at a distance of some other agency*" (Latour, 2005, p. 219). Similarly, IE emphasises trans-local relations. The researcher pays attention to the ways everyday activities at the local site is coordinated by texts, most often produced elsewhere, at other times, by other people to standardise, count and control.

Although these theoretical positions have similarities and differences, one needs to acknowledge that they have different ontological basis. Both have a relational focus. Both start with everyday experiences. ANT researchers are concerned with enactment and IE researchers with active organisation. In ANT, non-human actants are as important as human actants. IE positions people and their experiences within relations at the centre. In IE, a text does not have agency by itself, it needs people to activate it and that relies on reading practices. The activation of texts brings forth specialised forms of knowledge and enables local action. Peoples' reading and activation of texts coordinate, organise and dominate both what goes on and what can be known authoritatively about that setting (Smith and Turner, 2014).

Therefore, with regards to the subject as an active agent, Smith offers a counterpoint to Latour's position. She has developed her ideas as a challenge to forms of thinking that are reticent to identifying people as active psychological beings (Satka and Skehill, 2012). From her sociologist's viewpoint "*positing the individuated subject means that problems of knowledge must be solved with reference to states of individual consciousness- perception, cognition, experience- and the objects they perceive, know, experience, or otherwise apprehend*" (Smith, 1999, p. 108).

Smith argues that an actor participates by reproducing or modifying discourse in the social relations provided by his or her material situation. Discourse creates positions for subjects or agents (Smith, 2005, p. 223) and it refers to a field of relations that includes not only texts and their intertextual conversation, but the activities of people in actual sites who produce them and use them and take up the conceptual frames they circulate (Devault and McCoy, 2002, p. 772). A subject position is thus defined by discourse and other relations of ruling and involves power, for example the power for a subject to objectify, name and displace other forms of knowledge (Smith, 2005, pp. 33, 120). Discourses themselves are mobilised to justify certain actions and can be a frame that constrains the possibilities of action or potentialises them and are therefore important to analyse to gain a better understanding for the factors that set the action space. The method developed by Smith's sociology is helpful to discover in detail the position of those involved in the urbanisation of the slopes whether authorities, technicians, inhabitants and others as knowledge producers and mediators between the social orders of everyday life and planning institutions.

2.4.3 Methodological implications of actor-network theory and institutional ethnography

Methodologically ANT and IE involve mapping relations. ANT analysis often starts by looking at an object of significance within a given network and exploring either how that object came to exist in relation to the actors who helped to create it, or how that object has had a significant impact on network activities (Farias, 2010). When seeking to analyse interactions, the focus can be on: 1) how actors use objects, artefacts or standards as storehouses for their relationships. Thus, one examines how the object helps organise or structure relationships; 2) the consideration of objects, artefacts or standards as actors themselves and therefore examine how they take a life of their own and reshape the relationships between actors. Such channelling may involve actors who are geographically remote from each other (Vilches and Tate, 2016).

ANT relies on extensive tracing of the actor-network to identify form (for example clustering patterns) and to partly explain the negotiation which occurs between the different actors mobilised. Similarly, IE relies on mapping as it follows the circulation of the text, bringing into view the different interconnected sites, and examines what happens in these sites with the text and on account of it; it analyses how a text enters into, shapes and coordinates people's doings across time and space (Smith and Turner, 2014, p. 5).

'Doing' ANT or IE means doing empirical sociological fieldwork. As Law (2009) highlights about ANT, it tells stories about 'how' relations assemble or don't: it is a form of material semiotics, *"better understood as a toolkit for telling interesting stories about, and interfering in, those relations. More profoundly, it is a sensibility to the messy practices of relationality and materiality of the world. Along with this sensibility comes a wariness of the large-scale claims common in social theory: these usually seem too simple"* (Law, 2009, p. 142). In this thesis, I take the approach of stories and rely on thick description to answer the main research question.

Summarising the above, I combine ANT and IE for their methodological possibilities to disaggregate groupings, unravel relations, as well as materially mediated practices, to observe how the urbanisation of the peripheral slopes of Lima is enabled and sustained. As an entry point to the research, I look into three black boxes, 'the State', 'land traffickers' and the 'community organisations'. I seek to better understand the network of heterogeneous actors that come together under these to advance interests. I take into account discourses and technologies used to structure everyday life and the rationalities, intentionality and coordinative possibilities of actors. ANT and IE as ethnographic approaches offer a way to go

about the research to arrive at a transversal reading. As explained above, by following an actor or artefact one can trace the relations, cast light on the practices and observe the negotiations that take place between actors to better understand how these link to outcomes. To operationalise the transversal reading sought, I propose to focus on cartography as an instrument of planning.

2.5 Transversal reading through cartography

2.5.1 Why cartography?

Through the process of land occupation and urbanisation of the peripheral slopes of Lima, cartography, in the form of maps and plans, is mobilised by different actors for different ends: to claim and defend territory, to negotiate with authorities, to acquire services, to organise the internal workings of settlements, to sell land, amongst many other uses. As explained in Chapter 1, maps and plans circulate, coordinate and operate in a visible manner within government institutions as much as settlements. Criqui (2014), in her article on water and electricity networks in *barriadas* of Lima, positions the layout plans as halfway between strategic planning (Albrechts, 2006), the urban services being the strategic entry point that influences urban consolidation, and collaborative planning (Healey, 2003) as inhabitants use them to define their priorities and future needs. Maps and plans work across networks and are thus enrolled in different ways. In this sense, they take hybrid dimensions and can be understood as boundary objects, a term devised by Star and Griesemer: "*plastic enough to adapt to local needs and the constraints of several parties employing them, yet robust enough to maintain common identity across sites*" (Star and Griesemer, 1989, p. 393). Because of the hybrid dimension, following cartography as a boundary object, means that one is inevitably made to travel across different networks and interests. It is thus useful for a transversal interrogation.

What is more, cartography and planning are closely linked. Cartography as a planning device is used to communicate and translate the urban planning regulation and standards into built form. In this sense, the layout plan in Lima's *barriadas* acts as a coordinating institution and structures the urban fabric of settlements. It enables the actualisation of an abstract set of rules into tangible outcomes. This translation is important in the case of *barriadas* since a spatial layout which complies with the planning norms is a prerequisite to recognition and a series of entitlements such as water and electricity. Thus, cartography operates as the link

between the regulatory framework on the one hand and spatial outcomes on the other. As I seek to interrogate the relationship between the regulatory framework, practices and outcomes, a focus on the cartographic practices that seek to translate regulations into spatial outcomes can provide a means to observe what happens during this translation and how undesired consequences are produced in the process.

To better understand the analytical and methodological possibilities that cartography offers, it is important to question its epistemological position. Methodological and epistemological aspects are indivisible because how one knows something is intrinsically linked to how one goes about knowing it. How maps are understood in the first-place guides what can be known through them. The literature in critical cartography as well as geography bring out different conceptualisations of maps. Diverging accounts explore what a map is, how it 'does work' in the world and where its power lies.

2.5.2 Maps as intermediaries or mediators

Maps have been explored in several ways. They are understood as social-constructions that do not merely represent the world but re-describe it *“like any other document in terms of relations of power and cultural practices, preferences and priorities”* (Abrams and Hall, 2006, p. 15). They are neither neutral nor unproblematic with regards to the representation, positionality and partiality of knowledge they embody (Harley, 1988; Pickles, 1991; Wood, 1993; Crampton, 2001).

Of particular weight, due to the number of academic contributions in the geography and critical cartographic literature, is the emphasis on the discursive power of maps and their ability to achieve social and cultural ends in line with the desire of those who produced them (see Harley 1989). Maps, as representations, are seen to influence consciousness and persuade publics of their value free and truthful nature. Thus, they can tactically be used for manipulation, persuasion and domination (Dodge *et al.* 2011). They are consciously adopted as a tool of power to advance interests.

The crucial role that maps played in the imperialist era to claim and control territory is well covered (Harley, 1989b; Buisseret, 2003; Akerman, 2009; Edney, 2009). Several scholars have analysed the instrumental role of maps in the construction of states and identities, the control and activation of territory and the unfolding of potential (see Christophers, 2007; Corner, 1999; Harley, 1989a; Wood, 2010; Radcliffe, 2009). Mapping relations have also been

theorised as key for producing and maintaining colonialism, property ownership, national identity, race, military power, bureaucracy and gender (see Anderson, 2009; Haraway, 1992; Pickles, 2004). Mapping is foregrounded as a technology of government (McCormack, 2012), as a strategy of territory and 'making legible' for purposes of intervention. In his book *Seeing like the State*, Scott (1998) argues that government inherently involves the mobilisation of ways of 'seeing'. This then leads to actions which seek to shape the perceived terrain according to such perspectives of government. The act of enframing, as the main manoeuvre in mapping, which literally means putting a frame around something, focuses attention and in turn extends the potential of the things enframed (Mitchell, 2002). Maps therefore play a role in strategising and tactically opening new possibilities and unleashing potential. As Corner notes, their main function is not to depict but to enable, "*thus mappings do not represent geographies or ideas; rather they effect their actualisation*" (Corner, 1999, p. 225). They do not remain as passive representations as they capture something of the world whilst simultaneously doing work in the world: they precede and produce the territory (Pickles, 2004). Corner (1999), following Baudillard, argues that maps and territory are co-constructed. One does not precede the other. Space becomes territory through bounding practices that include mapping. Moreover, given that places are planned and built based on maps, so space is itself a representation of the map.

At the same time that an array of accounts expose the hegemonic adoption of maps by the State (see Black, 2002; Edney, 2011; Brenner & Elden, 2009; Sparke, 2005; Crampton, 2010), others look at the appropriation of maps by the marginalised in society. There are numerous cases, in development planning literature, where mapping has been used to shift power imbalances and give a voice to those that are 'off the map' and made invisible (Lambert, 2015). Mapping is a means of creating alternative ways of framing in reaction to existing knowledge. It is adopted as a tactic to enhance the negotiation capacity of excluded groups when fighting towards just processes of recognition and equitable distribution of resources (Harris and Hazen, 2006; Pervaiz, Rahman and Hasan, 2008). Several scholars have explored how the mapping of indigenous territories has been used to bolster the legitimacy of customary claims over resources in legal battles and strategies (see Fox *et al.* 2005; Peluso, 1995). In the urban context, grassroots actors are adopting mapping as a means to contest evictions and relocations and to claim their entitlement to services and urban infrastructure (see Glöckner *et al.* 2004; Hasan 2006).

In these various accounts, whether the map is used for domination or resistance, one notes that there are differing positions with regards to the ontological nature of the map. In most

cases, the map is taken as a stable artefact, ontologically fixed; that is, what is represented is not interrogated or interpreted per se but rather taken to capture a universal 'reality'. Moreover, there is a perceived linearity between the intent and the outcome which the map facilitates. When enrolled by social actors for their desired goals, the map is used in ways that may reify dominant ideologies. It works through its perceived stability with regards to representation and can therefore be read by different people in different sites and maintain its message to a large extent. Its inherent mobility means that it can travel to coordinate the work that needs to take place. Latour (1987) refers to maps as 'immutable mobiles' and contends that it is the universal, stable, and mobile characteristics that enable the accumulation of knowledge in particular sites from which territories can then be governed from afar. In his book *Science in Action* (1987), he uses the example of cartography to explore how the cultures and mechanisms involved in the production of western scientific knowledge gained their power and authority to make truth claims about the world that in turn are employed to do work in the world. He examines how the forms maps take (in terms of scale, legend, projection) became familiar and standardised through protocols so that the map becomes stable, combinable and a transferable form of knowledge that is portable across space and time. When the map is adopted to further interests, it is done so with the belief that it is stable enough to translate those interests as intended. Therefore, using Latour's terminology, the map can be understood as **an intermediary**: it helps to transport meaning and force without transformation.

As a counterpoint, several scholars react to the ontological stability that is given to maps because, as inscriptions (Pickles 2004) or as a system of propositions (Wood and Fels 2008), maps are open to interpretation and therefore 'misuse', precipitating effects which are not entirely controllable. They show the way maps work in unexpected ways, escaping the design of the user and leading to unintended consequences (see Peluso, 1995; Fox, Krisnawati and Hershock, 2005; Roth, 2009; Radcliffe, 2010) From a non-representational perspective, scholars highlight maps as actors that can change the course of action and precipitate their own effects (see eg. Corner. 1999; Del Casino Jr. *et al.* 2006; Kitchin *et al.* 2013). In Latour's terms, maps are therefore **mediators** that are capable of changing the flow of power through them rather than being objects through which power flows unhindered (Latour, 2005, p. 9). From this perspective, a map is not inert, nor is it a stable component of discursive formations, but active matter. It is an agent that can associate with or disassociate from other agents. It is part of an assemblage of people, discursive processes and material things and works in concert with others to transform the world. In transforming it is taking part in negotiations and

transaction with other actors. From an ANT perspective, a map is an actant that is itself constituted through other actants; there is thus attention placed on those others that also come to be associated in the map.

Although there is a fundamental difference between seeing maps as intermediaries or mediators it is worth maintaining these conceptualisations together because they present different entry points in the research. As intermediaries, they reveal something of the actors that enrol them. Cartography, understood as a technology of calculation to expand the room for manoeuvre of those who adopt it, or to restrict the actions of others, exposes the rationalities at play. Rose (1999) defines technologies as "*an assemblage of forms of practical knowledge ... transversed by aspirations to achieve certain outcomes rooted in a rationality*" (Rose, 1999, p. 52). Aspirations are underpinned in particular rationalities that determine the means and ends in the hope of producing desired effects and averting undesired effects (Miller and Rose, 1990, p. 7). Focusing on the means, in this case the maps/plans used, is therefore a way of getting closer to the aspirations, rationalities, practices and desired outcome. When taking maps/plans as a mediators, the emphasis is on analysing the way these change the course of action, how they themselves play a role in structuring practices and outcomes. Moreover, the attention is drawn towards making visible the negotiations and transactions that take place with other actants.

Understanding maps/plans as intermediaries, that extend interest and coordinate between sites, or mediators, that calculate and negotiate in relation to other actants, I hereby propose to focus on two aspects of cartographic practices: cartographic coordination and cartographic calculation.

2.5.3 Cartographic coordination and cartographic calculation

Cartographic coordination refers to the practices of coordination that occur with the map/plan but also within the map/plan as a site of coordination itself.

Maps are enrolled for their coordinative abilities to extend and translate intentions into actions. Because they are wielded as a technology in line with a rationality (beliefs, values and ideologies that sustain some representations of nature and the social world at the expense of others) they are a window into those that adopt them. In examining how maps are used to coordinate interests, one is attentive to the ideological stance that accompanies them, the discourses they embody and the practices they coordinate. Following how the map/plan

circulates and who it coordinates is productive for bringing into view the different actors and observing how the different networks interrelate. At the same time, it exposes the sites it lands in which can be examined further to understand the practices: what is done with the map and because of the map. As in IE, taking the map as a coordinative inscription, one is drawn to examining how the map orients and shapes the reader's consciousness, organises readings and talk, and coordinates the knowledge and actions of diversely located co-readers of the same text (Turner, 2014).

In addition to the coordination of different sites through its travelling, a map as an actant, also brings different actants into association during its production. Because it is a manifestation of an association it can itself be examined as a site of coordination. For example, settlement layout plans that are used to translate urban norms into build form, bring together different elements such as conventions, regulations, the grid, the territory, past inscriptions amongst other actants. Therefore, the map not only moves between places coordinating different sites but is itself a site where actors are brought together from distant places and times. As Hanna *et al* (2004) notes, representations such as maps work because "*they help make connections to other representations and to other experienced spaces*" (Hanna *et al.*, 2004, p. 464).

Cartographic calculation refers to the practices of calculation in which the map/plan plays an important role to structure outcomes. This brings attention to how social actors as much as non-human actors interact with each other, with a potentially competitive streak to precipitate effects. I use the term 'calculation' to refer to the drawing out of potentialities and possibilities from multiple unfolding relations and set of actions in the hope of furthering particular objectives and desired outcomes. The focus on calculation brings forth the aspects of territory of action whether this be physical or as a realm of possibilities and constraints. Thus, one is drawn to identify and examine the different factors that come to structure a calculation and by extension also understand which factors are excluded from the calculation. Moreover, in focusing on cartographic calculation, one is also drawn to analyse the negotiation and transactions that take place between actants.

2.6 Conclusion

In this chapter, I presented two main ways that the relationship between planning, urbanisation and informality has been conceived. On the one hand, peripheral urbanisation is seen to occur as an independent process 'outside' of planning but comes to violate planning laws and regulations. On the other hand, contrary to positioning planning at the margins, it is

seen as central to peripheral urbanisation, producing and regulating it. In the latter framing, scholars have understood auto-constructed settlements as the result of strict and bureaucratic regulatory frameworks which do not give any alternative but their violation. Thus, peripheral urbanisation, seen through an informality lens, is also positioned more as an unintended consequence of planning laws and regulations. Others demonstrate the purposeful appropriation of planning by the elite to produce peripheral urbanisation in order to dominate and control. Undeniably planning is a site of struggle, and the current literature emphasises the conflictual relationship between the modernising developmental State and markets and the urban poor. This is well synthesised by Watson (2003) who argues that 'conflicting rationalities' between the 'will to govern and improve' and the 'will to thrive and survive' come to clash and structure the planning process.

This thesis considers the central role of planning in peripheral urbanisation and questions the often-accepted assumption that the interaction of different actors is characterised by a conflictual relationship. The case of Lima is here productive to advance existing planning scholarship that explore the failures of planning because of the unique particularities it presents. Firstly, the engagement between *barriadas* and the planning system has a long history and the two have a co-constructed relationship. Secondly, the continuous occupation and urbanisation of the slopes of Lima are enabled through dedicated planning processes for *barriadas*, even though the national State has declared the areas they occupy as uninhabitable and high-risk zones. Thirdly the engagement with planning standards, regulations and procedures are continuous throughout the different stages of *barriada* development as they structure entitlements. Fourthly, stipulated outcomes in line with the urban norms are also tied to the ladder of entitlements thus practices translate regulatory frameworks into outcomes and in the process produce undesired outcomes. Finally, the *barriadas* on the slopes comes about as an effect of the practices of multiple actors, with different interests, and their interaction with planning professionals, instruments, procedures and regulations. Consequently, the dichotomies often used to understand auto-constructed settlement such as the legal/illegal, formal/informal, state/non-state are unproductive. One needs to acknowledge that peripheral urbanisation comes about and operates through a transversal logic that cuts across these dichotomies. This thesis therefore seeks to find a means for a transversal reading to better understand the nature of the engagements that enable and sustain the continuous urbanisation of the slopes.

In this chapter, I have drawn on literature from a variety of fields: urban planning, critical cartography, urban studies, architecture, science and technology studies and human geography. The theoretical plurality enabled me to adjust for the limitations of different theoretical positions. The different approaches were judged in terms of their relevance, fit and utility (Thornberg, 2012) while remaining conscious of the possible disjunctures between different kinds of reasoning and different ontological position, and methodologies these implied.

Borrowing from ANT and IE and taking a relational and socio-material perspective on the urbanisation of the slopes, as well as the production of risk, are conceptualised as an effect of a heterogeneous association of human and non-human actors which come to form networks. As there are diverse networks driven by different interests operating on the slopes, I propose to approach this interrogation by unravelling three black boxed entities: 'the State', 'the community organisation' and 'land traffickers'. I do not preclude that only these exist but use them as a starting point.

To open these black boxes and provide a cross reading, I propose to enter through a focus on cartography because maps/plans are important and operative in the urbanisation process under observation and provide multiple entry points for analysis. As intermediaries, maps/plans coordinate actors and distant sites. As mediators they take active part in a transaction with other actants, calculating and negotiating to precipitate effects. I therefore focus on cartographic coordination and cartographic calculation to make visible the various actors, their practices, their rationalities and relations, and analyse the engagement with planning regulations to better understand the link with undesired outcomes.

Chapter 3 Research Process and Design

3.1 Introduction

Chapters 1 and 2 provided a detailed introduction and discussion of key debates and research findings that have shaped the research focus. Chapter 2 developed the conceptual and theoretical direction that culminated in a relational, socio-material and historical perspective to examine how and why the urbanisation of the slopes of Lima, as an outcome of planning, is enabled and sustained over time and space.

Chapter 2 proposed cartography as an entry point to this interrogation. It explained how a focus on cartographic practices, that is cartographic calculation and coordination, is analytically and methodologically productive to bring into view the actors that constitute networks, their practices, relations, rationalities, as well as the tradeoffs and negotiation that occur between actors to precipitate desired but also undesired spatial outcomes. The chapter developed a conceptual and methodological approach by combining different theoretical perspectives on cartography. This chapter will explain how the approach was operationalised in the research process and design to answer the research question.

Acknowledging that one always 'comes from somewhere' laden with preconceptions, frameworks, values, and an outlook on life that guides any process one embarks into, this chapter will first offer a brief explanation of why Lima became the study context, and how my earlier engagements with maps and mapping have influenced this PhD. Subsequently, it describes the research process through which the conceptual approach developed, and outlines the information needs, the data collection techniques adopted, as well as the data processing and analysis. The chapter then offers some reflections on positionality, reflexivity and the ethical considerations that have emerged throughout the research, ending with a brief explanation of how the boundaries for the research were determined and the limitations of the study, since these were mainly methodological.

3.2 The Point of Departure and Motivation

Reflecting on the past years, I can identify several factors that motivated me to embark on a PhD in Lima-Peru, as well as informed the entry point for this thesis through cartography. Figure 3.1 offers a timeline of the various academic and professional involvements that impacted on this PhD. It starts from my architectural training in 1995 where the focus on

space, the built environment, and a close engagement with instruments such as maps, plans and the act of mapping to design, communicate and implement projects, became second nature. Despite this pervasive use of maps and mapping in my professional circle, there was a lack of critical engagement with the instruments and techniques we adopted to facilitate our work. This was also accompanied by a disproportionate attention on social aspects and little on the political. In more recent years, from 2011, I took on several overlapping roles: teaching fellow, co-investigator in a number of research projects, and PhD student. These enabled me to develop a critical position and understanding with regards to broader political and social-environmental concerns in cities of the global South (namely Lima, Bogota, Karonga, Freetown, Accra, Addis Abeba and Harare).

A year prior to starting the doctoral research, I was exposed to Lima in my role as co-director of the practice module of the MSc in Environment and Sustainable Development (ESD)¹⁰, at The Bartlett Development Planning Unit (DPU), University College London (UCL). Every year, the module culminates with a 3-week fieldtrip in a chosen city of the global South. The engagement with the same city typically lasts 4 years. While teaching in ESD and travelling to Lima in the first two years, I became sensitised to the literature focusing on the city and undertook fieldwork in different geographic locations within the urban metropolitan region. I met various academics, public officials, community leaders and inhabitants and gained a more grounded understanding of the urban development processes and the current political, economic and social structures of the city. I became invested in the rich context for research that Lima provided, leading me to confront established ways of understanding the city, informality and planning. Moreover, historically Lima has been used as a laboratory for experimentation and a fertile ground for the conceptual reframing of urban processes.

I had already been in academia and research for several years when I embarked on the PhD, hence the PhD was not so much a way of launching my professional career, but a way of understanding a subject matter that puzzled me: the continuous urbanisation of the slopes in high risk situations with the involvement of the State and its planning apparatus. Having received a fully funded scholarship from the Economic and Social Research Council (ESRC), it was a privilege to be able to spend a generous 5 years on my research interests. I embarked on

¹⁰ The ESD Practice Module is part of a full-time Masters planning degree based on an action research approach. It runs over three academic terms concluding with a period of overseas fieldwork in a city in the global South. The module aims to diagnose socio-environmental injustices in the city and define strategies to address them.

the PhD in 2013, part time, while taking advantage of my teaching and research in Lima from 2012- 2017.

My teaching at the DPU influenced the PhD in many ways. The specific case study site I chose, Jose Carlos Mariátegui (JCM) in the district of San Juan de Lurigancho (SJL), had been one of the six case studies selected for the ESD masters students' fieldwork. Moreover, the research I was involved in as a co-investigator, namely two DPU projects ReMap Lima¹¹ and cLIMA sin Riesgo¹², also concentrated part of the efforts in the same geographical location. This gave me considerable advantage in accessing the area as well as informants. Furthermore, the action research projects placed the focus on risk and my remit in these was to develop ways of mapping risk, to better understand where it accumulated, who it affects and contribute to the development of strategies to disrupt risk accumulation cycles (see Lambert & Poblet 2015).

During my time on the DPU projects, I was confronted with three important realisations in the field which could not be covered by the research we undertook. Firstly, many factors which interacted to reproduce risk on the slopes were not so visible or well understood. For example, certain actors (human and non-human), as well as work processes and practices can easily go unnoticed unless one focuses on the minutia of their actions. An ethnographic interrogation was necessary to understand what exactly was going on to begin suggesting ways of disrupting risk cycles. Without this, there was a danger of remaining too broad in the strategies and entry points, and too easily assign blame to the 'informality' of processes.

Secondly, plans commissioned by settlements determined the spatial layout at the moment of occupation of the slopes. In many cases, the layout worked against the contour lines exacerbating risk. Looking at how and why such plans were produced and used was important to understand how they shaped the urbanisation of the slope.

Thirdly, there seemed to be an absence in the effective application of learning. Although we held a number of focus groups and workshops with inhabitants and leaders to explore how

¹¹ ReMapLima - *Mapping beyond the Palimpsest* - led by Adriana Allen and Rita Lambert from 2013-15, interrogates maps and mapping practices and how these configure the territory in the centre and periphery of the city. It was done in collaboration with several Peruvian NGO and executed with a grant from the Bartlett Research Materialisation Grant.

¹² cLima Sin Riesgo - *Disrupting urban 'risk traps': bridging finance and knowledge for climate resilient infrastructural planning in Lima*, led by Adriana Allen from 2015-17, investigated potential ways of disrupting cycles of risk through connected actions and investments by local communities and State agencies. The project was funded by the Climate and Development Knowledge Network - CDKN.

things could be done differently to mitigate/reduce risk, I was perplexed that change was so difficult to instil. We would come back, every couple of months, to find that more areas of the hills were parcelled out, following the same spatial layout that contributes to creating difficult access ways. Despite the many moments discussing and strategising with settlement leaders and inhabitants over several years, it was hard to realise that our efforts did not instil a different development path, even for those settlements that seemed to have strong control over their own affairs. These realisations led me to consider the existence of emergent conditions that could not entirely be foreseen or controlled, informing this thesis.

Using maps and mapping as an entry point was not entirely coincidental having previously had considerable theoretical and practical engagements with mapping. I had used mapping widely in my architectural work as a practical tool for analysis and communication. I later came to engage with its political implications as I shifted to the field of urban development planning. I gained a better understanding of how power is enacted in and through maps in struggles for socio-environmental justice by writing my Master thesis at the DPU, later published as a working paper (Lambert, 2015). In my teaching, I still adopted mapping to foment new insights into spatial relations, to understand trends and make correlations between the causes and manifestations of socio-environmental injustices. I continued this intellectual journey on mapping, in my subsequent involvement in various DPU action-research projects which culminated in a number of publications (Allen and Lambert, 2015a, 2015b; Allen *et al.*, 2015; Lambert, 2015; Lambert and Poblet, 2015; Lambert and Allen, 2016; Allen *et al.*, 2017; Allen, Lambert and Yap, 2017) and conference proceedings. Together, these enabled me to explore in more concrete ways how maps and mapping work to foment possibilities that expand the room for manoeuvre of different groups, especially those marginalised working towards just processes and outcomes.

With the practical experience and the theoretical engagements, as well as the realisation that maps and plans were important in the study context, I could see how cartography could be an intellectually productive entry point. As explained in Chapter 2, focusing on maps/plans can be a means to examine the range of social processes in which they are enrolled, as well as understand the role they themselves play in shaping these processes. Although entering research through a focus on artefacts is common within some fields, such as institutional ethnography with a focus on how texts coordinates people's doing and thus can reveal the 'ruling relations'; or the political sociology perspective of policy instruments put forward by Lascoumes and Le Gales (Lascoumes and Le Galès, 2004; Lascoumes and Le Gales, 2007) to reveal power relations associated with instruments and issues of legitimacy, politicisation, or

depoliticisation dynamics; it is less common in planning studies. Using cartography, as a key instrument of planning, that has a co-constitutive relationship with planning, could be used to theorise planning and observe planning in practice.

The kind of knowledge I sought to produce was driven by my desire to better understand the urbanisation of risk, as an outcome of planning, and to identify the points of entry where the stability of the socio-technical arrangements producing these outcomes could be disrupted to inform action towards more progressive change. In this sense, theory could not remain purely as critique. As in the applied discipline of urban planning, for me, this research and analysis had to play an important role in informing practice (Watson, 2014). I had to refrain from adopting explanatory frames and tame my instinct as an architect to impose a technical solution. As planners/architects, in our projective frame of mind, we are often looking at 'what could be'; tracing back how things came to be in the first place is not typically what we spend most of our time researching. I needed to get closer to the facts before intervening and this meant fostering collaborative and community based knowledge, examining the mundane everyday practices and normalised processes and also, as Latour puts it, cultivating a "stubbornly realist attitude" - realism in relation to what he calls "matters of concern" (Latour, 2004b, p. 232) that could inform my own practice and also be relevant to policy makers and planners.

3.2.1 An Iterative Research Process

Undertaking the PhD at the same time as fulfilling the DPU roles in teaching and research, meant that I was frequently travelling to Lima. The ten trips I made over the course of five years, amounting to 6 months and 3 weeks in the field, shaped my PhD as an iterative process with various stages of data collection, analysis and writing between Lima and London. Two of those trips were before I officially started the PhD and acted as a scoping exercise which subsequently helped to define the research. Some of the trips were solely dedicated to the PhD while others, I combined with my other engagements. This arrangement was overall very productive even though I had to renegotiate the allocation of time to each at different intervals. The first three years, I was on a part-time basis on the PhD after which, I changed to full time with a reduced contract for teaching and research in the fourth year. Figure 3.2 is a timeline showing the various projects I was involved in and the periods of travel.

The iterative process between data collection, reflection, analysis, writing, more collection, analysis, writing and re-writing informed the way I approached theory and the research

process. There were multiple and complex interactions between overall research aims, development and testing of concepts and theories, formulation of research questions, methods of data collection and analysis, as well as the soundness and reliability of findings and conclusions (Maxwell, 2013). I did not follow a typically sequential process of developing a theoretical framework or hypothesis and operationalising it or testing it on the ground. Instead I explored different theories or bodies of literature using them as 'sensitising concepts', a term devised by Bowen (2008). Sensitising concepts are used to draw attention to important features and guide the interpretations of data and the analysis. They are "*those background ideas that inform the overall research problem*" (Charmaz, 2003, p. 259) and offer ways of seeing, organising, and understanding experience. Sensitising concepts tend to be viewed as interpretive devices and as a starting point for building analysis (Glaser, 1978; Padgett, 2004; see also Patton, 2002). This positions them as meta-theories, useful in theory-building (Connell, 2007), and offer something for research findings to speak back to.

My research methodology, I would describe, as an informed grounded theory approach. This refers to the product of a research process as well as to the research process itself, in which both the process and the product have been thoroughly grounded in data by grounded theory¹³ methods, while being informed by existing research literature and theoretical frameworks (Thornberg, 2012). The literature helped me to draw my attention to details in the data, and then draw out interpretations in the analyses (Stern, 2007; Bowen, 2008; Dunne, 2011). I was also aware that the data and theories were constructed as a result of my interactions with the field and my participants (Mills *et al* 2006a; Charmaz, 2008). Pre-existing theories and research findings were used as a heuristic tool. The extant concepts, theories and ideas were used as "lenses" and tools that helped focus the attention on certain phenomena, aspects or nuances as well as imaginatively see beyond data (Kelle, 1995, 2005). I purposefully remained theoretically sensitive but also theoretically plural. Chapter 2 explains how I have navigated between theories and methodologies. Having used a number of different methods, I was aware that combining these risks mixing up underlying assumptions, both at a methodological and foundational theory level (Greene and Caracelli, 2003; Giddings and Grant, 2007). I therefore had to remain critical of the theories and the methods I adopted for their complementarities.

¹³ Grounded theory was developed by Glaser and Strauss (1967) as a methodology defined by "the discovery of theory from data" (pg1) in reaction at the same time to the dominant hypothetico-deductive use of "grand theories" in the social research of the 1960s.

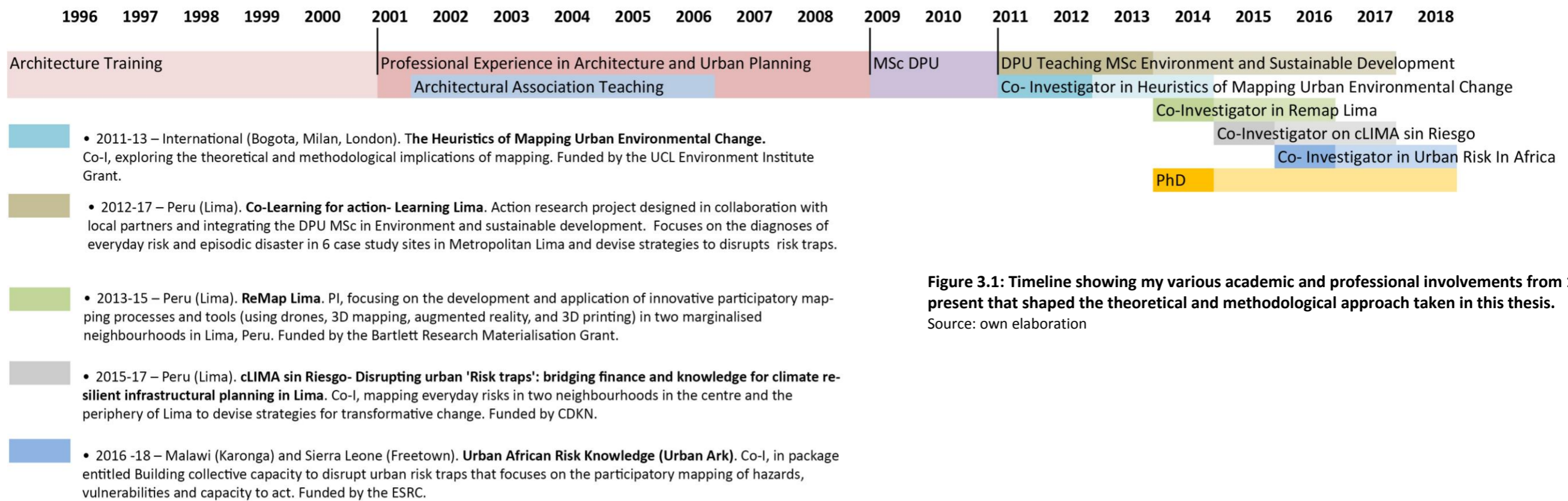


Figure 3.1: Timeline showing my various academic and professional involvements from 1995 to the present that shaped the theoretical and methodological approach taken in this thesis.
Source: own elaboration

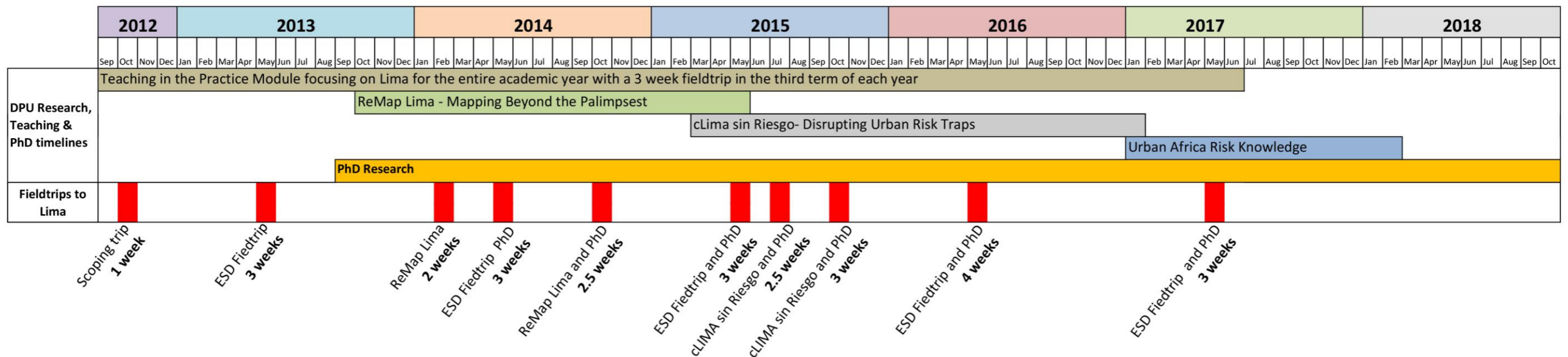


Figure 3.2: Timeline of the DPU-led research projects, teaching engagements and PhD research I was undertaking from 2012 to 2018 and the multiple fieldtrips to Lima for data collection during this time.

Source: own elaboration

The research process with multiple trips spanning 2-3 weeks at a time were constraining with regards to how much I could do during each visit. The constant interruptions of the data collection process in the field was problematic because I had to find means to pick up where I had left off in subsequent trips. However, there were also clear advantages. I had more time and space to reflect between periods of data collected and consult relevant literature. In this way I could identify gaps in the literature as well as in my own data and formulate the questions for subsequent trips to Lima. Moreover, the limitations I encountered in the secondary data could be complemented with primary research on multiple occasions. Secondly, the physical moving in and out of the case enabled me to also shift theoretically and methodologically keeping a pluralist approach where I made adjustments in response to the theoretical position's limitations, and corrected, improved and revisited the arguments and methods.

When I was in the field, I was completely immersed in the case. When I was out, I moved around the case, broadening the search through secondary research, reading relevant historical and current documents to reconstruct the context, and taking what seemed at times a positivist approach removed from the field.

Furthermore, the multiple trips to Lima allowed me to take a somewhat longitudinal approach over five years. I observed the changes which were propelled as a result of the mayoral and presidential changes in government. I made a few visits to the same institutions and also interviewed selected people more than once over these years. This enabled me to explore the different facets of people's identities and work processes. For example, I contacted the officials in the District Municipality of SJL at every trip and with each visit, I acquired another level of understanding. Through these repeated interviews, which took place in various locations and situations ranging from the more formal office set up, to cafes or to walks in the field, I was able to gather different types of information. Place and time had an impact on the type of data I gathered. My informants opened up in different degrees depending on when and where they were interviewed. Moreover, the repetitive contact over time also fostered a level of trust which enabled me to get more information in subsequent visits.

3.3 Information needs and data collection

Adopting a relational, socio-material, and historical perspective to understand how the urbanisation of the slopes is enabled and sustained through a close engagement with the planning apparatus of the State, required me to methodologically address the following:

1. examine who is involved and how in the urbanisation process
2. examine the practices of different actors in implementing, adopting and negotiating regulatory frameworks
3. examine how these practices lead to spatial outcomes that produce risk

These relate to the three sub-questions:

RQ1) What interests and rationalities do different networks associated with auto-construction operate under and which actors are enrolled in these networks?

RQ2) What cartographic calculations and coordinations are undertaken within different networks to arrive at the desired outcomes of actors?

RQ3) What are the tradeoffs and negotiations that occur between (human and non-human) actors within this process and how do unintended consequences that exacerbate risk for inhabitants come about?

Answering these questions involved several tasks and use of techniques explained below.

3.3.1 Unpacking the diverse networks

As explained in earlier chapters, I enter the interrogation through a focus on the three black boxed entities: the State, the land traffickers and community organisations. Acknowledging that the past shapes the present, a historical analysis is here important to contextualise these entities and comprehend how they have changed over time and how their evolution explains the way they operate in the present. I also sought to understand the relationship between them over time.

Unpacking these entities to answer RQ1, also involved disaggregating them to bring into view the different actors that are mobilised, their logic and interests.

Historical contextualisation of *barriadas* and diverse networks

To better understand *barriadas*, I undertook a historical analysis from the time of their emergence in 1940 to the present day. This involved tracing the factors that contributed to their formation, their spatial distribution in the city, the different types of modalities under which they were established and developed, and the key changes in the political, economic

and social spheres that have influenced the shape they take today, organisationally and physically.

Because *barriadas* cannot be understood in isolation and have developed through a close engagement with the State and its planning apparatus, it was important here to understand the changing relationship between the State and *barriadas* over time. The historical analysis is used to understand the State and the community organisations, as much as it is to understand their relationship. This involved tracing the changes in low income housing policies, official discourses and framings of *barriadas*, and the actions taken towards them through institutional planning processes and the use of technologies, administrative procedures for recognition, service provision and titling.

I approached the historical analysis through archival work, in-depth interviews with academics and representatives of institutions. I also consulted academic literature on the urban development of the city and the political shifts and examined policy documents and laws. To capture the ideology and discursive rationality of the State at different periods, I paid particular attention to the framings of *barriadas* in official documents and the actions these proposed. Taking different maps as parts and products of social discourses, I sought to deconstruct them (following Harley, 1989a) to understand the interests they promoted. I tried to collect historical maps of Lima from different sources to see how *barriadas* were represented, by whom, and the actions they potentialised, remaining attentive to the different technical, economic, political, and social factors which informed the type of mapping at various times.

Visiting various archives and speaking to academics and institutions dealing with cartography, it became apparent early in the research that the cartographic information available for Lima is dispersed. With the changing administration every four years, and the routine erasure of each administration's data, it was difficult to trace back the municipal archives. Some interviewees had knowledge of their existence, however their location remained a mystery. Although records exist, their scattered nature made it difficult to revert to the originals. Nevertheless, by looking through publications as far back as 1950, particularly those of Jose Matos Mar, Juan Gunther, Wiley Ludeña and Gustavo Riofrio, it was possible to inspect some of the historical maps reproduced in the books. Moreover, these authors offer maps that they themselves produced, in reaction to a way of thinking about the city or, in some cases, as part of a commission to support a shift in political thinking.

As for contextualising the history of the areas I was working in, I consulted satellite images from different years to understand the growth of individual settlements as well as the pattern of urbanisation of the slopes in the broader area of the SJL district and the adjoining district of San Antonio. I also conducted focus groups discussions with inhabitants from various settlements as well as in-depth interviews with community leaders (current and former) to understand how the settlements grew and the type of plans produced over time.

Although I could advance in the historical analysis of the State and community organisations, I was limited by the lack of information with regards to land trafficking. I interviewed various officials mainly in the Ministry of Housing, academics as well as elders within settlements. I consulted a number of newspaper articles and grey literature. Published material was scarce in this regard and although my coverage of land traffickers is partial, I was able to capture the various moments in time where particular State actions successfully halted or facilitated land trafficking.

Bringing actors and their relations into view

Guided by a methodology adopted by institutional ethnography to unravel the different sites that are networked and thus shape 'ruling relations' (see Chapter 2), I followed the circulation of maps and plans to bring different actors into view and to understand their relationship. Following the plan and observing the sites it lands in, allowed me to broadly understand the different practices of calculation that take place. This initial understanding guided me in the selection of particular actors and processes I needed to examine in more detail through an ethnographic approach explained in the section below.

The decision of where to start following the maps/plans was straightforward in the case of the community organisations. State and non-state actors would inevitably be revealed by following the plan from the moment of its production and through its travels along the various stages of the process of *Saneamiento Físico Legal* from recognition to titling. In the case of land traffickers who operate on 'private' land, I could not follow the same approach for several reasons, even if there is the dedicated municipal process of *Habilitaciones Urbanas* for private properties. The municipal process was only partly followed and there were clear interruptions in the way spatial information travelled. Secondly, the information travelled in a less visible manner. Thirdly, I could not use similar ethnographic methods for safety reasons to unpack the practices. Because the aim was to identify the actors that come to be networked within the sphere of pirate subdividers, I was still able to explore the sites where some of their spatial

information comes into view. Therefore, instead of following the layout plan as such, I was scanning for fragments of the plan or any other spatial information relating to the activities of land traffickers on the slope. Chapter 7 explains some of these moments, for example the leaflets advertising the sale of plots, or the momentary appearance of their plan in the AutoCAD file of the district municipality of SJL. By seeing where these fragments appear, I captured the actors that are involved in facilitating and supporting the activities of land traffickers to urbanise the slopes.

Tracing the way plans travelled involved interviews with officials and technicians from different municipal departments, water utilities and electricity company, as well as interviews with community leaders. I moreover shadowed a number of these actors in their activities to reconstruct the flow of information. Understanding what the different work processes involved and analysing the practices of actors in the disaggregated sites also showed how information was drawn in from other networks to undertake the work process. For example, it became apparent that a water and sanitation engineer, commissioned by a settlement, cannot produce an implementable layout plan of pipes unless he is able to 'informally' get the information from the governmental water utility company SEDAPAL by paying a bribe. Similarly, the civil engineer who first draws the settlement layout needs information from COFOPRI which he also gets through informal channels. Figure 3.3 is an example of the visualisation I compiled to represent the actors, the work process and the information flows from different sites.

Furthermore, this tracing of the plan's circulation also exposes those actors that appear more than once in the timeline from recognition to formalisation. For example, this is the case for the risk estimator, within the district municipality, who oversees that settlements have reached a sufficient level of consolidation and reduced risk in order to acquire services. This risk estimator reappears later in the process close to titling; this time providing his services, independently from the municipality, to draw the compulsory evacuation plans that settlements need. As these actors navigate the process with multiple identities, I was keen to understand how they carve a secure position, making themselves crucial to the various institutional processes that a settlement enters, and how they contributed to the way the slope is urbanised. Having identified these different actors, I could then focus more closely on their varying practices using an ethnographic approach.

Understanding the rationalities at play

Although I start with a general idea about the rationality of different networks and the goal they seek to achieve, acknowledging that these are constituted through different individuals meant that I needed to examine the logic of each of the players and understand how the different rationalities fit together to achieve the outcome. De Satge & Watson (2018) argue that in order to "*assemble and catalogue the rationalities imbricated in the wills to govern and improve and record the ways in which these encounter wills to survive and thrive demands methodologies which enable fine-grained analysis of discourse and action. These must be capable of rendering social and institutional complexity and mapping intricate networks, relations and oscillations of power*" (De Satge and Watson, 2018, p. 188). I was able to get closer to the rationalities through in-depth interviews and shadowing of actors, paying attention to what they said and what they did, as well as how they described what they did and the purpose it was for. I soon realised that to understanding the rationality at play, the interrogation had to be cross cutting through discourses, practices and outcomes. I thus could only give a more nuanced answer to RQ1 after attempting RQ2, which analyses the cartographic calculations and coordinations that take place, and RQ3, which sought to understand the transactions that lead to unintended outcomes.

3.3.2 Observing the cartographic practices

Having provided a first level of disaggregation of actors within the networks, I then focused on particular actors selected for being obligatory points of passage, that is, indispensable for progress. I used ethnographic methods to understand their cartographic calculations and coordinations to answer RQ2 and partly RQ3. Since the practices I sought to observe are those that navigate the regulatory framework and stipulated spatial outcomes, I first had to understand the administrative procedures and protocols that need to be followed, and then contrast this with what happens in reality.

Reconstructing the official processes and protocols

The relevant processes that I needed to understand better were the *Saneamiento Físico Legal* for settlements occurring on government land, the process of *Habilitaciones Urbanas* for developments on private property, and any other protocols which structure the way different governmental institutions function. I interviewed different officials and technicians in various departments in order to string the processes together and find out what each stage entails.

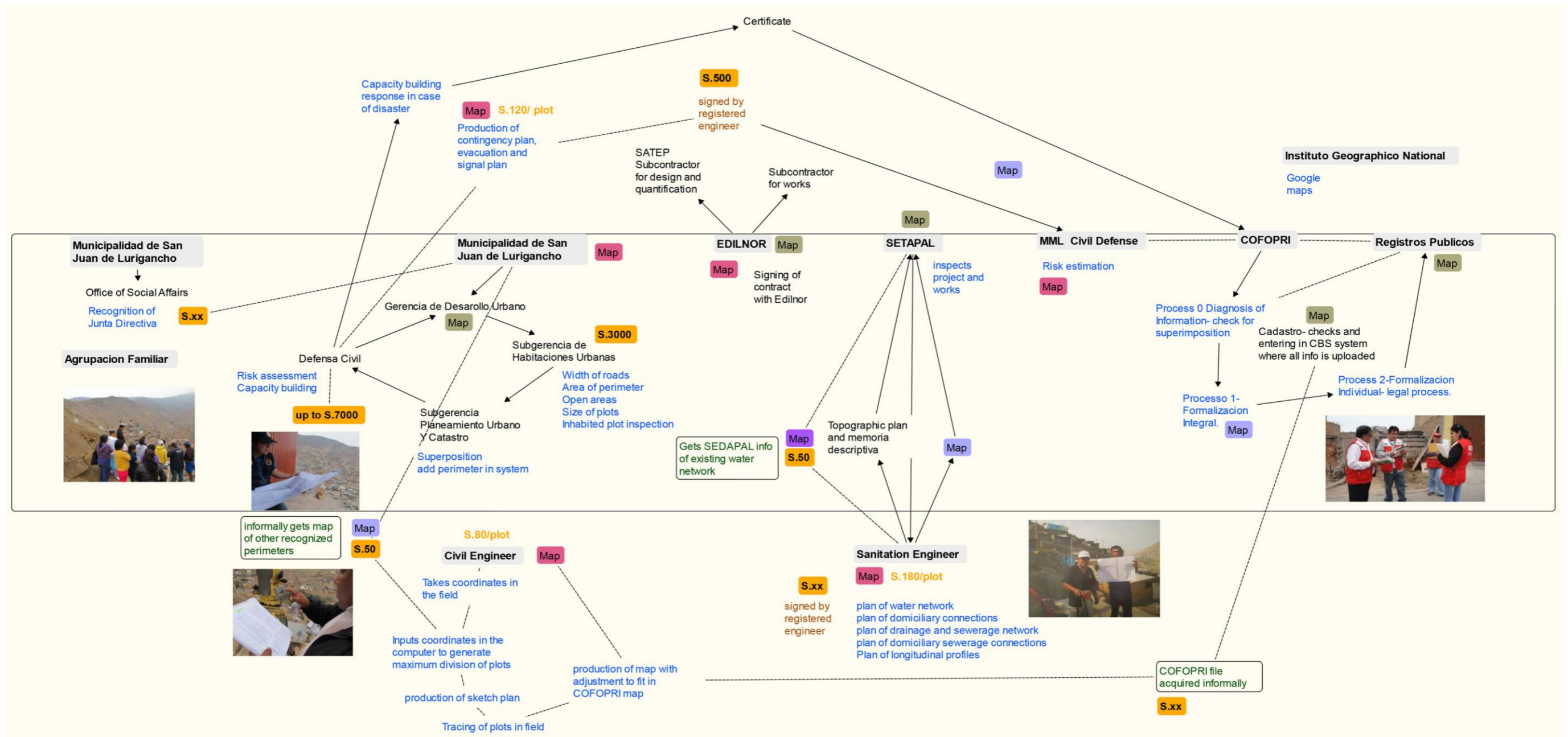


Figure 3.3: One of the visual maps produced when unpacking the processes from recognition to formalisation*.

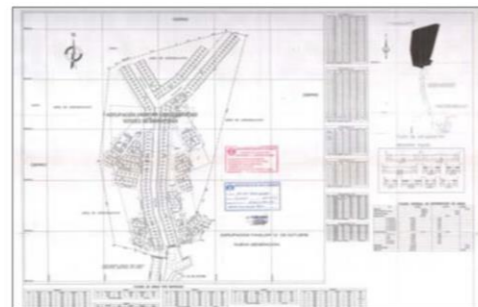
*Through this tracing of the circulation of spatial information, several actors and work processes are made apparent, as well as the exchanges of money (in orange) that take place to progress. It also shows in blue what kind of information is consulted during the work process and where and how it is acquired (whether through formal or informal channels) in order to complete a work process.

Source: own elaboration

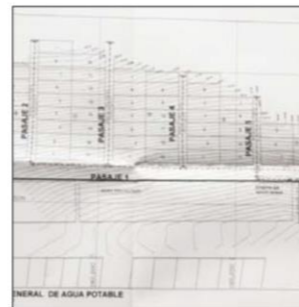
AF PRE-REQUISITES		AF appoints civil engineer to produce perimeter plan with coordinates, libro de acta, libro de fundacion		AF appoints civil engineer to produce location, perimeter and plot plans. As well as road sections and other pre-requisites			AF appoints sanitation engineer to design project and prepare other mandatory documents			AF appoints technician to produce contingency, evacuation and signal plans											
Stage 0	Stage 1	Stage 2			Stage 3			Stage 4													
OCCUPATION OF LAND	RECOGNITION OF JUNTA DIRECTIVA		CERTIFICATION OF PLANS FOR BASIC SERVICES			BASIC SERVICE PROVISION			TITLING												
AF	Municipality of SJL		Municipality of SJL			SEDAPAL- Water provider	EDELNOR- Electricity provider		MSJL	MML	COFOPRI		SUNARP- Public Registry								
AF delimits the perimeter of the settlement on the ground with chalk	Catastre Office checks for clashes with perimeters of other recognised settlements as well as archaeological zones, conservation areas, or areas earmarked as public spaces	Plan stamped and settlement recognized as part of SJL jurisdiction	Office of Social Affairs Registration of social organization	Urban Development Office checks if there is inhabitation on plots, width of roads are compliant with regulations, size of perimeter relative to area of plots	Cadastral Office verifies perimeter and superposition with adjacent settlements	Civil Defence Office undertakes risk evaluation- structural and non structural	Urban Development Office emits 'Constancia de Posession' and stamps plans to certify that these can be used to acquire services	SEDAPAL inspects project and works that sanitation engineer has independently prepared for the AF	EDELNOR receives application for electricity from AF	SATEP is subcontracted by EDELNOR for project design	Subcontractors hired by EDELNOR to carry out the works on the ground	Each inhabitant of the settlement signs individual contract for electricity with EDELNOR	Civil Defence Office of MSJL undertakes capacity building and emits a certificate of attendance	Civil Defence Office of MML carries out risk estimation	Process 0 - Diagnosis of Information- check for superimposition of perimeter using public registry base and other sources	Process 1- 'Formalizacion Integral' - Technicians in the field check all dimensions comply with regulations. Topography and filling of form.	Cadastral Office- checks and enters in CBS system where all info is uploaded	Process 2- 'Formalizacion Individual' - legal process. Analysis of each plot and emission of individual titles. Plots entered into the system of titling	Public Registry- the location plan and settlement layout plan together with COFOPRI's registration are sent to SUNARP	Cadastral Office inside SUNARP- gets plans which are checked and added to the system	Public Registry - private property is registered



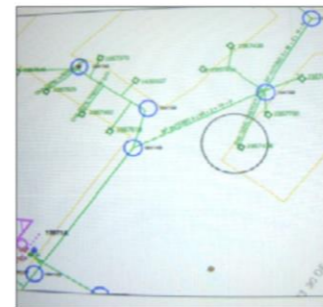
Perimeter plan produced by the AF's civil engineer



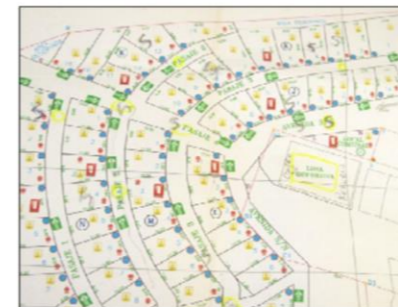
Settlement layout plan certified by the district municipality



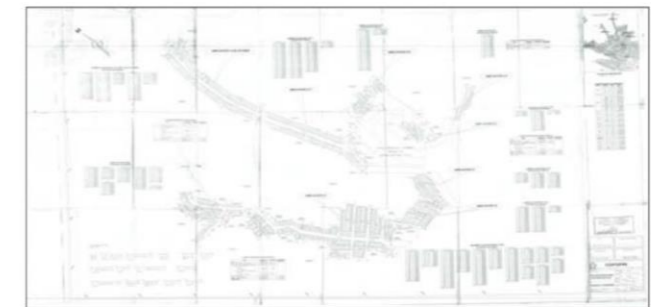
Water supply layout plan produced by the water and sanitation engineer appointed by the AF



Electrification plan produced by SATEP



Settlement evacuation plan produced by risk engineer commissioned by the AF



Titled settlement plan produced by COFOPRI

Figure 3.4: Image reconstructing the process of *Saneamiento Fisico**

*The process for the physical and legal regularisation of settlements can be divided into 5 different stages: Stage 0- occupation of land by the AF; Stage 1- recognition of the AF by district municipality; Stage 2- certification for basic services; Stage 3- acquisition of basic services; Stage 4- land titling. The figure captures the different departments involved and the work processes that ought to occur at each stage. It also shows the different plans that are produced using the settlement plan as a base.

Source: own elaboration.

I moreover observed people at work while asking them to explain the work process they were performing. This was important because I found that people interviewed tended to speak in general terms about the different stages, the tasks involved and the purpose. I also looked at a variety of sources for the data such as policy documents; written implementation and enforcement protocols, grey material and staff training presentations that officials gave me. I was able to reconstruct the municipal processes as in Figure 3.4 and use this to contrast what was occurring in reality within the various stages.

Analysing the cartographic calculations and coordinations

Through the tracing of spatial information flows and an initial scoping of what happens in the sites the maps and plans land in, I was able to make visible the actors these pass through, such as the engineers and technicians, that are often overlooked in studies of *barriadas* yet play an important role. Although these might appear as operating by the book in straightforward bureaucratic tasks, in reality they take many decisions of their own accord that might go against the stipulated rules. They constitute complex nodes of human and non-human actants which combine together in a way that directly contributes to the reproduction of risk.

I conducted in-depth interviews while shadowing technicians to gain an insight into the micro processes that take place. I analysed how they produced the maps/plans, how they used them and what they did on account of them. To answer RQ2 and RQ3, 'following the engineer', as advocated by Latour, was an important means to cast light on the actors, human and non-human, that are mobilised in the practice of these technicians and enabled an observation of their interaction to precipitate action and outcome. Moreover, being attentive to the factors that come from the past, present or future to give shape to the frame within which cartographic calculation take place, was important to understand the politics that shapes the work people do. Paying attention to the tradeoffs and negotiations that occurred meant observing the work process and outcome, but also asking my participants to explain in detail what they were evaluating at different stages and why they were taking certain actions.

While scrutinising the practices that took place, I was at the same time contrasting them with the stipulated protocols within the municipal planning process to identify the deviations. These moments of deviations became important points of close analysis to understand how they linked to outcomes. I complemented this approach by analysing the discrepancies between the plans created at a given time, and the actual occupation on the slopes. Because the plans are produced to enter the municipal process for recognition and acquisition of

services, one would expect a close correlation between reality and the representation on the plan as, in theory, there are several checks undertaken by officials to make sure that the plan and reality concur. However, having identified inconsistencies, these became important entry points for interrogating the work processes and actors involved in producing them. In this way I could examine the various interests as well as the intended and unintended outcomes fostered by these discrepancies. Some settlement leaders were able to provide me with different versions of their settlement plan since occupation. I analysed the series of plans produced over time to find out what propelled each version and how this materialised on the ground.

A high-resolution drone image of JCM, produced under the research project ReMap Lima in February 2014, was useful to critically compare the reality to the representation (Figure 3.5). I also used this image together with the settlement plans (given to me by settlement leaders-see Figure 3.6) as prompts to interview current leaders and municipal officials. Besides all the printed spatial information, I was also given digital files by official sources which were useful to make this comparison between the representation and the reality.

3.3.3 Making sense of "irrational" outcomes

As explained above, to answer RQ3, I paid attention to the tradeoffs and negotiation that occur within the cartographic calculation and sought to identify the resultant outcomes. I also explored the connection between the practices and the outcomes by focusing on specific spatial outcomes that I recognised as exacerbating risk and travelled backwards to trace the practices that led to these.

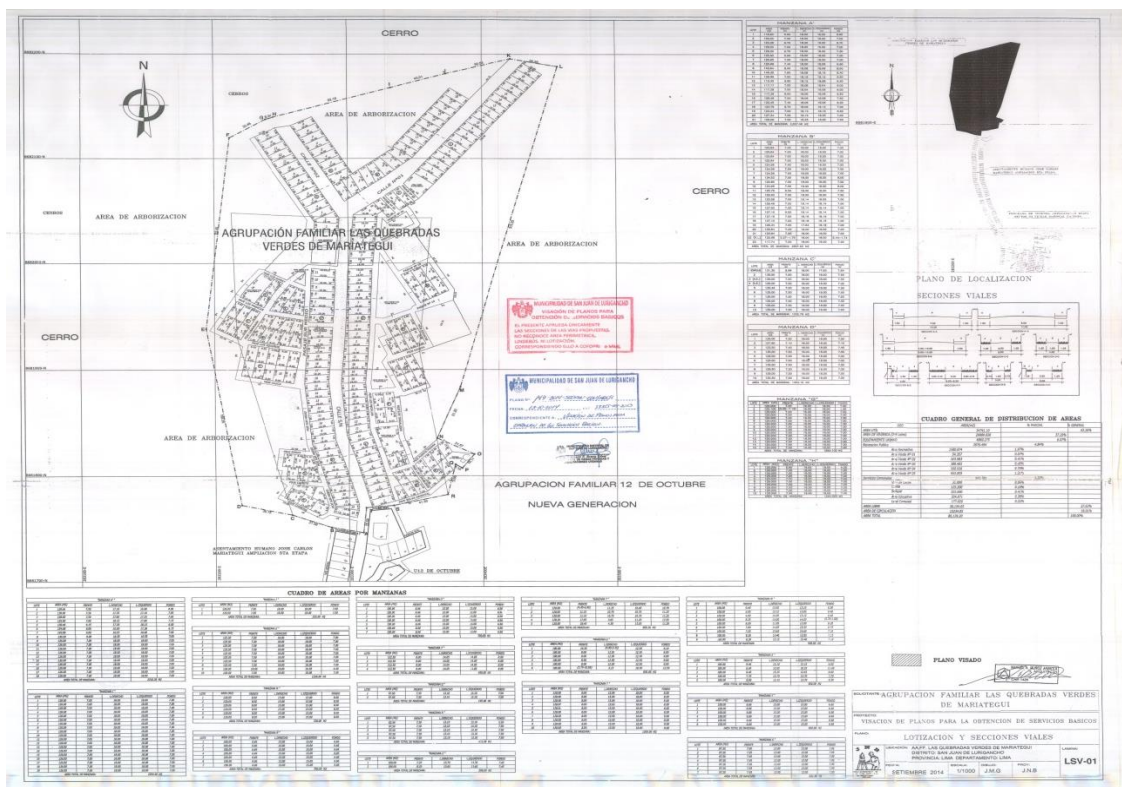
For example, some spatial outcomes, such as the gridded layout of most settlement on the slopes materialises in steep staircases that make access difficult. To understand why this layout is repeatedly used, I interview leaders and officials who could not explain the reason. Moreover, the literature I consulted was also patchy in this regard. I found the answer by analysing the layouts of *barriadas* from their emergence in the 1940s and noting that these changed from the 1960 with the urban planning norms that became pre-requisite to any entitlements. This tracing back led to many unexpected findings because one could bring into view the relationship with regulatory frameworks and thus explain these outcomes as outcomes of planning.

Figure 3.5: A fragment of a high-resolution drone image from 2014 produced under the project ReMap Lima*.



*This image was useful for a comparative reading between the reality on the ground and the settlement layout plans. These served as prompts to discuss discrepancies with interviewees and understand the practices that led to them. Photo © R. Lambert (2014)

Figure 3.6: An example of a settlement layout plan collected from settlement leaders.



Source: ReMap Lima (2014)

The landscape held many clues with regards to how practices make it onto the ground in a way that produces hazardous conditions for inhabitants. I identified these while moving through the settlements, during transect walks with inhabitants or while shadowing engineers. For instance, the jarring conditions I encountered included electricity poles in the middle of staircases (Figure 3.7) or emergency signals that led to dead ends (Figure 3.8). These became entry points to understand whose and what practices led to these conditions. Borrowing from a landscape history approach, I traced back what led to these outcomes and the role that spatial information played if any. This data was fed back into the tracing of the work processes (from invasion to formalisation) to locate where and how these unintended consequences emerged. Looking at the practices involved in such tangible effects helped me to better understand how physical risk is reproduced on the slopes; in the case of electricity poles they obstructed access through staircases whilst the irrational location of exit signals makes emergency evacuation almost impossible in certain places.

3.4 Access and evaluation of methods

3.4.1 Access to key informants

The multiple roles I took on, as teaching fellow and co-investigator, working closely with local NGO partners, enabled me to establish very good contacts. I met various officials in high positions that were interested in the work of the DPU and were crucial in opening the door to others in their institutions. Some organisations, that are otherwise impenetrable such as the water utility company- SEDAPAL, the Commission for the Formalisation of Informal property- COFOPRI, the Institute of National Defence- INDECI and other national Ministries were made accessible to me. Over a period of 5 years, I built a relationship of trust through my numerous visits. This was also the case with JCM community leaders.

In most cases, I was welcomed at short notice which made my periods in Lima efficient and productive. This was in stark contrast to other institutions such as the military-led National Geographic Institute- IGN and National Aero photographic Service- SAN, who could not quite place me, and with whom I had not established previous contact. Contrary to my experience with others, I had to approach them more formally with letters requesting interviews and proof from my supporting university.

Figure 3.7: Photo of an electricity pole located in the middle of a staircase in one of the settlements in JCM.



Photo © R. Lambert (2014)

Figure 3.8: Photo of typical evacuation sign in one of the settlements in JCM leading to a non-viable escape route.



Photo © R. Lambert (2014)

Contact with other settlements besides those in JCM were granted through my shadowees. Shadowing proved to be a valuable method that allowed me to enter situations and places which would have been very difficult to access on my own. This is also true of the access granted by community leaders who were always willing to accompany me during transect walks.

With regards to understanding the activities of large-scale land traffickers, the easiest way to enter was through settlements that first started as pirate subdivisions but had later reverted to government land. However, those that were in the process of subdivision or selling were more difficult to access and consideration for safety limited my entry into these areas. I however was able to closely observe the operations of one particular pirate subdivision in the East of SJL by shadowing officers from the district municipality in the field.

3.4.2 Methods

I adopted a combination of inductive and deductive methods. I used inductive analysis where the patterns, themes and categories of analysis come from my interviews, while I also took a deductive approach where I read into the data and imposed my own way of seeing, which was the case for example with the way I analysed maps/plans.

I used various **mobile methods** from transect walks, walking interviews with settlement leaders and inhabitants, following of maps and plans 'on the move', as well as shadowing technicians and engineers which also involved open/semi-structured interviews. Besides gaining a discursive form of knowledge through talking, walking through space with others also enabled me to gain a non-discursive or tacit (unexplicated or unacknowledged) form of knowing (as also explored by Garfinkel 1967 referenced in Burawoy, 1998, p. 15), which came with the embodied experience of being in place and participating by "doing" things with those that I studied.

With regards to **interviews**, I conducted 246 in-depth open and semi-structured interviews. They included 17 governmental institutions. Within these, I accessed several officials and technicians. In many instances I conducted an interview with the same person more than once over the course of the 5 years of research. In total, I conducted 45 interviews with officials, 6 with service providers, 12 with academics, 10 with NGOs, 13 with specific independent individuals. I also reached 20 settlements and spoke to a number of community leaders and inhabitants, men and women during the DPU research project, the teaching and the PhD

research. These amounted to a conservative estimate of 160 in the total period of 6 months and 3 weeks in the field. Table 3.1 is a summary of the type of organisation reached, the number of interviewees and the repeated interviews undertaken, as well as the total number of interviews in each category.

Table 3.1: Interviews with organisational representatives and individuals.

Type of organisation	Organisations interviewed	No of interviewees	Repeat interview	Total Interviews
National government	IMP(2), SAT(1), SUNARP(1), Ministry of Transport(1), Ministry of Housing(3), SAN(1), IGN(2), MML(3), INDECI(3), ICL(1), CENEPRET(1), COFOPRI(5), MEF(1)	25	4	29
Local government	Municipality of SJL(7), Municipality of SA(2), Municipality of Ate(1)	10	6	16
Service providers	EDELNOR(1), SEDAPAL(3)	4	2	6
Local NGOs	Foro Ciudades para la Vida(2), CENCA(3), CIDAP(2)	7	3	10
Academic institutions and archives	Pontificia Universidad Católica del Perú (3) Universidad Nacional Mayor de San Marcos(1) Universidad Peruana Cayetano Heredia(2) Universidad Santo Domingo de Guzmán(1), Universidad Nacional de Ingeniería Perú (1), Instituto de Estudios Peruanos(1), Sociedad Geográfica de Lima(1)	10	2	12
Individuals	Water and sanitation engineer(2) Civil engineer(2) Risk estimation engineer(2) Land trafficker guard(1) Road engineer(1)	8	5	13
Settlements	Bio Huerta , Bio Vivienda, Corazon de Jesus, Santa Rosita, Monte Verde, Portada de Belen, Nueva Generacion, 12 Octubre, U11, U11 Ampliacion, Antonio Raymondi, Quebradas Verdes, U4A, U4, Fortaleza, 18 de Marzo, Santa Rosita, Mirador de Las Lomas, Bio Huerto Paraiso, 26 de Genero las Lomas. In each settlement I interviewed the leader and secretary (20X2) In each settlement I interviewed at least 3 inhabitants (20X3) Repeated contact with half of the settlements at least 3 times and at least 2 people in the <i>junta directiva</i> each time (10X3X2)			40 60 60
TOTAL NUMBER OF INTERVIEWS				246

Overall, my informants were very open to discuss and respond to my queries. Moreover, they readily put me in contact with others that they considered relevant and knowledgeable for my

research, going so far as to give them a call for an informal introduction before I went ahead and coordinated a meeting directly. With many institutions, I would first go through the various Heads of Departments, who would willingly let me speak to their technicians. Using this snowballing interview strategy and relying on the introduction through others fostered a level of trust which enables me to get substantial amounts of information even from the first interview.

Moreover, I found that many of my interviewees had knowledge and experience beyond their current position as they had taken several roles over the course of successive changes in administration. This meant that they could make the connections between their current occupation and the work processes that happened in other institutions. For example, many of those interviewed in the Ministry of Housing, Ministry of Transport and SEDAPAL had at some point also worked for COFOPRI. The technical staff in particular who worked with cartography had this broad experience in other governmental institutions. I was therefore able to triangulate information in multiple ways, from within and from without the organisations I approached.

I found **shadowing** to be a particularly useful research technique as it elicits different data (McDonald and Simpson, 2014). It allowed me to observe and take a judgement on what I was observing but also ask in-depth questions about what I was observing. It involved me closely following a member of an organisation over a period of time. Three different forms of shadowing have been captured in the literature review undertaken by McDonald (2005) within the social sciences. These relate to the aims of the researcher as 1) experiential learning; 2) a means of recording behaviour, and 3) a way of understanding roles and perspectives. I purposefully used shadowing with all three aims in mind. The technique needs flexibility as meaning is "always emerging in-the-moment" (Cunliffe, 2008, p. 127) and one helps in enacting through one's interactions with others (Vásquez, Brummans and Groleau, 2012).

Compared to interviews, this method adds value on a few fronts. In interviews, the content can sometimes be rehearsed. Moreover, the interviewee makes a decision on what is relevant and interesting to the interviewer and therefore is selective in the data he/she offers. As Robson notes (2002) one of the interview weaknesses is that "responses are notorious for discrepancies between what people say that they have done, or will do and what they actually did, or will do" (Robson, 2002, p. 311). Before deciding to use shadowing, I had started with interviews but quickly found that I wasn't able to get the detail I wanted. Interviewees would contradict themselves when relating sequences of work. Moreover, when I asked someone to

describe their day, I would only get the memorable moments while the mundane routine and habitual activities would be omitted. Also, in an interview situation, by asking about one specific topic, one might lose the chance to see how micro events are interconnected and interdependent (also see Light 1979). It was important for me to find a way of observing that allowed me to see the extended relationships.

I shadowed for full days at a time. My shadowees would let me know in advance which days were appropriate to follow them based on the type of work they were going to undertake in the settlements. On the specified days, I would meet my shadowees early in the morning and spend the rest of the day with them. In this way, I observed them at work, in discussions with others, and during breaks and meal times. The moments of rest were opportunities to discuss in more depth what I was observing, and gain clarification on particular lines of arguments with others, the nature of relationships as well as the roles and perspectives of various actors he/she came into contact with. I was also able to have insights into the embedded discourses and motivations. Asking my shadowee to explain his/her actions opened opportunity for self-observation and self-knowledge on both sides (his/hers and mine) and thus generated collective reflection. This is noted as one of the benefits of the shadowing technique by Czarniawska (2007).

These kinds of days were spread over the duration of the four years of the PhD research, which also meant that for the shadowees I followed more than once, I could see the multiple identities and roles they inhabited over this period. This aspect was valuable for the research because it indicated how people navigated to expand their action space over time. For example, by my fourth year in Lima, the risk estimator from the district municipality of SJL had become a lobbyist for Keiko Fujimori's election with the promise of landing a seat in government should she win. In this instance, I could see how he used his knowledge of the settlements he had worked with while still at the municipality, and knowledge of the process from recognition to formalisation to make promises and amass the political support of settlements.

3.5 Textual and visual recording and analysis

I audio recorded most of the interviews taking place in offices, cafes or any quiet seated area. For those that explicitly asked not to be recorded, or when I conducted walking interviews, I took brief notes instead. I later developed these into extended notes with all the details I could remember. While notes on the spot were taken in Spanish, the extended notes were written

up in English as I had the time to translate while writing. This extended note-taking acted as a first phase of analysis as I translated, processed and sorted important information from background context.

I separated the audio recorded interviews into two groups: those that could be summarised as notes after listening to them; and those that were fully transcribed because they contained a lot of relevant details. I used the qualitative analysis software NVivo to code primary data applying a hybrid approach of inductive and deductive coding that combined codes emerging from the data itself (i.e. data-driven) with pre-defined codes on the basis of my research questions and conceptual approach (i.e. theory or concept-driven) (Fereday and Muir-Cochrane, 2006). This way of working was also complemented with visual methods for recording and analysing.

I used visual mapping throughout the collection, analysis and representation of the data. Having a visual mind, this method was particularly useful to manage and process the vast amount of data I had collected. It helped me to make meaningful connections between information gathered during various periods of research. I would keep adding to an initial skeletal structure represented as a visual map, such as the one in figure 3.3, as I amassed more data in successive field trips. In this way, the visual maps that emerged also acted as a prompt for remembering where I had left off. This was important because I had various periods of interruption away from the field. Furthermore, the method was consistent with the recording of the network of interrelated processes and actors which required me to capture flows rather than isolated facts. The visual mapping was particularly useful to reconstruct the relations through an initial tracing of the movement of spatial information. Subsequently, using the information that emerged from interviews and the shadowing of engineers, I could superpose the work processes that occurred at each node. Besides helping me to navigate through the data, the visualisation enabled me to advance the analysis informing the steps I needed to take next.

To record data, I heavily relied on videos and photographs. The photographs were a means to document observations particularly during the mobile data collection methods such as transect walks, walking interviews or shadowing. They helped me capture details and situations which I could then analyse. I also used them as evidence to substantiate claims or descriptions in the writing. Video recording on the other hand, was crucial in two ways. Firstly, as many of the interviews occurred while an interviewee pointed to a map/plan to explain particular aspects of the territory, or different elements on the paper, video recording the

conversation meant that I could go back to analyse the video since a voice recording alone would have been limiting. Secondly, I used video in ethnographic observation while shadowing selected actors. Because I was observing how the plan was produced and how it was used in talk, I found that relying solely on my observations and notes was not enough. I needed to capture the many details in those fleeting moments. Processing the video in my own time, transcribing the dialogue and reflecting on the important aspect (Figure 3.9) allowed me to identify how different actors operationalise the plan or particular elements on it to advance their interests. For example, when the civil engineer, commissioned by the settlement leaders, negotiates the layout of the settlement with them, I could follow how different elements on the plan are called out to support particular arguments and how the engineer reverts constantly back to the plan (inaccessible to others around the table) to reclaim authority in the discussion, and together with distraction tactics, to arrive at an agreement. The deconstruction of such dialogue and analysis is influenced by institutional ethnographic methods, particularly those used by Turner (2014) to follow the text in talk, closely observing how plans are used to substantiate different points of view in a planning consultation process. This was an important method to understand the micro workings of power through mapping and the tactics devised.

Apart from using coding and visual representation, writing and re-writing was also productive for the analysis. I went through various iterations. As questions of foregrounding and backgrounding are constantly negotiated in delineating the object of study (Vásquez, Brummans and Groleau, 2012), one of the challenges I faced was committing to a particular account. With so many starting points and actors, multiple versions, multiples ways of telling the story seemed valid. Moreover, what the case was about kept shifting. Because the notion of a bounded primary case itself is limited, as most cases contain multiplicity and are most often developed by linking manifold instances that constitute the case (Gerring, 2004; Mukhija, 2010), I had to constantly consider where to place emphasis and boundaries for the case. Using the writing process to explore various framings of the research, I contributed to several conferences¹⁴ throughout the PhD. I tried out different ways of telling the story, foregrounding and backgrounding various aspects and took advantage of the feedback from

¹⁴ - XXXVII International Congress of the Latin American Studies Association, May 2018, Barcelona
- Inside Planning: Exploring the Practices and Cities of Urban Planning, September 2016, Munich
- Research Committee 21, The transgressive city: Comparative perspectives on governance and the possibilities of everyday life in the emerging global city, July 2016, Mexico City
- XXXIV International Congress of the Latin American Studies Association, May 2016, New York
- VIII Foro: Lima Centro Vivo, April 2016, Lima
- VII Foro: Centro Vivo, March 2015, Lima
- Environmental Justice and Urban Resilience Seminar, September 2014, London

the audience to refine it. Moreover, I contributed to a few academic articles which helped me to work through certain ideas related to my PhD.

Figure 3.9: An extract of a transcribed video*.



Lady: A question: Is this line (pointing to the boundary between the two settlement) entering into the titled area?)

Mario: No it is here that you cannot enter (pointing to green boundary). (He explains to woman) they have come to an agreement with a demarking line, before I had this line, I was assuming to theat the road that could come this way. It would have come out really well.

Lady: Sure, sure, I see.

Mario: But what happens? This is an edge we have to respect. It has titles. because of this, we have to reposition so that boundary wall continues.

Lady: Yes yes

Mario: The problem lies here. so what do we do? (pointing to near boundary)

Leader A: Yet we are short of 3 m to be able to have a complete manzana. but what we cannot do is move back more.

Jaime: No one is asking for that. The agreed boundary stays put.)

Mario: It is not that you are remaining with nothing. We just need to change the shape. So say if we leave a green area although I know that in the future you will want to get more plots out.)

Leader A: So in conclusion are the same number of plots coming out?

Mario and Jaime: Yes yes.

Mario: It will come out so we just need to find the shape. (lots of happy sighs and comments in the background)

Another man: so the plots come out but it is just the shape that changes (yes yes- many murmur).

Leader A: So what happens here? (pointing at boundary)

Jaime: You will have nothing to do with them.

Mario: (takes another plan without all the pen scribbles and shows again the line which was agreed). You see this is where you agreed to. But I drew some more plots over this line

Leader A: But this is where we had agreed to...

Mario: No it was up to the green line. This is where the agreed 25m are. But for questions of design, I came into the boundary more, you understand?! Then I made a road so that it joins this other one at the bottom and then you can all get out. So what is happening? The man wants to stick to the boundary line with plots so he gets more plots.)

Leader A: So he gets more plots and we get fewer then.

Mario: No, he wants his plots near the boundary line and then we have to leave a road so he is ultimately harming himself by himself.) (reasoning using the unclear graphical representation, the fuzzy image with pen over the computer lines)

(Leader starts to talk about the house which is at 6 m signaling vaguely in the direction of the house) pointing in the air)

Mario: look, listen to me. I will respect this point (corner of green line, so we respect the perimeter. if there is a house built there (marking where the road will go) this is your own issue.

Man: Lets go to the sports field and this can be explained better) here (General murmur of agreement).

Jaime. Lets go and put the point (pointing to the corner)

Mario: we'll put this point, this other point (all points of the titled area) so we can line up. (He takes the clean map and tries to draw the new layout on it, but is unable to. (He takes the other map with the pen scribbles and says). (this is what we are going to do, align the plots with the wall. Moves again to the other clean map; this is how the plots will be aligned.) After this you could have a green area. Theorically you can get 2,4,6 8,10 plots here, this other bit, we leave it as green space.

Leader A: In total then how many?

Mario: Approx 54 plots with everything. (agitation in the background). If you want you can also take advantage of these two areas (pointing to left over triangles.towards the pink edge).

Leader A: That is 56.

Comment [r14]: Lady cannot read the map. She is following the conversation but is not able to make the connection between the elements that are spoken about and their representation on the map.

Comment [r15]: Different interpretation of the problem, as leader sees that he is losing space while engineer is iterating that there is no loss because boundary is drawn where it was agreed.

Comment [r16]: Acknowledgement that green area shown is only temporary and will eventually be occupied. Already departing from this premise.

Comment [r17]: Engineer covers the complete truth that settlement B want that layout so as not to share a road with settlement A.

Comment [r18]: Engineer makes Leader A believe that settlement B is worst off with this new layout. As a matter of fact is that the access roads, which previously was taking space from both settlements, will now have to solely be absorbed by settlement A.

Comment [r19]: Use of ambiguity in the drawing. Engineer uses the unclear drawing with many pen marking as well as his words to navigate conversation towards his gain.

Comment [r20]: Leader not able to point to the house on the map, which could show that he is not able to completely make the connection between what is drawn and what it is representing.

Comment [r21]: Clearly the drawing is become too difficult to follow.

Comment [r22]: By taking the clean original sketch out, which does not show the clearly drawn boundary and also the plots against the wall as preferred by settlement B, one still assumes that the access road is going to be feasible without losing area. So by drawing on this clean copy of the original sketch layout, he is manipulating individual consciousness that the plots against the wall will be accessible.

* What is said and what is done with the plan are scrutinised to understand how different people navigate and make use of the plan or elements within the plan.

Source: own elaboration

3.6 Positionality, reflexivity and ethical considerations

During the research, I was attentive to the expectations I could foment with my research. I always tried to be clear with my participants that as a research student, I could not change their situations and was there to document them. With regards to remuneration, I did not provide payment to my informants. For those that I interviewed outside of their work place, I would offer a coffee or a meal as a thank you for taking the time to meet with me.

Straddling different roles (co-investigator, tutor, PhD student) over the five years working in Lima, meant that I was straddling between being an outsider and an insider. My teaching and the DPU action research projects were undertaken in collaboration with three partner NGOs;

Foro Ciudades para la Vida¹⁵, Instituto de Desarrollo Urbano-CENCA¹⁶ and Centro de Investigación, Centro de Investigación, Documentación y Asesoría Poblacional -CIDAP¹⁷. Because of the nature of these organisations, our collaboration was embedded within existing struggles for resistance of marginalised groups. I was therefore inevitably associated with particular insider struggles, advocating for pro-poor planning in governmental institutions and academic circles, and contributing to outputs that supported these. Aligning and sustaining my position over several years with those that I was closely working with, enabled me to become an 'insider' from outside. It gave me access and I was able to form relations of trust that are so important in fieldwork.

I was also an outsider clearly placed in a Northern institution who was also producing knowledge not only for and with participants, but also about them. Being on the outside looking in, gave me the distance to interrogate the otherwise naturalised aspects that were so ingrained and resisted reflection. My foreignness permitted, as much as excused, the probing and sometimes persistent questions I was posing. I was aware that my foreignness combined with my gender, conveyed a naive and unthreatening persona that was, in most parts, productive particularly with officials who took the time to explain in depth the issues I was interested in and even went so far as to share sensitive information. On my part this inside/outside position was always coherent with my ultimate aim; whether researching 'for', 'with' and 'about' people, the objective was to carve avenues towards progressive change.

¹⁵ Foro Ciudades para la Vida is an umbrella organization which brings together 57 institutions in 20 Peruvian cities (NGO, civil society, government institutions and academia). Based in Lima and acting as a civil non-profit organisation, Foro seeks to promote and facilitate opportunities for cooperative action towards urban sustainability. The organisation facilitates institutional networking and has a long-standing record in capacity building of leaders, institutions and citizens in local environmental action planning. For more information: <http://www.ciudad.org.pe/>

¹⁶ CENCA is an NGO that specialises in informal settlements' rehabilitation, risk mitigation and improving the environment. It has been implementing local and regional development programmes for low income human settlements for the past 33 years, through the strengthening of decentralized decisions and resources, the improvement of local management skills, and the support in the coordination between various social and state agents. CENCA also promotes local economic development. For more information: <http://www.cenca.org.pe/>

¹⁷ CIDAP is an NGO, non-profit institution that works with people to help create inclusive, sustainable and dignified lives in cities, through the promotion of citizen participation and grass-roots organisation. CIDAP has a long-standing trajectory working on the ground with marginalised tenants in the centre of the city. It provides technical support, builds capacity and acts as a bridge between the needs and expectations of vulnerable citizens, and the ongoing municipal plans to renovate Lima's Historic Centre. For more information: <http://www.cidap.org.pe/>

Nevertheless, the various roles I inhabited influenced and interacted differently with the type of knowledge I produced. As Kobayashi (Kobayashi, 2004) also notes, one is inevitably inserted in grids of power relations which influences methods, interpretations, and knowledge production. Sultana (2007) develops this view as well asserting how knowledge is fomented by *"the context of our intersubjectivities and the places we occupy at that moment physically and spatially as well as socially, politically and institutionally"* (Sultana, 2007, p. 382). It is therefore important to remain reflexive about one's positionality and that of others. I was quite aware how different kinds of knowledge were produced under different conditions. For example, entering as a UCL lecturer or co-investigator into an interview situation with those that did not know me already, did have implications on the dynamic of the conversation and the information I was able to gather because it placed me in a more authoritative position than if I was entering as a student. Furthermore the data was co-constructed by myself and my participants, and shaped by my perspectives, values, privileges, positions, interactions, and geographical locations (see also Charmaz 2008; Charmaz 2009; Mills et al. 2006b).

Furthermore, because there is an ambivalence between the insider/outsider positions, there are possible contradictions that may arise and being attentive to these is important to maintain an ethical position. Sultana (2007) offers a good discussion on the importance of sustaining reflexivity in order to conduct ethical research. The reflexivity in research involves reflection on self, process, and representation, and critically examining power relations and politics in the research process, and researcher accountability in data collection and interpretation (Jones, Heidi and Roberts, 1997; Falconer, Kawabata and Kawabata, 2002). A reflexive research process can open the research to more complex and nuanced understandings of issues and also enable one to relate to research participants and evaluate what can/cannot be done vis-a vis the research within the context of institutional, social and political realities. Ethics shift from the strict codes of institutional paperwork, towards moral and mutual relations with a commitment to conducting ethical and respectful research that minimises harm (Sultana, 2007, p. 376). During the research I had to constantly evaluate the ethical implications of my methods, interpretations and representations. Because in many instances I was faced with deviations and corrupt practices, I also had to constantly evaluate what could and could not be said. I only included what was important for the research taking a view not to cause unnecessary harm.

The most challenging ethical aspects arose from shadowing. Because they are not necessarily addressed in the formal ethics review process, I would like to dedicate the rest of this section to reveal the dilemmas I experienced. Even though shadowing is used in many social science

studies, little research has been conducted on this method in its own right (McDonald, 2005; Czarniawska, 2007) and there is a gap in the literature particularly with regards to the ethical implications (Johnson, 2014). The method requires openness and flexibility as one does not necessarily know the situations one enters. Besides the unexpected ethical concerns that may arise in the field itself, ethical issues span the entire research process from the design of the study, to the relationship between researcher and participant and to the writing up and publishing phases.

Although the participants I shadowed knew the purpose of my research and had given me full consent to follow them, the method itself inherently implicated a range of people in diverse situations. These people were not as informed as the shadowees and did not give their consent to begin with. Unlike interviews, where I always explained what I was doing and how the data was going to be used, in shadowing, I was often a silent participant. In most cases, the shadowee would take the lead in introducing me and more often than not did so in brief and general terms. People were therefore not fully aware that they were being involved in an academic research project. I dealt with this by offering a more extensive explanation when there was a chance. But often the opportunities to do so were few as I took a back seat while the conversation or work process took a life of its own to the point of obliterating the initial curiosity I arose.

This technique therefore raises concerns because for many participants, there is no knowledge of the status of the researcher. As such one cannot argue that shadowing is completely overt and should be considered quasi-covert. As Johnson (2014) asks: if the research is covert, is it unethical? There is no clear answer to this question and it even generates debate over what is unethical. There are those that "*maintain that covert research is unethical on the grounds that it is deceptive, disrespectful and harmful, and thus should not be used in investigations, and those who contrarily argue that covert observation is necessary to explore certain social phenomena, and can produce valuable insights that would not be possible if done overtly*" (Johnson, 2014, p. 10 quoting Oliver & Eales, 2008).

Considering differing views, acting ethically for me required an assessment of the way I went about collecting the data and making sure that it did not cause harm to anyone and did not place people in a compromised position. With information collected covertly, I had to carefully decide how to deal with it in the analysis and write up stage. This was not straight forward as it was not always clear what is confidential, what is reportable and what is not. An interviewee might clearly state what is off the record but in shadowing, I was exposed to sensitive

situations such as the witnessing of bribes or conversations that seemed private. I dealt with these aspects by anonymising interviewees. Moreover, as the research itself paid particular attention to moments of deviation from the rules I have had to make a careful judgement to report facts that served the purpose of the research. I have revealed the role of my interviewees as it was important for the research.

Although shadowing is seen as a non-participant observation whereby the researcher is in the back seat with the objective of observing and recording and not participating in work-activities (Czarniawska, 2007), I was conscious that I played an active role and also had an impact on the doings of my shadowees. My presence in the field could not be neutral and I knew that it could conjure thoughts, discussions and/or insights and even shift the course of work of the shadowee. In many occasions, the situation was so charged such as during negotiations between invading settlements, that I was quickly forgotten in the background. There were other moments where my presence could not only not go unnoticed but brought with it the unforeseen exposure of my participants to unwanted attention. In Chapter 7, I offer an extract of the events that occurred while shadowing municipal officers in an area where large-scale land traffickers were undertaking their illegal activities with the support of adjacent settlements and the police. The episode brings forth a few aspects worth highlighting. On the one hand, it enabled me to collect rich data. My foreignness in this context propelled certain actors to come into view (such as the police that were also involved in protecting the pirate subdividers). It was therefore beneficial to the research. However, it also raised suspicion. I could therefore not ignore the possibility of compromising the position of my shadowees with my presence and asked them before hand to consider whether they would attract unwanted attention in my company. While non-participant observation as a research technique has been described as "*non-intrusive method for collecting data*" (Davis, 2004, p. 327) relative to other methods, it can certainly be both intrusive and disruptive to participants.

3.7 Boundary setting and limitations of the study

I made a number of conscious decisions to set the boundaries for the research but there were also limitations set by the methodology itself.

The focus on spatial information in the form of maps/plans and mapping as the production, manipulation and circulation of selected maps/plans, limits the scope of the analysis. There are perhaps many more actors which would have been revealed if other document types or activities were included. I focused more precisely on the types of maps/plans that acted as *boundary objects*. As noted by Star (2010), common objects form the boundaries between groups through flexibility and shared structure. Although boundary is sometimes understood as the edge or periphery, here it is meant as a shared space where it is neither here nor there. Taking the maps and plans as *boundary objects*, I considered the maps/plans that mediate between different social spheres excluding those that operated in a single sphere. A distinction is here made because some maps are produced for internal purposes only and do not circulate. In the context of the peripheral areas of Lima, the most visible spatial information is commissioned by the settlements themselves and used to advance territorial occupation, to negotiate the acquisition of services and the recognition of settlements. This involves maps commissioned from engineers by newly formed settlements and land traffickers to negotiate with the local government, utility companies, and other actors involved.

Although the case study was not geographically bounded, the focus was defined by selecting newly formed settlements within a shared institutional context provided within the district of SJL and located on steep slopes.

There are many processes that could have been observed. I limited the scope by concentrating on the interaction of various actors with the 'formal' municipal processes. This led me to explore the work processes that happened from the initial occupation, through to land titling.

The methodology adopted, while valid and rigorous, also comes with constraints limiting the empirical and epistemological contributions that can be made. As I focus on the interrogation of planning through cartography, it is important to acknowledge that not everything can be observed through cartography. Using cartography to observe planning and urbanisation processes will only reveal certain aspects, but even a partial observation will here contribute to the limited knowledge of such processes and planning in practice in the context of *barriadas*.

The scope of this thesis was limited to answering the research question posed within the short time frame within which the fieldwork and this research were conducted. First, the analysis emerged in the context of the case of the urbanisation of the slopes of Lima- Peru- a very local context with a specific social and political landscape. I cannot therefore claim that what I have found in this thesis has a universal application or operates in other cities in Peru or Latin America. This is because planning represents a wide range of practices and these practices are particular to their location and to the actors involved. However, by researching the specific social, political and administrative relations, I imply that one should examine the specific conditions through which a particular planning system results in outcomes that might or might not conform to the desired objective and normative expectations.

This thesis provides a partial observation of the heterogeneous actors involved, their practices and interactions. Taking a relational approach, and conceptualising those who play a role in the urbanisation of the slopes as a network inevitably means that one is dealing with a limitless field with endless connections. This network is therefore artificially 'cut-off' to fit within the scope and timeframe of the research. However, focusing on the spatial strategies of the different actors working in the same geographical space and their engagements with the regulatory frameworks, even if providing an incomplete observation, is useful in this context where little has been written. Moreover, exposing the role of non-humans within these networks and how they also take part in the micro-politics that precipitate undesired outcomes is a contribution to the way one conceptualises power and responsibility in peripheral urbanisation. Even if only a limited number of non-human actors are engaged with in this thesis, it has nevertheless demonstrated that they are active agents and need to be given importance in planning research.

As the thesis focuses on sensitive and sometimes illegal subjects with little available information, such as land traffickers or pirate subdividers, I have had to resort to multiple sources for information, often times patchy. At times I have also had to limit the direct observations for safety considerations. In such cases, I have sought as much as possible to triangulate information using different informants and media reports when they were available. In instances when physical access was limited, I was able to revert to satellite images from different dates, to have 'a view from above' and to corroborate and analyse the spatial changes that were occurring. I do not pretend to offer a comprehensive explanation of how the diverse networks operate. I nevertheless offer a contribution by making visible (even though partially) the actors involved, their effects on the landscape and how spatial information is used/manipulated to support the interests of the diverse networks.

Furthermore, my research process was such that the fieldwork was undertaken over many trips in the space of 5 years. I was therefore limited in what I could do over the time frame of one trip before having to interrupt. Nonetheless, this research process also had its advantages, including opening up a longer-term view, which I have explored in more detail in section 3.2.1 above.

Finally, I here side with a social constructivist view of knowledge, recognising that this thesis is my own interpretation of events. Although some aspects have disproportionately grabbed my attention while others have inevitably been hidden, the research contributes to what I believe to be the most detailed empirical information to date on the interaction between different practices and the regulatory frameworks in the context of the urbanisation of the periphery of Lima.

3.8 Conclusion

In this chapter, I explained how my choice of the study context, as well as the entry point through cartography, were shaped by my previous experience as a practitioner and researcher on other projects. I discussed how the multiple fieldwork trips over the past 5 years, have shaped the iterative research process between data collection, reflection, analysis and writing, structuring my approach to theory and the research design. This process allowed constant testing of the research questions, concepts and theories as well as the collection of data in subsequent trips.

In order to unpack the diverse networks and observe the practices through cartography, I have resorted to a wide range of techniques for data collection. Data in this research is derived from 246 one to one interviews, 23 focus group discussions, participant observation, shadowing, spatial analysis, landscape history, and transect walks. A broad variety of people were interviewed including settlement leaders, NGO activists, residents, academics, administrators, politicians, engineers and technicians. I have anonymised my interviewees for ethical reasons but revealed their roles as it was important for the reader to understand where they are speaking from. Snowballing and shadowing were important to identify interviewees. Access to interviewees was facilitated through the research projects and partner NGOs I have been involved in while undertaking my PhD, as well as the various individuals within and outside government institutions which I developed a relationship with over the 5 years of my PhD research. With regards to the analysis, textual and visual recording were instrumental to manage the large data set. I have also in this chapter offered some reflection of the

positionality, reflexivity and ethical consideration with special attention to the shadowing technique because it raises several concerns with regards to safety, the position vis a vis many participants that have no knowledge of the status of the researcher, as well as the potentially compromising position the interviewee is placed in.

The following chapter provides the context for the empirical chapters 5, 6 and 7, by presenting a historical overview of the relationship between the planning system and the *barriadas* from their emergence in the 1940s. It reveals some of the factors that are brought from the past to structure the shape *barriadas* take in the present day. In Chapter 5, 6 and 7, I focus on each of the black boxed entities identified: the State, the community organisations and the land traffickers. Through an ethnographic analysis of the cartographic calculations and coordinations, and using thick description, I unravel the actors that are enrolled and the practices they undertake to enable and sustain the urbanisation of the slopes.

Chapter 4 A historical overview of *barriadas* and planning

4.1 Introduction

Human settlements in Lima have been known by various terms, which have had considerable importance as political symbols. Before the 60s, the *barriada* was the most common term used meaning 'little neighbourhood'. Over time, there has been a general shift away from pejorative terms to refer to human settlements that reflect the shift in policy. After 1968, different legal texts adopted the term young town (*pueblo joven*), which was substituted by human settlement (*assentamiento humano*) after 1980 (Driant, 1991, p. 20). Other terms for the *barriadas* included "*clandestine housing development, clandestine neighbourhood, town in formation, marginal neighbourhood... Expressions such as 'social cancer, 'social aberration' and 'belt of misery' have also been used to refer to the settlements*" (Collier, 1976, p. 19).

The official discourses range from, on the one hand, considering human settlements as violations of property law, and on the other, as patriotic bids for rights and social justice. Although these framings have co-existed in time up to this day, one can identify particular dominant views that have characterised the various administrations and have led to actions ranging from eradication, tolerance, support and even promotion. The various official discourses with regards to *barriadas* went hand in hand with the production and use of cartography. These framed *barriadas* in ways that subsequently informed action.

Language is not merely contemplative or justificatory but performative (Rose and Miller, 2010) as is also graphic representation (Lambert, 2015). Both are mechanisms for making reality amenable to certain kinds of action. It is therefore important to analyse how these together were instrumentalised by the State to govern *barriadas*. The various definitions of *barriadas* in political discourse help to elucidate the rationality and systems of thought used to pose the problem for government and subsequently formulate solutions. With political rationalities also come governmental technologies (Rose, O'Malley and Valverde, 2006). Following Foucault, Miller and Rose (1990) argue that the linking of rationalities and technologies is what makes programmes of governing possible. By rendering thought into a technical form, authorities are able to act on conduct 'at a distance' aligning the aspirations of individuals and organisations with political objectives (Miller and Rose, 1990, p. 7). The production and use of cartography took off in Lima as a technology of government at a time when *barriadas* could no longer be ignored in the 60s. Supporting the political rationality, layout settlement plans were

standardised, and their adoption became compulsory. To this day, this remains so. However, they are not only a technology of the State but have also become the technology of various other actors to achieve their own goals while still navigating and negotiating regulatory frameworks, that is the administrative procedures, planning standards and planning regulations.

This chapter offers a historical tracing of the relationship between the regulatory frameworks and *barriadas*. It identifies the factors that contributed to the formation of settlements, their spatial distribution in the city, the different types of modalities under which they were established and developed, and the key changes in the political, economic and social spheres that have influenced the organisational and physical development of *barriadas*. In this way, this chapter provides the context for the following 3 chapters. To understand the relationship between *barriadas* and the regulatory frameworks over time, it examines the link between the changing political discourses¹⁸, the formulation of housing policies for the 'urban poor' by successive governments and the production and use of cartography as a calculative technologies that accompanied the decision making and actions of the different administration to govern and control *barriadas*. The chapter seek to capture the various historical factors and interactions that explain why *barriadas* on the peripheral slopes of Lima take the shape they do today. It thus seeks to address RQ1 by identifying the actors that are stabilised from the past and come to be enrolled in different networks operating in the present. It explores the administrative procedures, planning standards and regulations developed with regards to *barriadas* and how, over time, they came to be 'performed' by inhabitants and technicians both within and outside government institutions to produce a spatial layout on the slopes that exacerbates risk.

Organised as a linear account, this historical tracing moves from the initial emergence of *barriadas* in marginal spaces in the 1940s; to the time that they became the characteristic form through which the city grew and were recognised and formalised by the State; to the present day where this mode of urbanisation is occurring on steep slopes at the edge of the city, in high-risk areas deemed uninhabitable by the State. Figure 4.1 is a timeline capturing the evolution of *barriadas* from 1940 to the present day, showing the population growth and the changes in government. It is meant to help the reader follow the important chronological events that are mentioned in this chapter.

¹⁸ To capture the changing political discourses, I examine the different definitions of *barriadas* in official documents as well as how they are depicted in various maps over time.

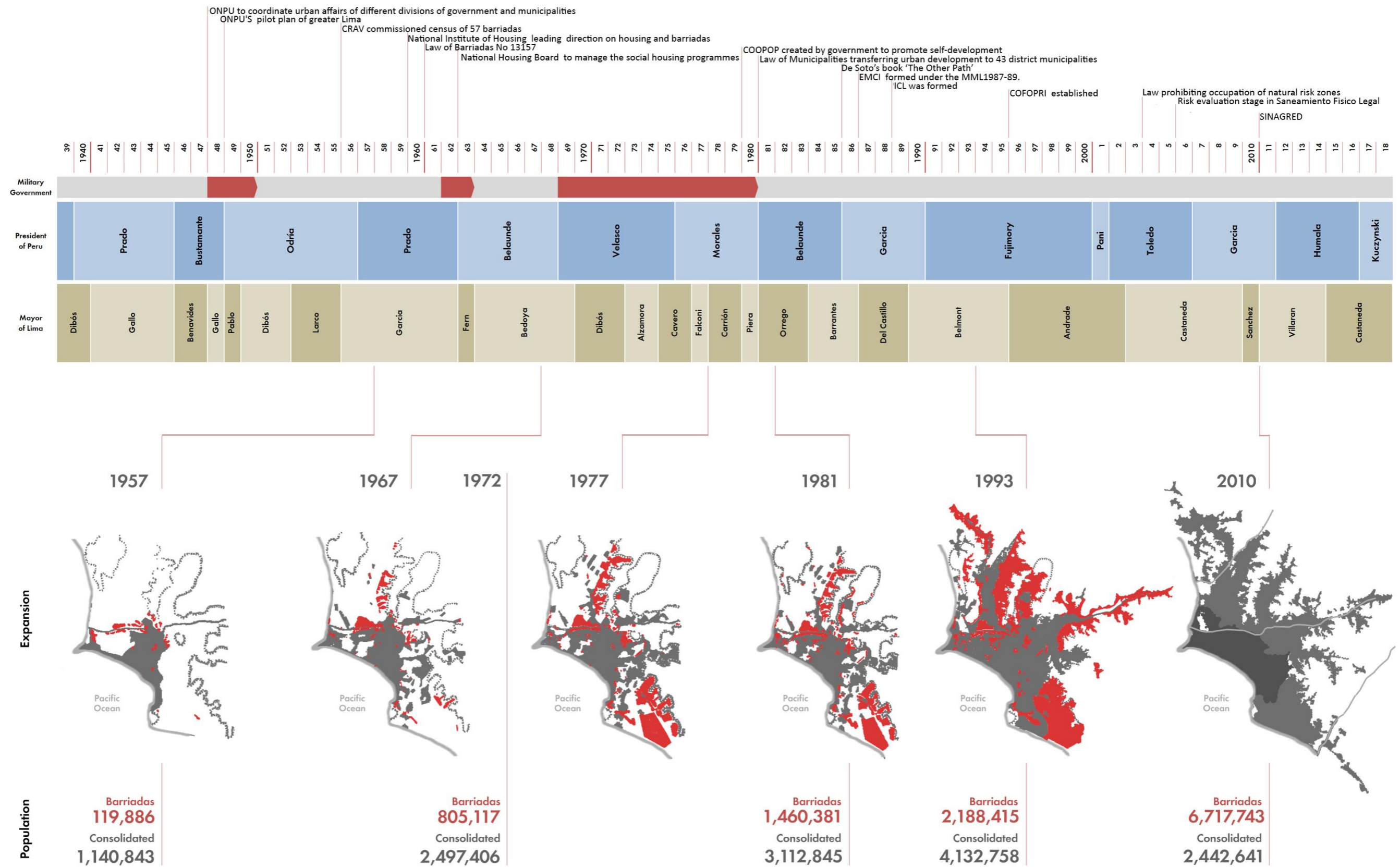
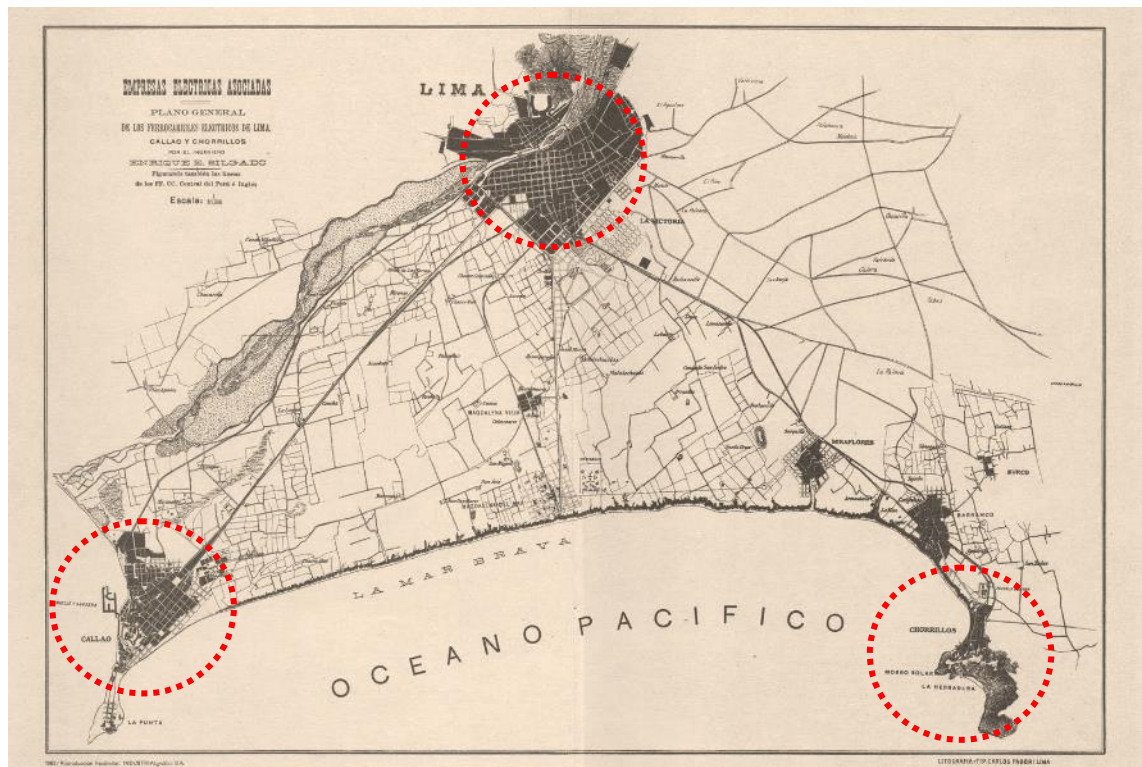


Figure 4.1: Timeline capturing changes in government, population and urban growth since 1940s.
 Source: own elaboration using data from INEI, Matos Mar (2010), Collier (1975), Riofrio (1990).

4.2 The emergence of *barriadas* as marginal neighbourhoods.

Lima was established as a Spanish colony in 1535 on the same site as a pre-Inca settlement, where various trails and irrigation canals came to form a junction (Gunther Doering, 1983). Lima remained a walled city between 1684-1880. It started to grow beyond its walls, guided by the connection established with the port of Callao to the West, and the balneariums to the South (Figure 4.2). Although, up to this point, the process of urbanisation was steady and mainly concentrated in the apexes of the triangle formed by Callao- Lima- Barranco the 1940s were characterised by an explosive urban growth. This urban expansion led to the rapid loss of agricultural land within this triangle (Ludeña, 2004) (see Figure 4.2).

Figure 4.2: 1908 general map of electric railway*.



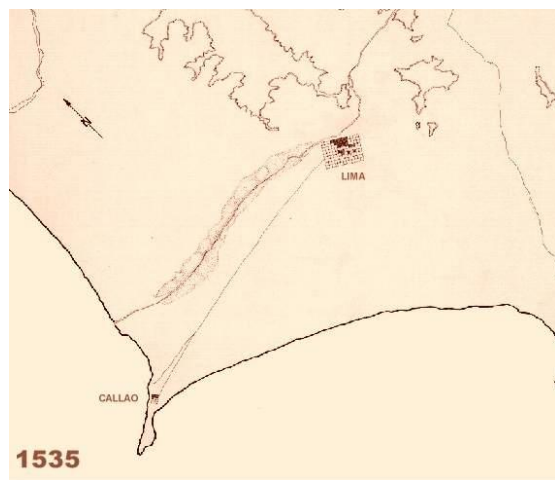
* The map shows the notional triangle constituted by Lima, the port Callao in the South West and Chorrillos in the South East.

Source: Maps of Lima 1613-1983, (Gunther Doering, 1983).

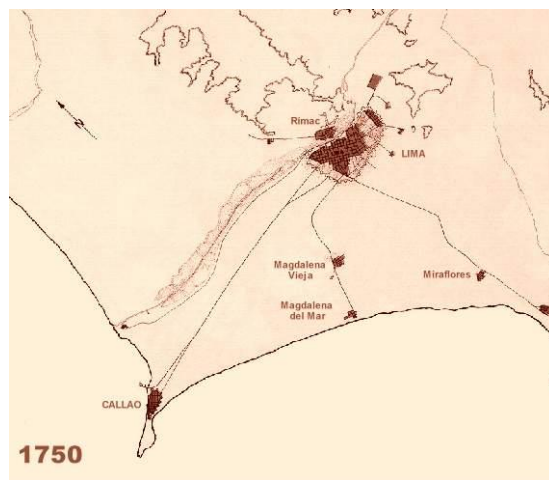
The urban growth was propelled as much by the middle and upper classes, as it was by the poor (Ludeña, 2002). Mass migrations started to occur from the provinces and rural areas. 'Pull' factors such as better opportunities for education and jobs, and 'push' factors such as the loss of agricultural land, the economic crisis and the occurrence of natural disasters saw large numbers of migrants coming to the city (Driant, 1991). At first the newcomers were

accommodated in properties in the now historic centre that were subdivided by their owners for the rental market (Ludeña, 2004).

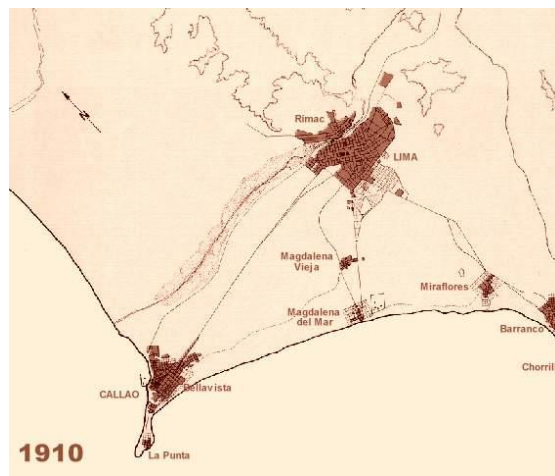
Figure 4.3: Series of maps showing growth of Lima from 1535 to 1940.



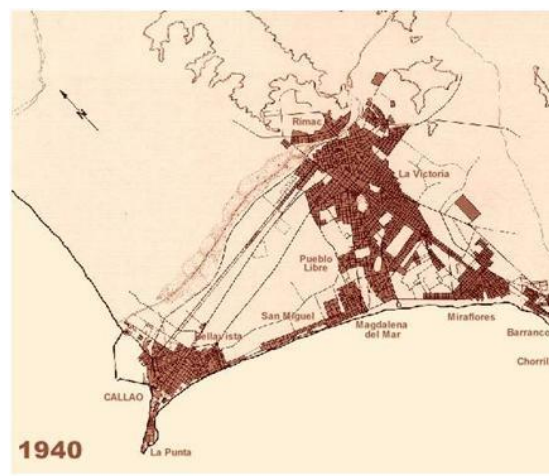
Only the walled city of Lima and the port of Callao existed in 1535.



In 1750, Lima was still contained within its city walls and a few smaller centres had emerged: El callao, Magdalena Vieja, Magdalena de Mar, Miraflores, Surco, Barranco and Chorrillos.



By 1910, Lima expanded beyond its walls and the various centres also grew.



The urban growth continued to occupy agricultural land and the various centres merged.

Source: Maps of Lima 1613-1983 (Gunther Doering, 1983).

The elite, on the other hand, started to move out from what was becoming an increasingly overcrowded centre, taking with them key functions such as banks, commercial centres and administrative offices (Ludeña, 2002). As migration continued and the housing demand could not be met in developed areas, people started settling on unoccupied marginal lands with

difficult physical condition, such as along the river Rimac and the steep terrain on north-eastern hills surrounding the (then) centre (Quispe, Arias and Maquet, 2005). Leticia, San Cosme (Figure 4.4) and El Agustino (Figure 4.5) are some of the first settlements that grew organically, with no regular pattern and narrow streets, rapidly reaching a high population density.

At first these settlements were known as 'clandestine urbanisations' which was soon replaced by the more common term '*barriadas*'. The *barriada* denotes a human settlement which follows the model of reversed urbanism where the land is occupied first, after which public services, utilities and facilities are obtained through the collective efforts of inhabitants to progress in terms of urban development and social organisation.

The *barriadas* were initially spatially contained for which reason Matos Mar (2010) refers to them as 'moles' within the city fabric. But they soon started expanding rapidly and emerging in different areas of Lima, as did the urbanisation driven by the middle and upper classes (Ludeña, 2004). In reaction to the rapid growth of Lima and the need to plan the city, the Bustamante administration (1945-1948) established the National Office of Planning and Urbanism (*Oficina Nacional de Planeamiento y Urbanismo* -ONPU) in 1948, whose responsibility it was to coordinate and direct urban affairs related to the different divisions of government and municipalities. Up to this time, the *barriadas* were a relatively new phenomena and little was known about their spatial and social organisation. Despite its pervasive use in various circles, the term *barriada* did not have a definition until 1948 where the ONPU released the first official definition in a housing study it conducted. The document defined the *barriadas* as:

"... the neighbourhoods formed on invaded lands, that do not conform to a preconceived physical plan or that have one but is rudimentary, lack basic social and public services and are characterised by an unhealthy environment where deplorable conditions prevail" (translated from Spanish to English from Driant 1991, p.17).

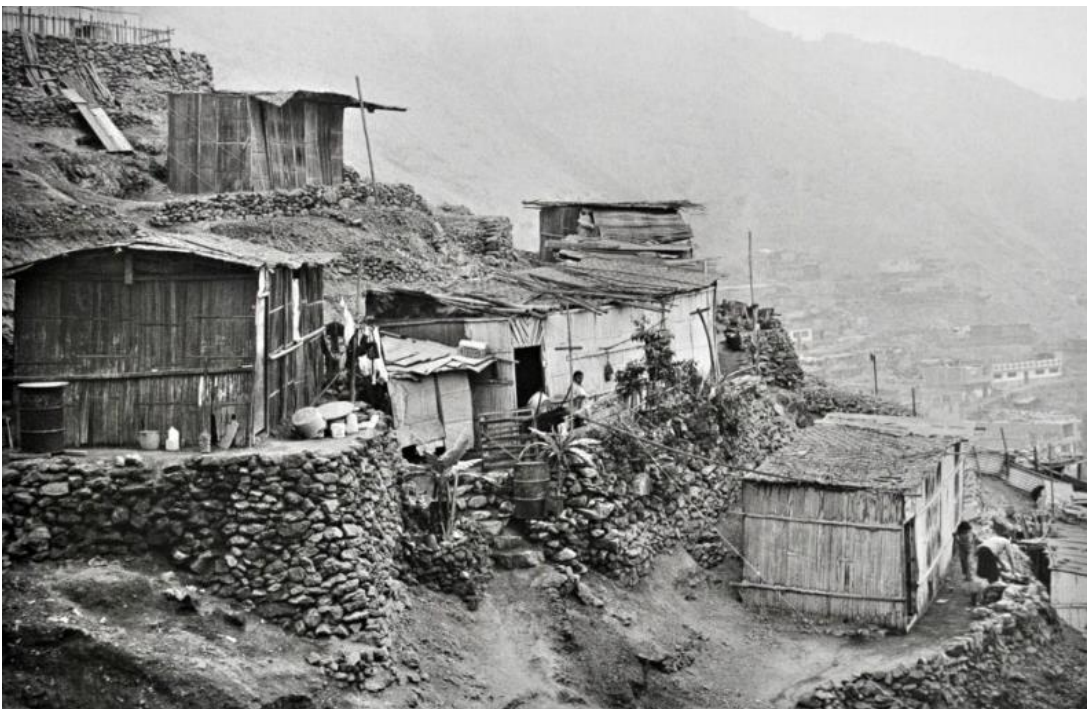
This definition clearly focused on what is lacking and it also marks the first attempt to capture *barriadas* technically. The ONPU elaborated the 1949 pilot plan of greater Lima (*Plan Piloto de la Gran Lima*) approved by Bustamante's military government. In the introduction, the document states "*cities that have insisted in developing without a scientifically studied urban plan have ended in degenerating and the living conditions have become truly pitiful*" (translated from Spanish found in Oviedo Lira 2011, p.1). Already at this point, one notes how technical urban plans are positioned as necessary to achieve healthier cities.

Figure 4.4 San Cosme, 1954.



Source: Servicio Aerofotográfico Nacional.

Figure 4.5 El Agustino in the first years of occupation.



Source: Gloria Calderon, *Las Terrazas de Catalina Huanca*, found online at: <https://redaccion.lamula.pe/2015/01/06/1986-1988-tafos-en-el-agustino/valentinaperezllosa/>, accessed 5/09/17

As part of ONPU's preliminary studies to elaborate the plan, the *barriadas* were identified spatially and the studies included the first classification of different forms of occupation of the

metropolitan area. The frame for this analysis was constructed around unhealthy housing conditions with a focus on physical, economic and social conditions¹⁹.

But this way of problematising *barriadas* did not lead to a corresponding solution for how to improve housing conditions and by extension the general health of inhabitants. The plan (Figure 4.6) stopped at a diagnosis (Garcia *et al.*, 2015). It offered a direction for the way the city should grow through satellite towns, without a proposal for the provision of housing for the urban poor (Oviedo Lira, 2011).

Figure 4.6: Pilot plan of Lima*.



*The plan shows the 'then' built up areas, half-built areas, industries and the projected areas for industrial purposes. The intention of the plan was to identify the borders of the city and define the areas for growth.

Source: Pilot Plan of Lima. National Office for Land Planning and Urban Development. Supreme Decree Nº 256, September 12, 1949

¹⁹ Different criteria were adopted; the status of property on the invaded lands, the quality of materials used as well as the stage of development of infrastructure and services (Ludeña, 2006).

With this narrow technical input, limiting its scope to making *barriadas* partially visible without interfering, human settlements continued to grow particularly between 1945-1948. This growth was accompanied by mounting pressure from discontented inhabitants living in challenging conditions, pushing the State to intervene. At first the State offered them recognition, but this was limited to conditional assistance based on a paternalistic stance. It was later extended to legal recognition through the handing out of land titles (Collier, 1976).

4.3 The recognition of *barriadas*

4.3.1 The State's paternalistic approach

Odria's administration (1948-1956) marks the first period where the government played a major role in helping settlements and promoting their formation²⁰ (Collier, 1976). During this period, several low-income public housing projects, as well as public works programs, brought a construction boom to the city and employment for the working class. This in turn promoted further immigration and 'invasions' of land (Figures 4.7 and 4.8).

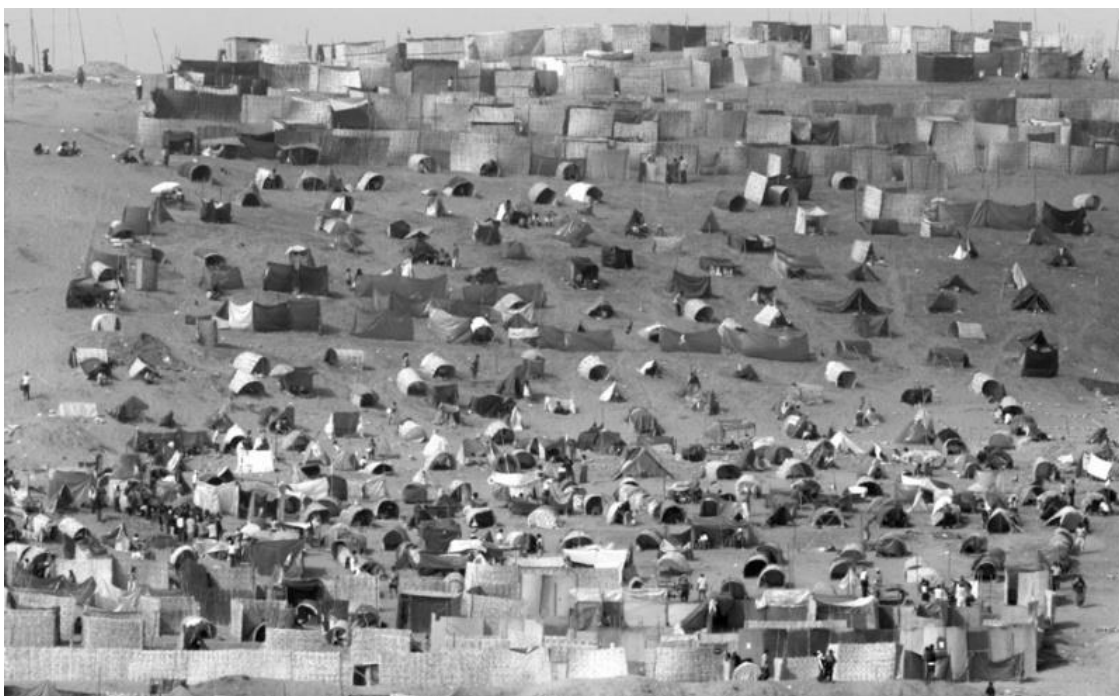
Figure 4.7: The 'invasion': people moving in with building materials.



Source: Jose Matos Mar (2012)

²⁰ Detailed information on political involvement in settlement formation before 1945 is hard to find (Collier, 1976).

Figure 4.8: Initial occupation of land.



Source: Photo by Jose Matos Mar, found in (El Montonero, 2015)

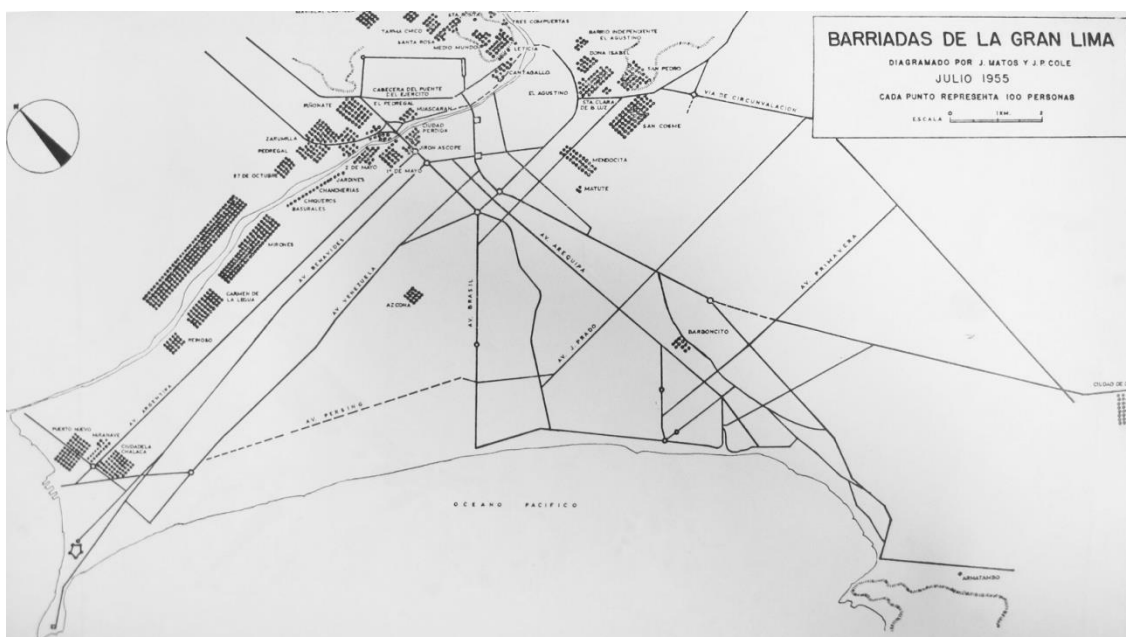
Instead of tackling the housing deficit, the State took a permissive stance towards settlement formation as an inexpensive way of giving aid to the poor. Together with gifts and charity, the State reinforced a paternalistic kind of politics seeking to establish a dependent relationship between *barriadas* and itself (Collier, 1976). Odria's government encouraged the formation of local associations in each settlement for carrying out community projects which acted as an interface for cooperation with the State. Odria also acknowledged the political power of the ever increasing numbers of *barriadas'* dwellers, reframing them as political subjects who could provide him the needed base of political support (Collier, 1976). From then on, this two way relationship generated expectations linking State help in exchange for votes (Collier, 1976). This political stance was heavily criticised by those who still saw *barriadas* as a 'social cancer'²¹ and who were calling for their eradication with the formulation of a large-scale, low-income housing policy. Such proposals were labelled as 'communist' by the power and social elite at the time and did not take hold (Matos Mar, 2012, p. 224). Instead, the focus was solely on providing land and allowing people to settle as a way of appeasing the masses.

Odria's government issued a first decree towards agrarian reform, declaring that the State had the capacity to expropriate lands that were not used and revert them to State property. However, during his administration, there was no progress in this regard and the presidential

²¹ Fernando Belaunde in 1954 in his article in *El Arquitecto Peruano*.(Matos Mar, 2012, p. 224)

campaign of Prado's government (1956-1962) re-committed its stance towards the reform. Prado's government established the Commission for the Agrarian and Housing Reform (*Comisión para la Reforma Agraria y la Vivienda - CRAV*), to advance land reform. CRAV commissioned several important studies to understand the scale of the housing crisis. Some of the pioneering works included the only global study of the housing problem at the time by the architect Adolfo Cordova (1958) and the census of 57 *barriadas* in 1956²² by sociologist José Matos Mar (Driant, 1991, p. 21). Matos Mar's study was unprecedented in that it provided the first comprehensive profiling of each *barriada* with detailed spatial information. His research team walked the city and entered *barriadas* taking time to undertake a careful mapping of the settlements (interview with Matos Mar, October 2015), not only in term of their location in the city (Figure 4.9) but also their individual layouts (Figure 4.10).

Figure 4.9: Map produced for the study of 57 *barriadas* showing the locations of *barriadas* in the city.



Source: Photo R. Lambert taken from Matos Mar (1978).

For the first time, *barriadas* were represented as more than just stains on the map. The seemingly precise drawings used conventional planning standards to capture the street layout and the division of plots within each settlement. The plans also indicated the various trades located within the settlement which include: public baths, bars, chapels, carpenters, music houses, churches, hairdressers, dressmakers, water tanks, public toilets, shops and shoe makers amongst others (Figure 4.10). Beyond capturing the physical form of the settlement,

²² He also later published the book *Las Barriadas de Lima, 1957*

these documents alluded to the life within, focusing attention on the high level of social organisation and development that the inhabitants were capable of and, in many cases, had already attained.

Figure 4.10: Layout plan of Puerto Nuevo, one of the *barriadas* included in the study of 57 *barriada.**



* The layout plan shows the information of the various trades found within the settlement.
Source: Photo R. Lambert taken from Matos Mar (1978).

Unlike the previous framings of these settlements which were from afar, a-spatial, and homogenising, one could argue that the careful recording of particularities of all 57 *barriadas* in Lima played a role in shaping the imagination of these places, locating them as part of the city. Arguably, this more sympathetic and grounded mapping provided the basis for how *barriadas* came to be seen as valuable contributors to the city (interview with Matos Mar, October 2015). Moreover, the cartographic conventions used in these representations also

give settlements a sense of order and legibility which further contributes to their perception as organised spaces. This relates back to the discussion offered in Chapter 2, where mapping is taken up as a means of creating alternative framings in reaction to existing knowledge, raising awareness towards those that are 'off the map' and made invisible (Lambert, 2015).

Adding to Cordova's and Matos Mar's efforts, John Turner²³ and Willian Mangin, from a more international perspective, also helped to focus the debate reframing inhabitants of *barriadas* by drawing attention to their efforts. Contesting its framing as the problem, the *barriada* was strongly positioned as the solution to the housing deficit (Turner, 1966). This shift in perception conceptualised *barriadas* as an inevitable manifestation of the explosive growth of the city and the State's inaction, thus calling for a more systematised intervention that takes advantage of their value. At this time, Lima was a place of great political effervescence and the centre of debate on housing policy. The contrasting opinions on housing policies were related to broader debates about the planning of the city, the political ideology and the nature of democracy (Bromley 2003).

4.3.2 Legal recognition of *barriadas* and the plan as a technology of government

The Prado administration (1956-1962) took the pragmatic option of offering legal recognition (Collier, 1976). Land titling was therefore inevitably coupled with the production of spatial information. In Odria's government (1948-1956) prior to Prado's, though settlement formation was promoted, there is no evidence of inhabitants being granted land titles²⁴ (Calderón, 2011). This also meant that the production of spatial information was not as essential then as it was from the 1960s onwards, when *barriadas* started to "*exist juridically*" (Rodríguez and Jaworski, 1969).

At this point in history, one starts to observe that the cartography of *barriadas* is not only being produced by researchers and academics, as previously noted, but by government

²³ John Turner lived in Peru from 1957 to 1965 and experienced the first years of regularisation of the Peruvian *barriadas* (Calderón, 2013).

²⁴ Collier (1976) understands this to be a strategy for reinforcing the dependence of settlers on Odria because having titles would mean that their security of tenure would have a formal legal basis rather than depend on the willingness of the State to let them stay in a given area.

institutions²⁵. To help with titling, technical assistance, which included the drafting of plans, was promoted by the Prado administration. Already at this point one notes the calculative stance of the State to capture *barriadas* graphically and tie them to property regimes. However, because this did not go hand in hand with the building of housing projects, it indirectly promoted the creation of human settlements to solve the congestion in the city centre and housing demand surplus.

Collier (1976) notes that instead of dependency and informality (as was the case in Odria's government), the proposal of the Prado period was to get the *barriadas* to become independent of the State and "*create a highly structured world based on property and self-help that would teach the poor to help himself and would take him away from political movements*" (Collier, 1976, p. 61). In this way, the Prado regime was acting on the famous slogan used by the prime minister at the time, Pedro Beltrán, "*more owners, fewer communists*". Beltrán emphasised that once community improvements had been carried out on the basis of self-help, land titles should be granted, thus incorporating the settlements within the conventional system of private property (Collier, 1976).

The National Institute of Housing (*Instituto Nacional de Vivienda - INVI*) was created in 1960 with the objective of leading the direction on housing and *barriadas*. Following this, the 1961 Law of *Barriadas* № 13157- known as *Ley Organica de los Barrios Marginales Urbanizaciones Populares*- marked a major turning point. The objective of the law was to organise the process of transformation of what were then called 'marginal neighborhoods' (*barrios marginales*) into 'popular urbanisations with social interest' (*barrios populares de interes social*). Although it granted rights to already established settlements, it also prohibited further invasions. The law was an important step toward accepting *barriadas* as a normal aspect of urban housing development (interview with official in Ministry of Housing, May 2014). It was also instrumental in establishing a clear process with a strong technical orientation which promoted the production of layout plans as a pre-requisite to formalisation (Riofrio, 1991).

The mention of a lack of physical plan is found in the earlier ONPU definition stated above, and it is also present in the definition of *barrios marginales* proposed in the Law of *Barriadas* №

²⁵ The apparatus of State calculation includes statistics, census-taking, mapping to geo-code the world, gridding of space, street addressing amongst others, and the general organization of space according to the logic of numbers, assists the production of knowledge, which in turn facilitates the capacity for governing a population (Crampton, 2010; Rose-Redwood, 2011). Calculation is foregrounded as a strategy of territory and 'making legible' for purposes of intervention (Hannah, 2000).

13157. This highlights the persistent focus on having a physical plan as a central technical device for government and instils its importance for any proposed solutions thereafter. The definition in the Law № 13157 stated that:

a) 'Barrios Marginales' or 'barriada' is an area of land under the ownership of fiscal, municipal, communal or private(...) in which, through invasion and at the margins of legal dispositions on property, with or without municipal authorisation, on plots that are distributed without the tracing of an officially approved physical plan, have seen the building of groups of housing of whatever structure, lacking in such areas, on or more of the following services: potable water, drainage, electricity, sidewalks, vehicular roads, etc"²⁶ (translated from Ley No 13517, Art. 4, inciso 1.A , Congreso de la Republica Peruana (1961).

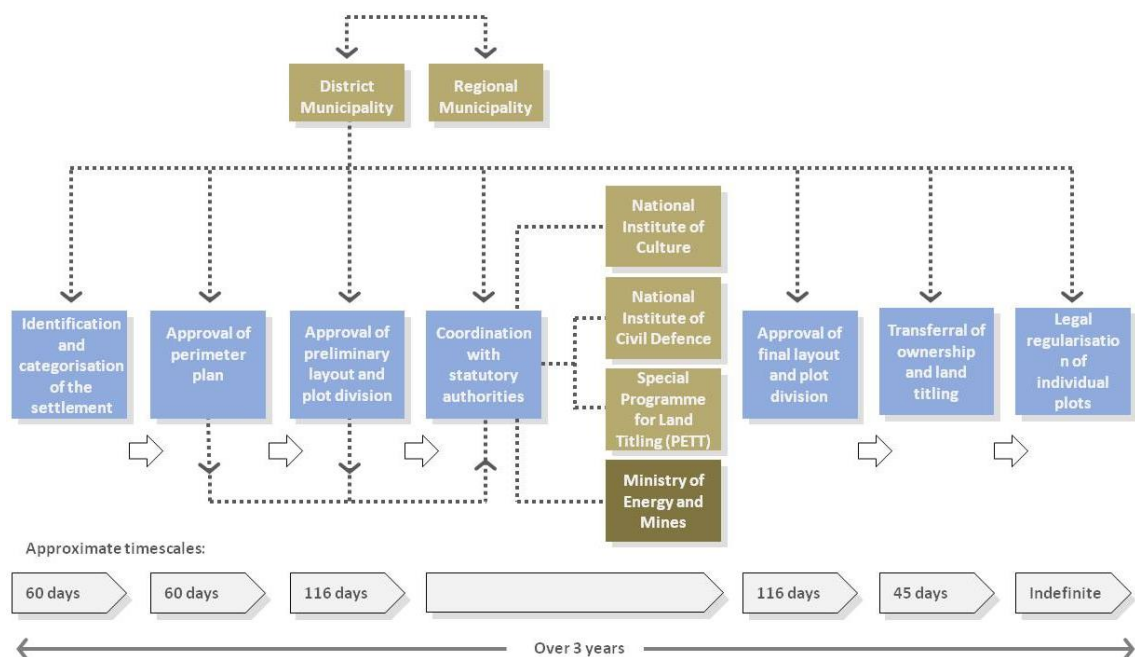
Although similar in wording to the 1948 definition of ONPU, it mentions the possibility of authorisation from the municipality even though it might be at the margins of the legal status of property. Moreover, it expands the notion of deficit, including the neighbourhoods which might not have one of the services listed, and does not limit the deficiencies. Unlike the previous definition, the focus is on the access to land rather than the lack of services or unhealthy conditions. The definition is also broad enough to encompass many types of settlements. Furthermore, it refers to the distributed plots without an officially approved plan, which does not mean that the plan is non-existent or rudimentary.

The Law № 13157 established that *barrios marginales* that already exist would receive special treatment from authorities. These would be legally recognised, securing the tenure of inhabitants that occupy the area of land. Moreover, they would also receive State help for their physical rehabilitation. The two processes under the responsibility of the authorities are known as *Saneamiento Físico y Legal* (the physical and legal regularisation) which consist in: 1) the physical rehabilitation of the existing neighbourhood to conform with urban norms and planning regulations, 2) the expropriation of land, which should it be private property, needs to be transferred to the State before being passed onto inhabitants; 3) the issuing of land titles for each individual plot (Driant, 1991).

The *Saneamiento Físico y Legal* was characterised by a linear process (Felipe, 2004). As stipulated in the Law № 13517, and explained in detail by various authors (see Riofrio 1991; Matos Mar 2010; Driant 1991; de Soto 1989), authorities had to first identify the settlements through their own initiative. An effort was made to discern, classify and catalogue the

barriadas that existed. After the recognition of the settlements, qualifying families were selected. In parallel, plans would be drawn by State technicians (mainly architects and engineers), in line with the specified norms and regulations for the width of roads, the size of plots, the buffer zones, the open spaces. Therefore, the technical plans produced, mainly the perimeter plan and the plot plan would indicate the works, negotiations and arrangements that would need to be implemented to mould the existing settlement into the proposed plan. In many settlements, this meant realigning the already occupied plots and shifting people within the boundaries of demarcated plots. The plots themselves would be delineated with the use of permanently fixed and mandatory metal rods ('*hitos*') at each corner. After this process, the legal regularisation would follow which involved the transferral of the land ownership to the State. Subsequently, the legal ownership of the individual plots would be given to the qualifying inhabitants according to the plot plan.

4.11 Process of *Saneamiento Físico Legal* previously used within Lima's municipalities.



Source: translated from Spanish to English and adapted from Felipe (2004, p. 52)

With the passing of the Law Nº 13517, a substantial number of lawyers and technicians infiltrated the administration and took a determinant role setting the base rules for the spatial layout of settlements using plans that would then be tied to land titles (Interview with official from Ministry of Housing, May 2015). At this point, curbing *barriadas* into calculable space became a major undertaking. Armed with the mandatory plans that had to be followed, technicians operationalised the governmental rationality of the State, making settlements visible, controllable and open to calculation. The gridding of space was adopted as the most

efficient and rational layout which was also rooted in the spatial planning ideas inherited from Europe.

However, this meant major remodelling. To begin with, the gridded layout was not implemented at the start of occupation but was forced upon already established *barriadas* who had to change their shape in order to be eligible for land titling. Arguably, forcing *barriadas* to take up the grid and therefore curbing them into calculable space was a means to control and discipline them, echoing a number of scholars who have explored the centrality of the grid as a calculative technique of the State for ordering, controlling and managing property regimes (Hannah, 2000; Grant, 2001; Blomley, 2003; Crampton, 2007; Foucault, 2007)²⁷. The settlement layout plan, drawn by technicians of the State, was used to facilitate the translation of the grid onto the ground and therefore became the central document which inhabitants used to coordinate the works needed. Worth highlighting is the close relationship between the grid and mapping as the latter is instrumental to implement the grid as it supports the degree of precision needed in the planning and the rational development of the planning project. Mapping makes the grid layout implementable because it is based on strict calculable space, fulfilling the desire for the systematic measurement of land and prior knowledge that the grid plan entails²⁸.

The process of *Saneamiento Físico Legal* was not rolled out as planned. The process was lengthy and onerous (de Soto, 1989). The remodelling according to the plan and grid had to happen first, before the introduction of services, and then land titling. Therefore remodelling did not always take place and many of the established *barriadas* remained as before (Ramirez and Riofrio, 2006). Moreover, with the growing migration the demand for land was increasing and the government could not keep up with the process of *Saneamiento Físico Legal*. Census data shows that the urban population went from 562,855 in 1940 to 1,069,515 in 1961 (INEI) and kept growing at a fast rate. With this explosive urban population growth, even though invasions were prohibited with the Law Nº 13517, they took an unprecedented scale in the absence of housing alternatives.

²⁷ The idea that the grid plan facilitates the social control of populations by a centralized State authority has gained wide acceptance and the emphasis on the disciplinary dimension of the grid has been explored by many (Rose-Redwood, 2010). Several writers have also highlighted the role of the grid as an instrument of real estate speculation and the commodification of space (Marcuse, 1987; Lefebvre, 1991).

²⁸ Several scholars implicitly refer to the rigid linear layouts resulting from mapping which is seen to play a role in the writing, calculating and governing of geopolitical and bio-political spaces at a range of scales (Sparke, 2005; Brenner and Elden, 2009; Crampton, 2010).

4.3.3 From government to governance and the adoption of the plan as a technology of invasions

Together with the prohibition of invasions captured in the Law № 13517, the State promised to build Low-Income Social Housing Subdivision known as *Urbanizaciones Populares de Interés Social* (UPIS) to avoid the formation of new *barrios marginales*²⁹.

Soon after Belaunde's government (1963-1968) took over, he created the National Housing Board (*Junta Nacional de Vivienda - JNV*) to manage the social housing programmes. The ONPU was reactivated and served as a base for the elaboration of the zoning plan of Metropolitan Lima. However, the State could not deliver at the rate of demand. This propelled a new wave of land occupations for which Calderon (2006, p. 75) notes that the State was obliged to tolerate invasions, firstly under the table, but later in an overt manner. A contradiction therefore emerges where invasions were prohibited by law but were supported in practice.

With the uncontained urban growth, also came a surprisingly orderly occupation of the desert surrounding the city (Figure 4.12, Figure 4.13).

Figure 4.12: The orderly occupation of the desert, Pampas de Comas 1962.



Source: Junta Nacional de la Vivienda (1962), found online at: http://www.amigosdevilla.it/archivoit/documentos/EST_LIM_06_2006.pdf, accessed 05/09/17

²⁹ The UPIS would consist in the provision of simple housing units with basic services that could gradually grow through auto-construction. A number of bare areas in the desert were earmarked for the purpose of building UPIS, while the 'best' land was reserved for market speculation.

Figure 4.13: Gridded layout resulting from 'invasion with the plan'.



Source: Photo Charles Abrams 1966 found online at: <http://laboratoireurbanismeinsurrectionnel.blogspot.co.uk/2016/04/john-turner-au-perou.html> , accessed 05/09/17

As the authorities could not keep up with drawing plans and formalising the identified *barriadas*, people took it upon themselves to produce their own plans. They would commission professionals, sometimes the same ones who worked in the public administrations to elaborate their plan (Riofrio, 1991). They thus took charge of the process of *Saneamiento Físico*. The remodelling phase was dropped, since now the occupation followed the plan from the onset: all houses were within the plots, the buffer zones and tolerances were respected from the street, spaces for parks and facilities were also reserved. With or without the help of professionals and authorities within the government institutions, the people started settling in an orderly fashion adopting a gridded pattern like that considered in conventional urbanism. Families therefore "*invaded with the plan*" (Ramirez and Riofrio, 2006, p. 12) which explains the urban order that characterised the so called 'spontaneous' or 'informal' urbanisations of the 60s and 70s.

From the moment the *barriadas* were legally recognised in the 1960's, the use of the settlement layout plan thus became entrenched, being replicated indiscriminately on all types of terrain. As an actant, it brought with it the grid, planning standards and conventions. As a technology willingly adopted by the people, it facilitated a form of land occupation that complied with planning norms and therefore tactfully helped to leapfrog the remodelling stage that older *barriadas* had to go through before titling. One can therefore assume that having

learnt from preceding experience, people internalised the planning norms with the expectation that cut-off dates for formalisation would always move and that in time, they would receive the same benefits as those of recognised inhabitants of the city, such as services and land titles. Whether the occupation of land was State or people led, the 'newer' settlements took an entirely gridded layout following the plan.

Between 1961 and 1972, in the space of 11 years, Lima's population grew from 2,031,051 to 3,472,564 (INEI, 2018b). In 1970, the North, South and East cones of the city were formed (Garcia *et al.*, 2015). Although in the mid-1960s an economic crisis led to the reduction of the industrial sector and gave rise to a tertiary sector dedicated to services, the migration to the city continued fuelled by the internal conflict (1980-2000)³⁰ in Peru. Human settlements further expanded with people settling on increasingly steep slopes. The natural increase of the population, particularly of the pioneer settlers, also gave rise to extensions of the original settlements (Ramirez and Riofrio, 2006). Moreover, an illegal land market began to take hold through housing associations, housing cooperatives and others which further promoted the occupation of slopes in the periphery of the city (Felipe, 2004; Riofrío and Cabrera, 2010). The establishment of this illegal land market or land trafficking is explained in detail in Chapter 7.

A stark contrast can be observed when comparing earlier *barriadas* of the 40s and 50s to those formed after the Law № 13517 was passed. Earlier *barriadas* have a different way of occupying the slopes. Those formed on hills, close to the city centre, have no regular pattern but nevertheless work with the morphology. Generally, the urban grain follows the contour lines, and the access roads present a gentler gradient. Although settlements in the peripheral hills formed after 1980, face similar morphological conditions with those established in the 40s and 50s (Figure 4.14 and 4.15), they present a stark difference because they adopt the grid layout up the slope (Figures 4.16 and 4.17).

This research finding that connects the current spatial layout of settlements on the slopes, to the Law № 13517 from 1961 highlights the importance of considering planning instruments and the role that socio-technical devices can play in sedimenting a particular form of urbanisation. This finding also provides an alternative explanation to the various ones offered in local analysis and discourse.

³⁰ The internal conflict in Peru began in 1980, and was an ongoing armed conflict between the government of Peru and some terrorist organizations such as the insurgent People's Guerilla Army (*Ejército Guerrillero Popular*), armed wing of the Communist Party of Peru (known as Shining Path or "PCP-SL") and the Tupac Amaru Revolutionary Movement which was also involved in the conflict.

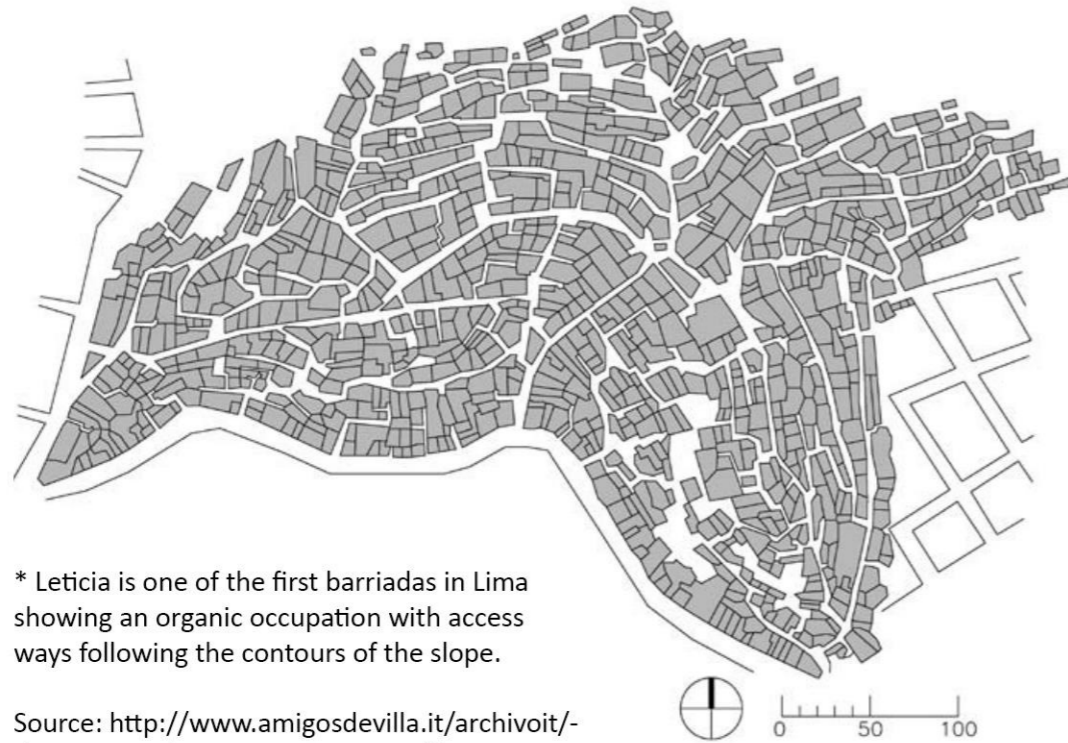
On the one hand, this form of urbanisation is seen as an essentialist response, successfully drawing from the Andean inheritance of the migrants, that is able to replicate the building techniques to inhabit the slope (interview with urban planner/academic, October 2014). On the other hand, the adoption of the grid is understood to respond to an internal desire of settlers to belong to the city. Since the grid is at the heart of the 'formal city', it is replicated as a claim for citizenship (Golda-Pongratz, 2009).

Rather than form strictly following function, such explanations suggest that meaning is extracted from the grid which dominates the way of doing things. Interviews conducted during this research have also added to these explanations highlighting the 'lack of imagination' on the part of inhabitants to do things differently, compounded by the limited technical and design knowledge they possess. Overall the research shows that in effect seemingly mundane and technical devices- such as the plan, the grid, the urban conventions, used by legal and institutional processes, are brought unchanged from the past to the present. The black boxing of these devices leads to their unquestioned use, structuring the spatial layout of settlements on the slopes. They are normalised even when they contribute to perverse outcomes such as the exacerbation of physical risk and the higher costs incurred by inhabitants to make the slopes habitable (Figure 4.18).

With the production of plans becoming the responsibility of the settlers from the early 1960s onwards, the authorities limited their role to verifying and approving these plans (except in the case of settlements set up by the metropolitan municipality). The State therefore shifted from giving land, technical assistance, and financial support to improve the physical conditions of *barriadas*, to only providing land. As long as the space claimed was on government land, and not private, land grabbing would be validated (Riofrío, 1991).

After Belaunde's administration (1963-1968), Velasco's military government (1968-1975) took over and made specific technical progress related to the procedures for titling (Ramírez and Riofrío, 2005). Although only 26,000 plots were titled in this period, there was an improvement with regards to the legal framework and land expropriation by the government, as well as a simplification of otherwise complicated stages of settlements' recognition, and the preparation of perimeter and plot subdivision plans (Calderón, 2013).

Figure 4.14: Plan of Leticia 1933*.



* Leticia is one of the first *barriadas* in Lima showing an organic occupation with access ways following the contours of the slope.

Source: http://www.amigosdevilla.it/archivoit/-documentos/EST_LIM_06_2006.pdf

Figure 4.16: Aerial image of a newer settlement in JCM*.



* Settlement adopts the grid up the slope. Dotted red lines indicate the staircases.
Source: adapted from Google Maps

Figure 4.15: Photograph of Leticia*.



* Leticia has a similar topography to settlements from 1980s onwards.
Photo © R. Lambert (2015)

Figure 4.17: Photograph of a settlement in the extension of the extensions*.



* The grid layout translates into a terraced occupation with limited vehicular access and steep stairs.
Photo © Evelyn Merino Reyna

Figure 4.18: The use of the grid on the slopes of JCM*.



* The grid is used up the slope results in steep staircases which inhabitants have to negotiate on a daily basis with the risk of falls and injuries.

Photo © R. Lambert (2016)

Besides these procedural aspects, the technical input also extended to changing the organisational structure of the inhabitants of *barriadas* to Neighbourhood Organisations or Committees for the Promotion of Development (*Organizaciones vecinales o Comites de Promocion del Desarrollo- OV*). The OV in the settlements managed the regulatory functions for internal order and social cooperation on a territorial basis. They established the relation with external agents to gain legitimacy and resources. The leadership committees as the interface between State and inhabitants was also stabilised then and persists to the present day.

With the two consecutive military government between 1968 and 1980, there was a political shift prioritising support for *barriadas*. These were not only included within a housing policy but were also considered as part of development and social mobilisation strategies. The military government established a few important institutions such as the Ministry of Transport and Communication, the Ministry of Housing who was responsible for informal settlements through the General Direction for Urban Communal Promotion (*Dirección General para la Promoción Comunal Urbana*). The responsibility for *barriadas* was later transferred to the National System for Social Mobilisation (*Sistema Nacional de Movilización Social -SINAMOS*), that also incorporated the National Office for Barriadas (*Oficina Nacional de Barriadas-*

ONDEJOV). Despite the establishment of all these institutions, none were successful in reducing 'invasions' and on the contrary, their actions paradoxically promoted them. The government took up the so called 'chalked plots' as a housing policy³¹. It thus adopted the same modality of the 'invaders' transposing the gridded plan straight onto the barren land in the desert. The chalked plots were presented as the official alternative to conventional urbanisation to solve the housing problems for the popular masses. To speed up the process, architects and engineers within governmental institutions drew up the plans, earmarking areas for community facilities and individual plots (Figure 4.19).

These were then transposed onto the ground with chalk. Subsequently, families were given chalked plots to occupy without any services but with the appropriate shape and dimensions for an a posteriori fit out. The conventional planning norms thus officially shifted from surfaced roads, water and sewerage connection before occupation, to the minimum adequate conditions for a plot to be occupied being the chalk markings used to demarcate the plot, dirt roads as the main access, a water connection in the form of a public stand, and latrines instead of a connection to the sewerage network (Riofrio, 1991). Since the State itself was urbanising in this way (Figure 4.20), there was an official acceptance of these conditions. Arguably these conjured the notion of a limitless city not necessarily determined by the extent of public infrastructure as alternative systems for water provision had to become the norm (interview with SEDAPAL official, May 2015).

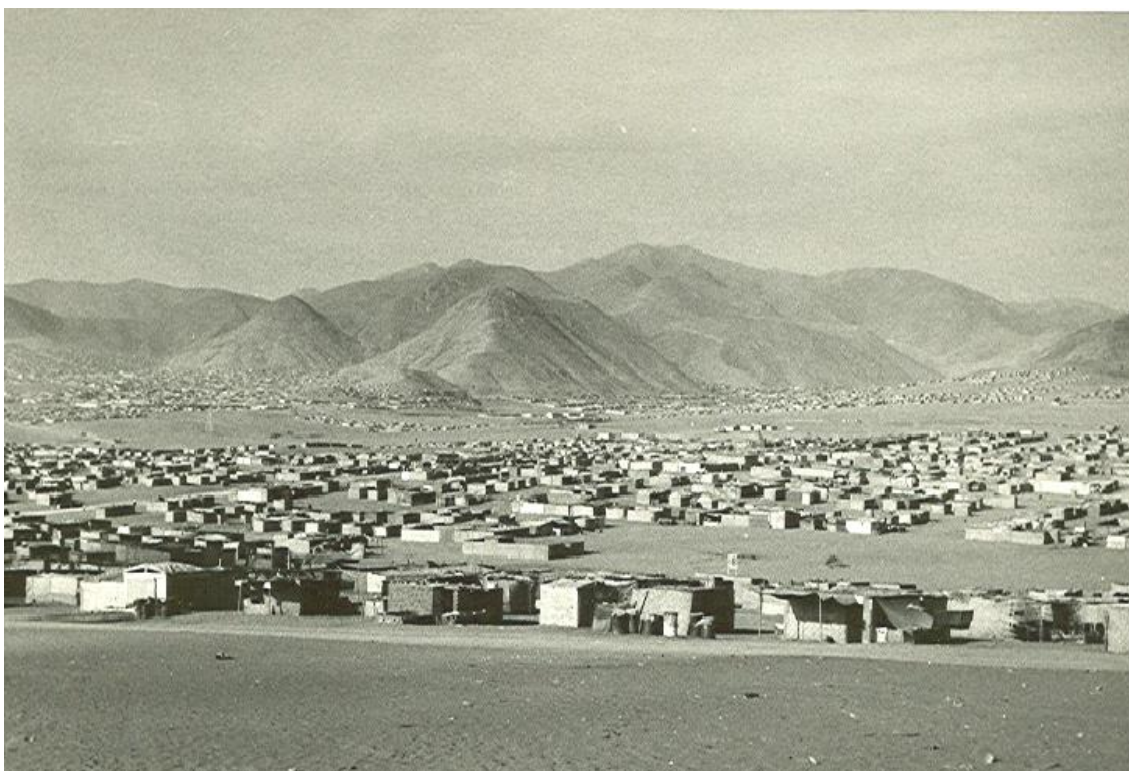
³¹ The chalked plots promoted by the State were also a means to resolve conflict. In 1971, the largest invasions of land consisting of 180 families occurred on State and private land in Pamplona, South of Lima. This was the first massive invasion since the military government took over. The first response was an attempt by the police to evict families. The conflict became violent with a death and the arrest of community leaders. To put an end to it, the State opted for the relocation of the families to a semi-desertic area 50 km South of the city which was named Villa el Salvador (Bigda, 2013). This area was quickly subdivided by the architects within governmental institutions to speed up the process. The first Self-Managed Urban Community (*Comunidad Urbana Autogestionaria*) was formed in 1974 in Villa el Salvador (Figure 4.20). This same process was also followed to establish the other Self-Managed Urban Communities, Huascar and Huaycan, with the last one being a decision of the Municipality of Metropolitan Lima and not the national government. The formation of *barriadas* in the periphery was thus taking hold.

Figure 4.19: Technicians working under the State to produce the plans for chalked plots.



Source: [www.amigosdevilla.it.](http://www.amigosdevilla.it/), accessed 05/09/17

Figure 4.20: Villa el Salvador in 1972 formed by the State using the modality of chalked plots.



Source: <https://www.slideshare.net/elarcalle/historia-de-fe-y-alegria-17/50?smtNoRedir=1>, accessed 05/09/17

One notes that in these state-initiated occupations, there was again a massive effort to recruit architects and engineers who were involved in the tracing of the plans for the *chalked plots*. However, the State's technical assistance was only limited to these municipal projects. For the inhabitants that did not make it into these central government projects, they still commissioned plans from their own engineers and architects, as plans needed to be professionally produced and certified to comply with the prerequisites for recognition.

These architects and engineers were either self-employed or were working within government institutions and offered their services on the side to inhabitants (Interview with official from COFOPRI, October 2015). The responsibility of authorities in these cases, was limited to approving such plans. With time, neither inhabitants nor authorities saw the plans as a municipal obligation; rather, the role of officials was limited to checking and approving plans produced by others (Riofrio, 1991). Since recognition and titling were under the remit of the central State, this checking was centralised within one institution. However, from the 1980s onwards, there was a process of devolution to the district municipalities placing titling under their responsibility. This created multiple checking centres which had different ways of interpreting and using the seemingly 'fixed' technical plans. Moreover, regulatory frameworks designed by the central State to standardise the process for every district municipality to follow, proved to be malleable and flexible as each municipality incorporated deviations from the rules.

4.4 Decentralisation and the emergence of deviations

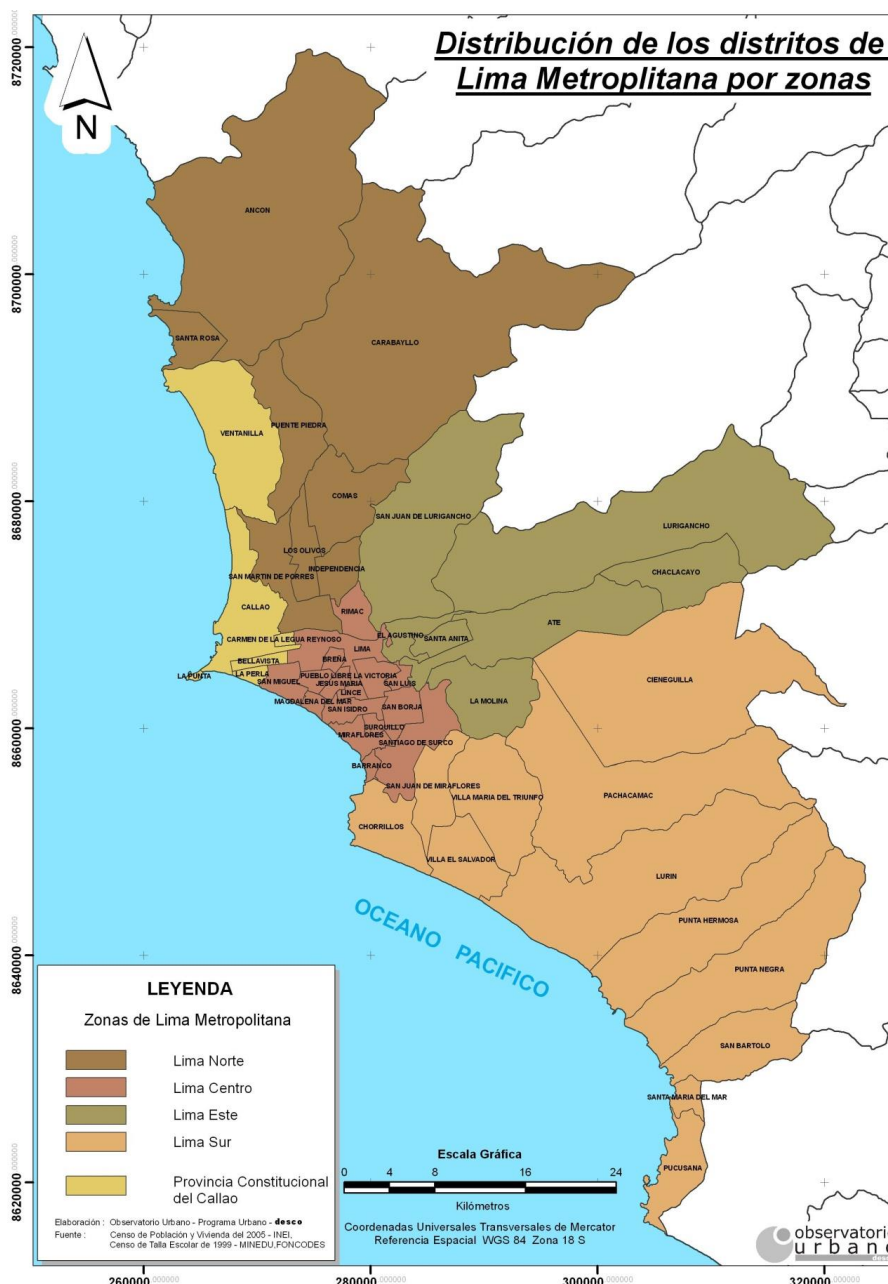
The major shift towards devolution occurred with the first Law of Municipalities (*Ley de Municipalidades D.L. Nº 051-04/1981*) created in 1981. This law transferred the organisation, planning and control of urban development to the 43 district municipalities which made up Lima Province (Figure 4.21).

Only the services for water, sewerage and electricity remained under the responsibility of national companies. Urban planning and development were the remit of each district municipality. With regards to human settlements, the law stated that:

"The marginal human settlements (*asentamientos humanos marginales*) with characteristics of young towns, recognised or not, existing on the date of this law, will be under the jurisdiction and control of the provincial municipalities who will be in charge of giving the necessary technical support regarding the regularisation of the physical as well as legal structure, identifying and prioritising the projects

which will improve their quality of life". Article 21 translation from Spanish, Congreso de la Republica Peruana (1981).

Figure 4.21: Map of the 43 districts of Lima Province



Source: Observatorio Urbano- DESCO (2005), <https://www.pinterest.co.uk/pin/458100593316120179/>, accessed 20/03/2018

In this way, the central government relinquished any responsibility towards *barriadas*. It gave the district municipalities the task of recognising settlements and issuing land titles. The cut-off date for the recognition of new 'invasions' moved several times progressively shifting with new laws approximately every 2 years. In this process of date extensions, the customs and

traditions regarding recognition of the individual rights of inhabitants of *barriadas* started to take shape within district municipalities (de Soto, 1989).

But so did the inhabitants' expectations and hopes as precedence demonstrated that, with time, they would receive services and land titles. This not only had an effect on how the procedures and planning system developed but also the type of social organisation that was actively encouraged by the central State.

With Belaunde's return to power between 1980 and 1995, the government promoted the notion of self-development with the creation of the National System of Popular Cooperation (*Sistema Nacional de Cooperacion Popular -COOPOP*) established with Law Nº 23223 in 1980.

The middle class were provided with housing options through the creation of, for example, FONAVI- the National Housing Fund or ENACE- the National Construction and Building Corporation (Quispe, Arias and Maquet, 2005); while for the urban poor, efforts were limited to promoting/strengthening their self-help through organisation. The stated objectives of the COOPOP were to guarantee the validation, permanence and update of the ancestral practice of voluntary work for the common good. The government saw this as a means through which settlements and communities, exercising their own initiative and selfless efforts, could attain the wellbeing within a dynamic communal development. It was a way to incorporate them fully within the economic and social life of the country, accomplishing the national identity (Estrada and Perea, 2008).

Under these objectives, COOPOP had to promote urban development projects with the labour and resources of the community. It organised programmes for technical training and promoted the coordination of financial and technical aid from public and private sectors, as well as from international cooperation (Driant, 1991). The idea was that inhabitants of *barriadas* were still in charge of their own development and the establishment of a social organisation was a means to act as an interface with the State. Throughout the various administrations, social organisation was promoted but in an atomising way, which is still apparent today. Each settlement has its own leadership committee which negotiates with authorities and other actors to leverage support for the settlement's development. Arguably, the promotion of an atomised social organisation is also a form of control, dissipating potential political contestation: inhabitants dedicate their efforts to working within their own settlement, limiting coordination with other settlements (interview with elder of settlement in JCM, February 2014).

These forms of social organisation, which promoted the labour of inhabitants for improving their own living conditions, were followed through into Alan Garcia's government (1985-1990). However, as promised in the electoral campaign, Garcia's government extended public investments to *barriadas* more than other administrations. Vouching to improve the living conditions in settlements, it introduced the site and services programs which provided plots with services and communal projects of water and sewerage as well as electricity, while the building of the house was left to the inhabitants. Although these programs were a welcome improvement to the non-existent services that had always characterised *barriadas*, their reach was limited. With the absence of instruments committed to a global policy for low income housing, and without any other substantial infrastructural investments dedicated to improving conditions in a structural way, the appeasement of inhabitants of *barriadas* through titling and ad hoc service provision remained the main approach (Driant, 1991).

With decentralisation, the process for recognition and titling under the district municipalities' responsibility was set up by the central government. The strategy of the latter was to establish the procedures, protocols and standards that needed to be followed to enable it to control at a distance, without being involved in the day to day decision making. The regulatory framework, that is the administrative procedure, planning standards and planning regulations, were set to be followed by all the municipalities and applicants alike (interview with official from the Ministry of Housing, May 2015). However, abiding by the regulatory framework did not prove to be straightforward in all cases. With the devolution of responsibility to district municipalities, these had to generate their own funds through taxes, which reproduced unequal conditions between wealthier and poorer districts. Some municipalities had the resources, skills and technical capacity, while others struggled (ibid.). Although a process for the verification and certification of plans was established as a standardised routine for each municipality, different ways of operating started to take hold where each municipality developed its own culture, practices and procedures independently of others (Interview with official from COFOPRI, May 2015). Arguably, these deviations from the rules were partly caused by the limited capacities within the municipalities, but also by different framings that each municipality constructed of *barriadas* and its own role in either supporting or controlling them. This aspect is explored in detail in Chapter 6.

The deviations manifested in various ways, including the differential loosening of the procedure for recognition. For example, in some cases draft perimeter plans of settlements were accepted instead of professionally produced technical plans; or the residents' list prepared by inhabitants themselves was accepted without verification as a valid document for

the physical and legal regularisation to obtain titles and individual service connection (de Soto, 1989). Therefore, the municipalities, in their efforts to certify the occupation or recognise expectative rights referred to the 'informal' rules/law of residents such as the statutes³². In this way, municipalities overcame their limitations by managing the process of integration (de Soto, 1989) and in so doing stabilised a form of planning which integrated deviations as a norm (interview with official from Ministry of Housing, date October 2015). Moreover, they validated information produced by inhabitants thus giving space for the latter to play a role in planning which, till now, had been somewhat conceived as solely in the domain of the State.

On average, it took 10 years and much expense to conform with the official requirements (de Soto, 1989). Settlements which were organised and had official recognition did not always manage to get their titles. The municipal authorities created 'special' processes, that did not entirely conform with the planning procedures established by the central State. These enabled the regularisation of 'informal' settlements offering a partial solution to the problem of land occupation, recognition of individual property and housing (de Soto, 1989).

Throughout these processes, the settlement layout and perimeter plans remained one of the constants. Although district municipalities had to base recognition of settlements on perimeter plans, and land titles were distributed to individuals according to their settlement layout plan (Driant, 1991, p. 194), these plans facilitated more than just the bureaucratic planning procedures. They became important communicative devices that acted as an interface with authorities and coordinated the various work processes within the deviant procedures of district municipalities. As a requirement, the settlement layout plan was abided to, but it was not necessarily used strictly in line with the planning system devised by the central State; it was 'elastic' enough to facilitate the 'special processes' developed within each municipality. Chapter 6 explains in more detail how the settlement layout plan was conceived as a 'closed' technical tool that does not allow interpretation or misuse, and is able to facilitate manipulations and deviations within established administrative planning procedures.

Before Fujimori's government took over in 1990, titling efforts lacked coherence and were unsystematic throughout the various shifts in formalisation dates from 1978 to 1989. In principle, each district municipality kept the records of the recognised and titled settlements within their jurisdiction, but these records were patchy and disorganised (Interview with

³² Statutes are the rulebooks that define the principles for cohabitation in each settlement. They establish the settler's rights and duties and provide a vision for the future of the settlement. These are generally written by the founders and define the number of members and responsibilities of the committee.

official from COFOPRI, October 2015). The cartography of the city remained fragmented and there was no centralised record of the spatial information of settlements which had already been formalised (ibid.). As the next section discusses, Fujimori's government marks a drastic change where land titling is taken back as a function of the central State and is accompanied by great efforts to produce integrated spatial information at the city level (Ludeña, 2004).

4.5 Neoliberal reform and the reclamation of the formalisation process by the central State

Although titling efforts were part of every government from Prado onwards, it was not until Fujimori's neoliberal administration (1990-2002) that titling took hold on an unprecedented scale with 1.2 million households or 6.3 million people receiving titles from 1995 to 2001 (Krueger, 2003). Hernando de Soto and a group from the Institute for Liberty and Democracy (*Instituto Libertad y Democracia*) elaborated a new synthesis of the human settlement which was very influential not only in Peru, but in an international context. It promoted formalisation in order to release the economic potential of the poor. In his book of 1986 *'The Other Path'*, De Soto shed a positive and optimistic light on Lima's popular sectors. His proposal was to modify the legal setup to allow titling and formalisation. He argued that beneficiaries of land titling would develop economically and improve their quality of life because they would gain access to credits and the formal housing market. Massive titling fitted well with the neoliberal reform (Calderón, 2012). Moreover, *'The Other Path'*, was framed as an alternative to the shining path, the group that had caused terror and destruction for decades in the country. The creation of owners was seen as a means to end with terrorists; not that dissimilar from Beltan's slogan "*more owners, fewer communists*" or in this case '*more owners, fewer terrorists*'.

In preparation for the massive titling, Fujimori's was the first government to undertake the cadastral map of the country. Up to then official city maps did not include all the settlements even if many had already undergone land titling. France provided the technical help sending professionals and equipment to start the work and train local technicians. The mission remained from 1985-1987 leaving the model cadastre for two districts- Cercado de Lima and Lince (interview with official from IGN, May 2015). Following this, the technical entity EMCI (*Empresa Municipal de Catastro Integral*), was formed under the Metropolitan Municipality of Lima and functioned from 1987-89. It encouraged each district municipality to produce the cadastre of its own territory (interview with official from IGN, May 2015).

The massive cartographic effort was undertaken by the Commission for the Formalisation of Informal Property, Peru (*Comision de Formalizacion de la Propiedad Informal* - COFOPRI) established in 1996 with support from the World Bank. A legislative decree Nº 803 took the competences for regularisation, titling, adjudication and urban habilitation away from district municipalities and placed it again under the central government. COFOPRI which took up all these roles was given the exclusive competence for regularisation and titling. It was also given the responsibility to produce an inventory of government land which would be dedicated to low income housing and thus halt the informal occupation of land (Calderón, 2013). The law, similar to that of 1961, proposed to regularise and at the same time order urban growth.

Together with the handing out of over a million titles, it was COFOPRI's duty to provide a cartographic base for the process. Before COFOPRI, settlements submitted their own plans to their respective district municipalities and there was no way of registering and integrating their information into one system. As one informant from COFOPRI notes:

"COFOPRI re-titled what had already been titled and registered it in the land registry. They made a massive effort. They re-drew everything and created a special register, geo-referencing every plot and strengthened formalisation. Before this, each owner has his/her little plan, but no one knew where it was located spatially. Because of this, tenure security was not guaranteed even if you had your titles since it did not necessarily correlate with a determined piece of land on the ground " (interview with informant from COFOPRI, May 2016).

As Ludeña (2004) notes, the representation of the urban environment changed with the labour of COFOPRI. A new digital cartography of the *barriada*, as part of the city, was developed. It used aerial pictures as a graphic base for the whole of Lima and incorporated detailed information on the urban structure of each of the registered human settlements.

Although COFOPRI advanced the cartography, its efforts were limited to titling, and the cadastre was still the responsibility of each district municipality. As the endeavour was frail, the Cadastral Institute of Lima (*Instituto Cadastral de Lima*- ICL) was formed in 1989, to strengthen the production of the cadastre. However, ICL did not manage to produce the maps for the whole of Lima. Consequently, it was placed under the Metropolitan Municipality of Lima (MML), and its remit limited to producing the spatial information for the Cercado de Lima which mainly constitutes the historic area. As for the district municipalities, they were expected to produce their own cadastre without any support to further strengthen their capacity and technical skills to do so.

In parallel to this cartographic effort which created a base for the efficient collection of taxes, Fujimori reformed the government to take a secondary role as facilitator of the market, with the understanding that the latter would provide more efficient and effective solutions. He deactivated all State interventions and instruments in urban policy and housing. He prepared public services for privatisation and deactivated development banks.

Since the mid-90s, the State through the Ministry of Housing employed principally two strategies with regards to low income housing: 1) titling and formalisation by COFOPRI as was the case during Fujimori's government and that of subsequent governments of Alejandro Toledo (2002-2006), Alan García (2006-2011) and Ollanta Humala (2011-2016)³³; 2) the improvement of existing infrastructure in human settlements. This also came with a new awareness of possible earthquakes that could potentially have disastrous effects on human life since a large number of people had settled on steep slopes (Rodriguez and Munoz, 2015).

4.6 The infiltration of a risk management rationality

Across the 90s, as neoliberal politics were consolidating in the Peruvian economy and society, and the State was gradually retracting from productive activities, relenting its obligation to provide basic services in health, education and housing, urban growth was extending to the most precarious areas on the steep hillsides surrounding the city. In this period, slopes with angles between 10 to 35 degrees were being occupied following the same gridded pattern as those in relatively flat areas (Rodriguez and Munoz, 2015). This form of occupation came with a series of problems: it concentrated a high number of vulnerable populations in areas with difficult living conditions, lack of public spaces, lack of basic services (and difficulties in their provision), and high investment costs to make the land habitable (Allen *et al.*, 2017).

A law was passed in 2004 that made all forms of land invasions illegal as a means of preventing people from building in 'natural risk zones', on land designated for natural reserves, or on land that is part of the regional housing plan (e.g. areas reserved for hospitals or schools). The law is also a less explicit reaction to the unceasing demand for land, as well as extensions, that are 'second generation' invasions that occur as people outgrow their parents' homes. According to

³³ Many programmes related to titling and service provision, which sought to balance the impact of structural adjustment policies and bolster government legitimacy that had been damaged by the social costs of the austerity programme during Fujimori's second and third presidential re-elections (in 1994-1995 and 1999-2000, respectively), continued in the 2000s, often also responding to short-term political motivations, targeting benefits at urban low-income communities in exchange for votes (Raffo, 2011).

the Centre for the Study and Promotion of Development (DESCO), a Peruvian NGO, another important reason listed for the 2004 law was "*to stop the activities of professional land traffickers, and the accompanying complicity of government officials, especially during political campaigns*" (interview with academic from DESCO, May 2016). Land trafficking is explored in more detail in Chapter 7. Essentially a person may 'traffic' land in several ways; most simply it involves invading prohibited areas and then later selling a falsified land title to other residents. More elaborate schemes, in which temporary houses are constructed and then sold when the property value has risen, also exist. Land traffickers often hold substantial power in their areas. During political campaigns, candidates may court these individuals to offer them legal property titles in exchange for the communities' political support (Bigda 2013). Despite the 2004 law to limit invasions, residents living in poverty, and with few opportunities in the countryside, continued to settle on the steep peripheral slopes surrounding Lima.

Despite the precarious living conditions, settlements established before the cut-off date for formalisation could still receive land titles through COFOPRI. For settlements established after the cut-off date, the stance was to withhold basic services to curb invasions. Dwellers were required to hold title deeds before any improvements could be made (Calderón, Romero and Lucci, 2015). However, for electoral and humanitarian reasons (interview with community leader of JCM, May 2014), in 2006, under Garcia, the State established the municipal certificate of possession (*'Certificado Municipal de Posesión'*, Law № 28687) through which it was possible to access water and electricity without holding title deeds (Calderón, Romero and Lucci, 2015). Arguably therefore 'illegality' as such was not a barrier but rather a reversible condition given enough time.

This stance split the planning procedures into two distinct processes at various levels of government. On the one hand the district municipality would be in charge of emitting the certificate of possession to residents and certifying the settlement layout plan which would then enable settlements to apply for services from water and electricity providers. On the other hand, the central government, through COFOPRI, would oversee titling. Thus, one notes that separate roles were assigned to different levels of government and these were fulfilled under different and somewhat conflicting rationalities. District municipalities enabled further occupation of land since all who settled would essentially comply with requirements stipulated within the regulatory framework to get basic services. Thus, dwellers were supported indiscriminately and their hope of making a life on the slopes asserted. However, the central government, respecting the cut-off date for formalisation stipulated by law, sought to limit invasions and thus worked with a rationality of control.

Besides the certificate of possession and the certification of settlement layout plans, risk evaluation was also added within the district municipalities' administrative procedures. It was not until the earthquake of 2007, which destroyed the town of Pisco in Peru, that a disaster risk management (DRM) rationality started to infiltrate State agencies³⁴ (Watanabe, 2013). Many technical public sector agencies, as well as donors and international organisations focused on the impact of potential earthquakes and tsunamis and conducted important studies and projects (Watanabe, 2013). DRM became more visible in the public agenda³⁵ and the discourse was that the continued occupation of the slopes was a disaster waiting to happen with millions of inhabitants at risk (interview with INDECI official, May 2015).

INDECI, the civil defence body, produced risk maps which provided the basis for the declaration of high-risk areas deemed uninhabitable and therefore illegal to occupy. Despite steep slopes being declared high risk zones, there were still avenues that enabled dwellers to occupy these areas and climb the ladder of entitlements. Although the process of certification of the settlement layout plan, by the district municipality, was amended to include the process of risk evaluation, it did not entirely halt the urbanisation of the slopes since risk was not seen as a permanent condition but one that could be mitigated (interview with Civil Defence officer in MSJL, October 2015). The settlement layout plan would only be certified for basic services by the district municipality provided inhabitants demonstrate they could lower their risk from high to moderate/low. They could do so by building retention walls and concrete staircases in accordance to the stipulated planning standards. Thus, the occupation of the slopes was not halted. It however came at a greater cost to inhabitants since they had to invest labour and resources to comply with specific spatial outcomes (interview with Civil Defence officer in MSJL, October 2015).

Important to note is that risk evaluation was inserted within the administrative procedures of district municipalities without altering any other aspect of the process (interview with technician from MSJL, May 2015). Although the preoccupation with risk emerged because steep slopes were being urbanised, the gridded layout and the conventions for the settlement

³⁴ According to the Peruvian Geophysical Institute (IGP), there is a high probability of the occurrence of an 8-Mw magnitude earthquake in the city of Lima, taking into account the relatively long 'seismic silence' of recent years (Watanabe, 2013).

³⁵ Headlines in the press and the TV highlight the projections of these studies regarding the occurrence of an earthquake of great magnitude in the capital: more than 50,000 deaths and more than 2.5 million inhabitants affected by the destruction or partial damage of their houses. See: "El Terremoto que Tememos" (The Earthquake We Fear), an article published in 2011 in *El Comercio*, the most read newspaper in Peru (Watanabe, 2013).

layout plans were left unchanged as these were standardised to comply with the planning regulations. One notes that the administrative procedure is itself characterised by a conflicted rationality: it seeks to integrate risk management without considering the very aspects inherent in the embedded forms of planning that produce risk, or even the standards adopted that play a role in propagating risk. As explained in another section above, the gridded layout working against the slope gradient exacerbated risk; but this together with the type of mapping that supports the standardised settlement layouts are inherited from the past unchanged when they themselves play a role in producing hazardous living conditions. This points to the fragmented rationality as the logic within the administrative procedures is itself made up of fragments from the past that come to contradict the intended goals in the present but are not amended because they have been normalised and never opened to scrutiny.

The contradictions also stem from political intentions. These are clearly manifested in the cartography at the scale of the city. In 2011, Peru's national congress approved a law creating the National Disaster Risk Management System (*Sistema Nacional de Gestion del Riesgo de Desastres*- SINAGRED). This meant that a considerable effort was made to map areas of risk. However, not all that is at risk is considered in these maps as only titled areas are included in maps that are made public. The cartography therefore shows that even at the very technical level the State is embroiled in supporting particular political views, using inclusions and omissions to justify its investments. Hence settlements receive differential support as well as entitlements, in the same way that they are also differentially represented on the official cartography (Chapter 5 explores this aspect in more detail).

Only a coordinated cartography of formalised settlements exists with the base produced by COFOPRI. The way spatial information is dealt with is in line with the divergent framings of 'informal' settlements at different levels of government. At national level, the dominant discourse is that these settlements, being 'informal/illegal' do not have any entitlements and are therefore not represented in official cartography. However, at the local municipal level, there is as much ambiguity within the discourse as there is in the actions taken. This can partly be explained by the different ways of operating that each municipality developed because of the devolution process. Hence one district municipality might have a different discourse and way of dealing with settlements than another municipality. Furthermore, the outward framing of informal settlement within one municipality, may contradict its own actions. Chapter 5 and 6 examines the current institutional practices with regards to cartographic production, use and circulation to better understand the tradeoffs, negotiations and tensions that arise between different levels of government, their discourses and their actions.

4.7 Conclusion

4.7.1 The emergence of disparate sites of planning

The historical tracing from the 1940s onwards shows how *barriadas* were integrated into the planning apparatus of the State, and at the same time, how the planning system itself evolved in response to *barriadas*. In the 60s when *barriadas* could no longer be ignored because of growing at an explosive rate, planning was solely undertaken as an activity of the State. The State's army of engineers and architects played a role to curb *barriadas* into calculable space following the planning standards inherited from the European planning tradition. However, as the State could not keep up with the process of *Saneamiento Físico Legal* it had devised to integrate *barriadas*, planning shifted from government to governance and governmentality. Actors outside the State institutions started playing a crucial role in planning. The State no longer fulfilled all its functions and some of the duties under its responsibility shifted to other actors. Inhabitants took it upon themselves to willingly abide to the planning rules and regulations when establishing *barriadas* to leapfrog the stage of remodelling that older *barriadas* had to go through. Arguably therefore, at the same time that the planning norms were taken up as a tactic by 'invaders', they were being internalised and normalised to the point of instilling auto-control. Thus, planning in this sense was embedded in governmentality as it would precipitate particular spatial outcomes such as the grid layout, unquestioningly taken up by urbanisers, facilitating order and control in line with the rationality of government. In this way, as Valverde (2009) also notes, the particular arrangements of streets and buildings come to appear 'natural' when they are in fact the result of legal rules which normalise urban spaces by setting standards.

The centrality of planning standards in the case of *barriadas* offers a counterpoint to the way spatial layouts within peripheral urbanisation is often times understood to develop 'haphazardly' or 'spontaneously'. Although various scholars emphasise how auto-constructed settlements involve a substantial amount of planning, with the regular parcelling of land, following a plan and a clear logic (see for example Caldeira, 2017; de Soto, 1989; Matos Mar, 1977; Riofrio, 1991), the spatial layout is often seen to be driven by the rules internal to the community organisation, thus placing the emphasis on the will and initiative of inhabitants. Such assumptions overlook the importance of regulations and how these, over time, become so naturalised that they are 'performed' by inhabitants themselves materialising in specific spatial outcomes.

Two aspects in this tracing over many decades emerge as playing a crucial role in operationalising planning through its various shifts from government, governmentality and governance: technological devices such as the settlement layout plans and technical professionals such as architects and engineers. These take a somewhat stable and authoritative position which becomes apparent through this historical analysis.

The settlement layout plan remains unchanged whether produced by engineers/architects within government institutions, or as became the norm, by the engineers independently commissioned by the leaders of *barriadas*. As it became a compulsory document in every administrative process from recognition, to the acquisition of basic services to land titling, it acted as a mediator and intermediary for any planning process. However, one also understands a different aspect when considering that settlement layout plans were taken up by inhabitants. The system of spatial inscription was established and maintained by the State institutions as much as by inhabitants themselves; the State positioned the plan as a prerequisite to any process from recognition to formalisation; the inhabitants of *barriadas* adopted it to accelerate the process of physical and legal regularisation. In this way, the plan retained its currency for actors involved in the urbanisation of the periphery up till today.

When the responsibility for the production of plans shifted from the State to inhabitants, the plan was enrolled into new sets of relations. It took on a coordinative role between different actors who did not strictly belong to the official sphere as initially designed. Settlement inhabitants, their leaders, their hired technicians, the authorities and service providers were amongst the actors that were now networked and engaged in cartographic coordination and calculation to secure their goals.

As for the technical professionals, although there are different configurations between politicians, inhabitants of *barriadas* and technicians over the various administrations, one notes that these become stabilised as obligatory points of passage. That is, they gain a level of legitimacy and are considered essential and unavoidable in planning processes, whether they are within or outside governmental institutions. Throughout the following chapters, I follow the technical professionals to better understand the role they play since, more often than not, they are entirely absent in the dominant account of how the slopes of Lima are being urbanised.

4.7.2 Instrumentation at work

This chapter demonstrated the important role that planning instruments and socio-technical devices play in sedimenting a particular form of urbanisation and planning. Regulatory frameworks have been implemented and maintained through several technological devices. The plan, together with the grid and urban conventions it assembled, determined the mode of land occupation by migrants to the city and characterised the spatial layouts settlement took regardless of the topographic conditions. The historical tracing shows that these seemingly mundane technical devices are brought forward, unchanged from the past to the present. Their naturalisation and internalisation by urbanisers explain why a spatial configuration is perpetuated over time without significant revision to respond to difficult topographic conditions that characterise newer settlements. The findings thus demonstrate how planning regulations, standards and instruments come to also perpetuate the production of risk.

This chapter also reveals that technical devices such as plans are open to interpretation and 'misuse'. They therefore have the potential to open new spaces for action. In the case of Lima, the plan was part and parcel of violations of the symbolic 'order': although its initial intended use was for the control of 'informal' settlement by the sovereign State, it paradoxically enabled the staking out of land and facilitated invasions. This resonates with the writings of a number of scholars (Miller and Rose, 1990; Barry, 2001; Higgins and Lerner, 2010) who argue that technical devices can enact political programmes at a distance, but they can also act in contradiction to the political objective for which they are deployed. They fail to function as intended and produce their own difficulties.

Revisiting Latour's (1987) description of maps as 'immutable mobile', able to fix particular meanings that become familiar and standardised through established protocols all the while being portable across space and time, the fixity that maps and plans acquire does not necessarily limit their original use. There is, in effect, a 'mutability of immutable mobiles' (Hind and Lammes, 2015). They are thus reinforced as boundary objects because they adapt to the local needs of different users but are robust enough to maintain common identity across sites (Star and Griesemer, 1989).

The findings demonstrate how the plan understood as an actant, is itself enrolled and mobilised for different effects but is also a carrier of other actants, such as the grid, which travel in time and space without a fundamental change, even when adopted in different contexts. This shows that different devices are nested into one another as actants, whether the urban rules and norms, the grid or the plan, amongst others. They all operate as

intermediaries across space and time but also as mediators because they transport meaning but also have agency to determine outcomes. When using these actants therefore, a controllable outcome cannot always be guaranteed because each actant is also enrolled in other networks which cannot be cut-off. In using these technological devices, planning cannot be a controlled calculative activity and unwanted consequences are in effect internal to it.

4.7.3 Conflicting rationalities within the State

This chapter has cast light on how the State operated through contradictory logics, on the one hand controlling invasions and on the other paradoxically enabling them.

Conflicting rationalities are evident between different levels of government, central and local, because these essentially work towards different goals. The central government, through COFOPRI, formalised eligible settlements following the law of formalisation and respecting the stipulated cut-off date. However, district municipalities did not operate in line with these laws and indiscriminately facilitated the recognition of settlements and their acquisition of basic services, thus directly promoting the further occupation of land. Moreover, although administrative procedures are set to standardise the way *barriadas* obtain entitlements, there are deviations within these procedures that have historically developed as a culture within each district municipality, which facilitate the progression of settlements in the ladder of entitlements. These deviations are evidenced in subsequent chapters.

Another important aspect arising from this historical analysis is that the administrative procedures within the planning process, have developed to contain contradictions within them. Fragments of different rationalities from different times are maintained together. This is the case with the incorporation of the risk evaluation stage within the procedures that *barriadas* must go through since 2006 with the raised awareness of risk management. As explained, this stage was inserted without an evaluation or reconfiguration of how other parts of the process might paradoxically create risk. Thus, conflicting rationalities characterise the administrative procedures themselves and one notes the persistent inherited factors that are brought from the past, unchanged and normalised, to contradict the intended goals in the present.

Having provided a historical contextualisation of the relationship between *barriadas* and planning regulations, protocols, instruments and professionals, and identified how these are stabilised to play an important role in the way the slopes of Lima are urbanised, the following 3

chapters seek to provide an in-depth examination of the transactions that occur in the present to give rise to undesired outcomes such as risk. Chapter 5, 6 and 7 focus on the 3 black boxed entities respectively- the State, community organisations and land traffickers- and use these as entry points to better understand the engagements with regulatory frameworks and provide a transversal reading across the actors involved in the urbanisation process and planning.

Chapter 5 Entering through the State

5.1 Introduction

Chapter 4 has shown how the State devised calculative technologies to control invasions and govern *barriadas*, with planning regulations, standards and administrative procedures tied to a series of entitlements. Socio-technical devices such as the grid, the urban norms, the plan amongst others were linked together and made compulsory to strategically curb *barriadas* into calculable space and tie them to property regimes making them amenable to government. Through the historical tracing of the relationship between *barriadas* and the planning system, the chapter demonstrated the shift from government to governance, and the dislocation of several socio-technical devices from the sphere of the State where they were created. These were appropriated by inhabitants to comply with the planning regulations and thus climb the ladder of entitlements. They were also enrolled to paradoxically facilitate the occupation of land. With decentralisation and the devolution of power to district municipalities, the previous chapter also illustrated how the central and local government started to operate with different and conflicting rationalities directly and indirectly promoting the continuous occupation of the peripheral slopes of Lima.

Since the State 'rules' on the basis of an elaborate network of relations formed amongst the complex of institutions, organisations and apparatuses that make it up, and between State and non-State institutions (Rose and Miller, 2010), it becomes important to disaggregate it further and achieve a transversal reading across the entities that work under the broad umbrella of the State. Planning scholarship has made important contributions disaggregating the State to the level of the institutions that constitute it, demonstrating how these might not be aligned in the overarching normative objective of the State (see for example Dean 2009; Healey 2003; Gualini 2001). It has also disaggregated to the level of individuals within government institutions demonstrating how their practices can diverge from those stipulated in administrative processes (Alexander and Faludi, 1989). As Chapter 6 captures different individuals working within and outside government institutions by tracing municipal processes, this chapter remains at the level of different national and municipal district institutions, with functions ranging from disaster risk management, regularisation and control of the occupation of government land, that play a role in the peripheral slopes of Lima.

As shown in Chapter 4, the objectives of different levels of government might not entirely align with the overarching objective of the central State. Different governmental institutions have different goals and operate in various ways to attain them. Each institution produces and uses cartography differently and in line with its particular logic. I here seek to better understand how the discourses and practices fit with the broader State's objective to govern and control. This objective has been iterated by the various officials interviewed for this research. They articulate that the aim of cartographic production, use and circulation is to govern the territory and plan the growth of the city in an integrated way through the coordination of different State and non-State actors.

With this overarching objective in mind, as well as the specific goals of each organisation, I examine how stabilised practices within the various institutions relate to regulations and contribute to the stated objectives. At the same time, I remain attentive to outcomes that are precipitated through the cartographic calculations and coordinations of the various institutions. I seek to therefore address RQ1, RQ2 and RQ3, acknowledging that the research questions will be partially answered by this chapter's entry point through the State, but knowing that other layers of understanding will be achieved in the subsequent chapter 6 and 7 which respectively use the community organisations and the land traffickers as entry points.

The chapter is structured in three main parts. The first section addresses the politics of cartographic omission. I analyse what is included/excluded when representing settlements on the slopes, and the discourses and justification that accompany the maps' production. I seek to capture some of the interests and rationale behind the institutions dealing with disaster risk management, regularisation and control of human settlements and explore the outcomes that these precipitate. Having identified that what can be represented is not entirely in the hands of the map's producer, the second section examines the factors that come to structure cartographic calculations, revealing the transactions that take place between actants and lead to undesirable outcomes. The third section addresses the politics of cartographic coordination to better understand how it happens, who is enrolled, and the effects produced.

5.2 The politics of cartographic omission

The act of enframing inherent in map making inevitably means that a decision must be made about what to include or exclude. This decision is taken in relation to the actions the map seeks to potentialise as well as legitimise. The information captured is therefore not the outcome of neutral recording. It is itself a way of acting upon the real and as Rose & Miller

note, "*a way of* devising techniques for inscribing it in such a way as to make the domain in question susceptible to evaluation, calculation and intervention" (Rose and Miller, 2010, p. 283). An examination of the official maps that are produced by different institutions to represent human settlements is a means to capture the ideological and discursive rationalities that go into their production, enabling a better understanding of the actions that they seek to restrict or expand.

Recognition by State authorities to a large degree structures the extent to which peripheral urbanisation is made visible on official maps. The exclusion of settlements considered 'informal' in official representations is not that uncommon as it is a means to legitimise the marginalising actions of government institutions in withholding entitlements reserved for 'recognised' citizens (Glöckner *et al.*, 2004; Karanja, 2010; Allen *et al.*, 2015; Lambert, 2015).

In the case of Lima, only those settlements that have gone through formalisation and have received land titles through COFOPRI are fully recognised and included graphically in government maps. As the formalisation process takes many years to complete, large extents of the city's periphery remain entirely absent from official maps of metropolitan Lima. This is the case for a large number of settlements considered informal/illegal and therefore includes: 1) those that are entitled to formalisation but are still in the process of acquiring land titles and are consequently on stand-by; 2) those that are located in high-risk areas and are labelled as 'unsafe and a violation to the zoning law'; 3) those that were established after 31st December 2004 - the cut-off date to qualify for formalisation (interview with engineer from INDECI, October 2016).

The absence of such settlements from any official representation that circulates at higher levels of government reinforces and legitimises the discourses of illegality and the withholding of public investments for infrastructure and services. Although many settlements are recognised by the district municipalities and are entitled to services, they often have to cope without water and electricity for many years or adopt alternative coping mechanisms while they wait to be connected to the main utilities system (Criqui, 2014). The infrastructure and development projects that are currently underway in Lima are seen to be a form of elite capture where the wealthy in the city take a disproportionate share of the benefits (Allen and Lambert, 2015a). The public funds being funnelled to marginalised areas in the city,

particularly in the centre, are strategically targeting such areas for economic growth³⁶, and will not necessarily benefit the most vulnerable inhabitants of these areas (ibid.). There is thus a stark uneven economic landscape which is further exacerbated by the fact that, with the decentralisation agenda and the devolution of responsibility to district municipalities, the latter must generate their own funds through the collection of taxes, which reproduces unequal conditions between wealthier and poorer districts (interview with official from MEF, May 2016).

The few public investments for the periphery are in the form of projects and programs solely allocated to titled areas. This creates a clear separation on the slopes between those that can improve their living conditions with the help of public funds (Figure 5.1), and those that struggle, investing the little they have to make the slopes habitable in the face of hazardous living conditions (Figure 5.2) (Allen *et al.*, 2017).

Figure 5.1: A view of titled settlements in SJL*.



* From afar, the handrails visibly painted in yellow denote titled areas that have received public funds for improvements, in contrast to those considered informal and left without State interventions.

Photo © R. Lambert (2015)

³⁶ This is the case of the historic centre for example which currently concentrates a large number of vulnerable tenants and marginalised groups and is targeted for rehabilitation through strategies of gentrification.

Figure 5.2: A view of the untitled higher parts of the slopes in JCM*



* These settlements are excluded in official cartographic representations for being without titles, and do not receive public investments to improve the living conditions.

Photo © R. Lambert (2014)

5.2.1 The association of disaster risk management and formalisation

One of the few institutional programs, at the national level, specifically devised for areas considered high-risk on the peripheral slopes, is *Barrio Mio* meaning 'my neighbourhood'. The risk mitigation program was launched in 2012 by the Metropolitan Municipality of Lima (MML) under the administration of mayor Susana Villarán. The aim of the program was “to improve the quality of life in working class neighbourhoods and settlements around the city, depending on the efforts of local and State government with active community participation” (La Republica, 2013). About 400 million Peruvian Soles (approximately USD 122 million) of public investment were set aside to bring infrastructure and services to the poorest areas in the city, earmarked for the construction of 700 stairs and 1000 retention walls to mitigate the risk conditions affecting those dwelling on the slopes (Municipalidad Metropolitana de Lima, 2012) (Figure 5.3 and 5.4). Communities taking part in the programme, eligible only if they belonged to formalised/titled settlements, were expected to engage in participatory mapping to identify areas of risk to inform the location of retention walls and staircases (Figure 5.5).

Figure 5.3 The mayor of metropolitan Lima, Susana Villarán, inaugurating retention walls and staircases built under the Barrio Mio program on 11th February 2014.



Source: <https://barriomio.files.wordpress.com/2014/02/sv-bellavista.jpg>, accessed 06/10/18

Figure 5.4: Type of staircases build in SJL under the program Barrio Mio.



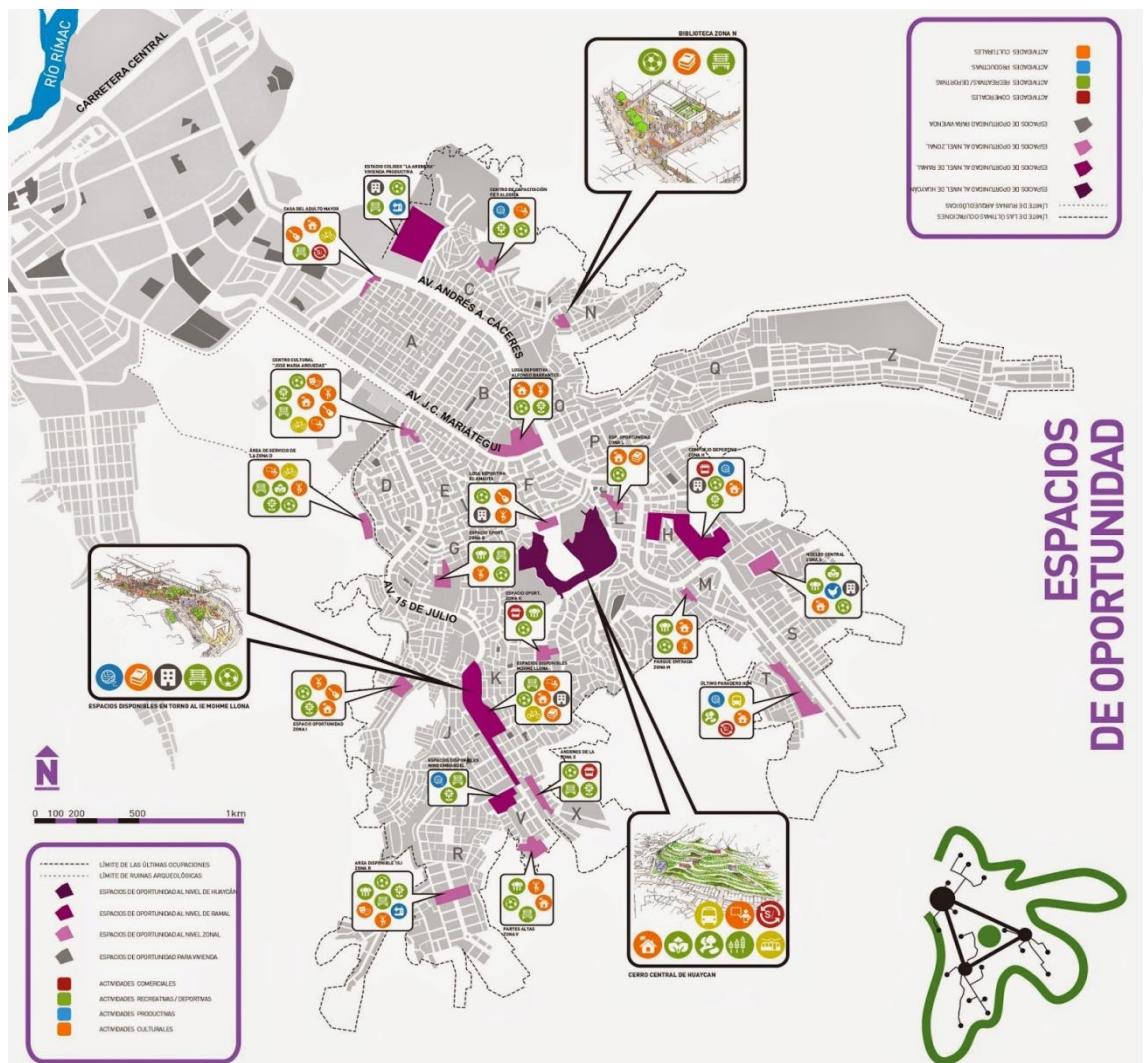
Source: Andina (2014)

Figure 5.5: Participatory mapping workshops with inhabitants from titled settlements under Barrio Mio.



Source: Pablo Muñoz Unceta (2015).

Figure 5.6: Map produced under Barrio Mio identifying the areas of intervention.



Source: Unceta (2015).

In total, forty areas in the periphery of metropolitan Lima were identified for the development of 'integral urban projects' (*Proyectos Urbanos Integrales*- PUI). However, Barrio Mio, as a program geared towards risk mitigation, only takes into consideration titled areas and thus only such areas can benefit from PUIs.

The maps used for this program, as a basis for discussion and proposals, only show the titled areas leaving out many settlements that are also exposed to high levels of risk but have not yet been formalised (Figure 5.6). A clear line is therefore drawn to determine what can be included, leaving all untitled areas blank, as though they were apparently uninhabited. When asked why this is, the former head of the program explained that informal areas cannot receive the infrastructure projects and are therefore not represented on the maps. She added that during the participatory process with inhabitants, it is important to keep their focus on the areas that can receive intervention because:

"If we include all the settlements on the slopes, with and without titles, it might cause misunderstandings as to who is included or excluded. Also, we can't afford for the discussion to go somewhere where our remit does not permit. Of course, there is a flaw: risk is everywhere on the slope, but we can only tackle a fraction of the slope" (interview with former head of Barrio Mio, May 2014).

Thus, the maps produced are designed to delimit the scope and determine the conditions for participation. They also contribute to a fragmented vision of the territory, undermining the very efforts made by the program to mitigate risk because, even if risk is tackled locally, without an overall strategy to halt the occupation of areas further upslope, risk is continuously reproduced. The inhabitants' own efforts to mitigate risk on the higher parts through the opening of new roads and the construction of retention walls, amongst other practices, can lead to the instability of the slope as a whole. Therefore, the lack of a comprehensive vision of the slope exacerbates risk for all its inhabitants, regardless of where they are located. As such, omitting untitled areas from the program can paradoxically increase risk for those living further down the slope including the titled areas that are supposed to benefit from the Barrio Mio program (Lambert and Allen, 2016). The rationality that seeks to control invasions, omitting settlements considered 'informal/illegal', structures the risk mitigation program from the onset. Such rationality clashes with the rationality of risk management thus generating an unresolved contradiction: neither 'invasions' nor risk are contained; on the contrary, by tackling areas in isolation, both are promoted.

Besides the maps used for programs specifically targeting peripheral slopes of Lima, the other maps where one would expect all settlements to figure, whether 'formal' or 'informal', are

those produced by the National Institute for Civil Defence (*Instituto Nacional de Defensa Civil*-INDECI) within the Metropolitan Municipality of Lima (MML), in charge of the prevention of risk and response in case of a disaster at the metropolitan level. Even here, settlements that have not received land titles are omitted, although the purpose of such information is to guide prospective and reactive planning and needs to take the spatial distribution of the entire population into account (interview with risk estimator from MSJL, November 2016).

The risk estimator from the department of Civil Defence within the District Municipality of San Juan de Lurigancho (MSJL), who is in charge of checking that settlements have reduced their risk from high to moderate/low before they can apply for water and electricity, explains why at the higher level of INDECI, only titled settlements are included in the geo-referenced map:

"The settlements higher up the slope are informal so they cannot be included in the metropolitan maps of INDECI, even if they have been recognised by the district municipality and have received their certified plan which allows them to acquire water and electricity. They [INDECI] say there is no quality control in these areas. Settlers build as they like in a risk zone which is not meant to be occupied. In this way, they [INDECI] wash their hands of any obligations towards the people and altogether ignore them. But the issue is that we, in this department, need to know where these settlements are and how many people live in them, so we can plan our risk mitigation and prevention. We in the district have carved the path for settlements in these high-risk zones to become formalised. Therefore, as the administration and as those responsible for the security of the entire population that live in this district, we must think and work with prevention in mind. But to do this, we must have knowledge of our reality. I need a map which helps me to know the total population, and where it is located, how many of these are on the slopes. With this information I can then be prepared: plan for a disaster, stock up my warehouses with humanitarian aid supplies" (interview with risk estimator from MSJL, Nov 2016).

He further notes that, in theory, the production of this information at the municipal district level is mandatory and has to travel from all district municipalities to INDECI at the metropolitan level. However, as this does not happen according to the regulations, he tells me how he takes it upon himself to produce the spatial information which remains for internal use within his own department. Indeed, from all the institutions interviewed for this research, the only 'official place' that settlements without land titles are graphically represented is at the municipal district level within the Civil Defence Department of the MSJL (Figure 5.7).

The map is drawn in AutoCAD by the risk estimator and is meant to inform the allocation of resources and preparedness in case of a disaster. As the risk estimator explains, the map is used by his department to plan in case of emergencies, such as earthquakes, by showing the location of warehouses with emergency supplies and the evacuation routes, and presenting a

better understanding of the number of settlements located on very steep slopes that would be gravely affected in the case of a disaster event.

The map includes the titled settlements that are at high-risk, coloured in red in Figure 5.7, but also untitled settlements on the higher parts of the slopes albeit partially drawn as faintly hatched areas (Figure 5.8). The latter are included graphically on the map that is solely used by the Civil Defence Department within MSJL. The spatial knowledge of informal settlements is therefore not taken as a priority to enable coordinated planning between departments at the district or national level or even between the different departments within the same district municipality. It can therefore be understood as information which remains isolated, with limited reach in terms of the consequences for planning and action, because the Civil Defence Department within the MSJL cannot plan or act alone to effectively mitigate or prevent risk.

Figure 5.7: Photograph of the map produced by the risk estimator within the MSJL Civil Defence Department*.



* As the map uses the COFOPRI base map, only the formalised areas are clearly drawn whilst the footprint of many settlements considered informal do not appear. The areas coloured in red show the formalised high-risk areas located on steep slopes.

Photo © R. Lambert (2016)

The risk estimator explains how, given that the spatial information of informal settlements is absent at the national level, he uses the geo-referenced COFOPRI base and adds the settlement names he has come across, one by one, on his own version of the AutoCAD file in his computer, hatching the approximate area they occupy (Figure 5.8). He adds that he does not have the time or resources to draw settlements in detail although he could take the layout of streets and plots from the plans settlements submit to the municipality. This sketchy representation is in stark contrast to the formalised settlements drawn to the level of each individual plot.

Figure 5.8: Detail of risk map*.



* The map shows the faint hatched areas and the floating names of informal settlements drawn by the risk estimator. The settlements have already been recognised by MSJL, and even though their spatial layout is known, as settlements submit their plan to the municipality, they are represented here as notional stains.

Photo © R. Lambert (2016)

The limited ability to engage in spatial planning because of the lack of adequate spatial information is expressed as a frustration by various officials interviewed for this research. Like the MSJL risk estimator, a technician from the Department of Urban Transport within the Ministry of Transport at the MML explains:

"The best instrument for the development of planning is cartography. If we do not know where the population is located, we cannot plan. We cannot distribute resources effectively and cannot combat poverty at the national level" (Interview with official from Ministry of Transport, October 2015).

Along the same lines, the head technician of the Metropolitan Institute of Planning (IMP) notes:

"Here in the IMP, just for having this name and being the competent body for urban planning, we should have the cartography up to date with all kinds of details; blocks, plots, health centres, education centres, and all the uses...we should be tracing everything whether formal or informal. But we all live day to day, we are not dedicated to spatial planning. We have the concept, the idea, but we do not even produce the required information to plan. What we do is appoint consultants who work through isolated packages without having a holistic vision. As someone who knows the importance of cartography and is in charge of it within the IMP, I should have a whole army of people managing the tools and mapping the entire city, no matter how far it extends" (interview with head technician from IMP, October 2015).

The many accounts from government officers at different levels show that the rationality and practices of government produce an unresolved tension: on the one hand the purposeful omission of 'informal' settlements from official city maps is a means of withholding entitlements and upholding their illegitimacy. On the other hand, it limits the State's ability to manage its own territory, restricting the possibility for integrated planning, which is the goal discursively upheld by various authorities interviewed in this research.

5.3 The politics of socio-technical devices

Although the concealment on official maps of entire settlements framed as illegal/informal is purposeful and strategic, the examination of cartographic production I undertook in many of the institutions reached in this research demonstrates that cartography is not entirely controlled by the producer. Instruments, standards and procedures assembled during the process of production come to structure the calculations possible and can also propagate further omissions.

5.3.1 The paradoxes of standardisation

Standardisation is one of the most powerful strategies which extends into many aspects of the work of government, whether this is standardisation of procedures, routines or representations amongst others. Various scholars, drawing from Foucauldian governmentality research, have written on the way standards, protocols, certification and auditing systems form pervasive and powerful mechanisms for governing conduct within contemporary economics and societies (Brunsson and Jacobsson, 2000; Barry, 2001; Power, 2002; Tamm

Hallström, 2004; Mennicken, 2008). Standards effectively shape conduct 'at a distance' (Higgins and Larner, 2010) and are, together with other practices of calculation, now central to social and cultural life (Lampland and Star, 2009).

Standardisation is a means of predicting and controlling the outcome by restricting the frame in which calculation is possible. However, the research reveals another side to standardisation which moves it away from its conception as a closed system, and is rather productive of externalities. By analysing the cartographic conventions, the instruments used to produce maps as well as the standardised processes, one is made aware of the unforeseen outcomes that emerge as products of these technologies.

The research demonstrates this clearly in the case of the cadastral mapping process. Aerial images produced by the National Aerophotography Service³⁷ (*Servicio Aerofotografico Nacional*- SAN) are translated into line drawings using cartographic conventions (Figure 5.9 and 5.10). However, in this process, areas that clearly show the emergence of human settlements are left out because they cannot be captured using the cartographic conventions. Therefore, at this early stage, the representation is a transaction between what is there and what can be represented with the instruments and rules at hand. This is explained by the head of the Cadastre Department of the district of Ate:

"At this stage, I should draw everything that is on the aerial. I can see dirt roads but no asphalted streets or visibly delimited plots. How can I show it? They are just shacks and I am restricted by the conventions of streets and plots. So, I leave areas in the making out of my drawing, and yes, I effectively show no habitation" (interview with head of Cadastre Office in Ate, October 2014).

Omissions are not necessarily in the control of the technicians in charge of producing the maps. There is a level of abstraction which is inherent in the processes, standards and instruments used. The standardised codes and rules that govern cartographic conventions are based on selecting particular elements over others, giving hierarchy and order and in this process omitting aspects which cannot be subjected to these conventions. Moreover, the instruments used to capture, draw and represent also set the boundaries around that which can be represented thereby foreclosing other possibilities. As Corner (1999) notes, maps are *"constructed from a set of internal instruments, codes, techniques and conventions, and the world they describe and project derive only from those aspects of reality that are susceptible to*

³⁷ SAN was created in 1942 and is part of the Peruvian Air Force Service. It oversees the aerial photography of the country which is then used as a base for the cartography of the country.

these techniques" (Corner, 1999, p. 216). The technology and set of parameters are active in determining what can be represented and therefore what is calculable and open to calculation.

Figure 5.9: Work station at the ING where aerial images are translated into line drawings.



Figure Photo © R. Lambert (2014)

Figure 5.10: Detail of the initial cartographic stage where plots and streets are converted into drawings from aerial images.

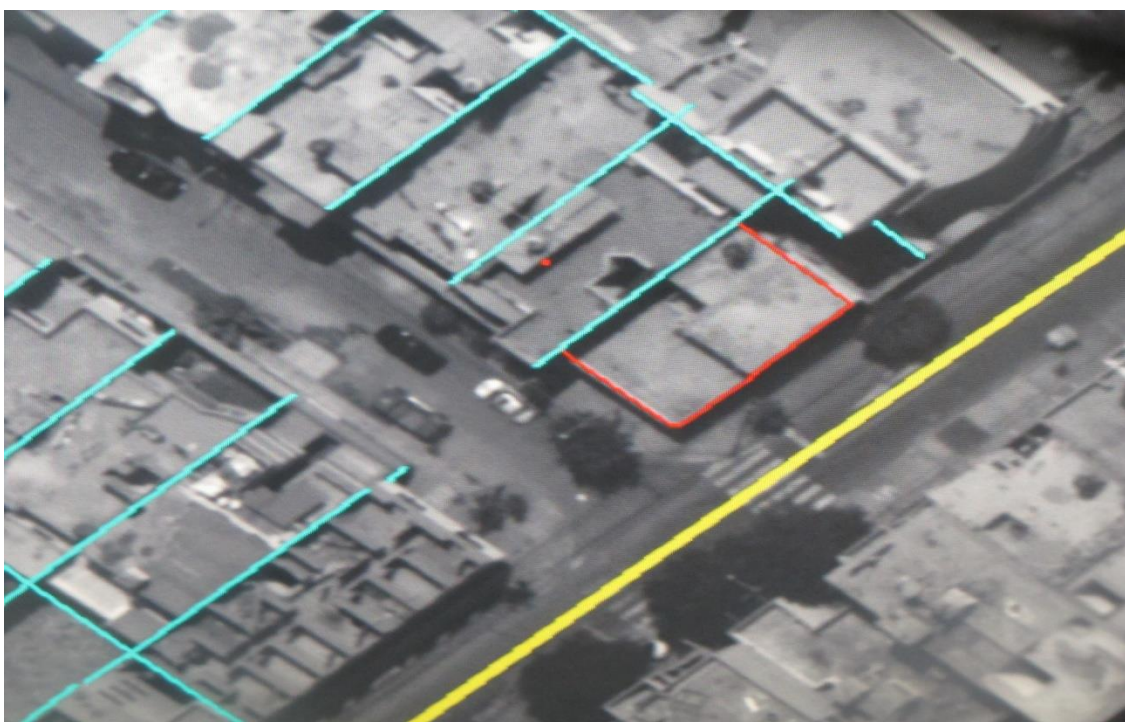


Photo © R. Lambert (2014)

In the case of settlements in the making, even if inhabited for many years, because they develop in a progressive and uneven manner, only once they have reached an advanced stage of development are they susceptible to being captured using the cartographic conventions (interview with technician from SAN, October 2015).

Standards are not revised and do not evolve to accommodate the changing context. This can create its own problems. For example, the type of plans that *barriadas* must produce in order to gain recognition and acquire basic services were standardised from 1960s onwards. At this time, the type of areas that were being 'invaded' were relatively flat desert areas. From the 80s onwards, steeper slopes started to be occupied as these were marginal government lands, that the urban poor could claim with relative security³⁸. However, the cartographic conventions for compulsory settlement plans submitted to the district municipalities to claim recognition did not change through time. These plans did not need to show contour lines to capture the topography.

Consequently, vast numbers of settlements located on steep slopes still produce plans without contour lines. The plans are a sort of 'flat' sketch where the crucial constituting elements are the perimeter that claims the frontiers of the neighbourhood, and the numbered plots that fill the area within the perimeter. Figure 5.11 shows an example of the location plan, the perimeter plan and the settlement layout plan of plots, that must be submitted to the distinct municipality. Each of these plans isolates the settlement from its surroundings and omits one of the biggest determinants of physical risk: the steepness of the slopes. For municipal district authorities, who read these plans from their offices before approving them, there are no indications of the kind of land that is being occupied and therefore no awareness, or communication transmitted by the map, of the hazardous conditions which the inhabitants will have to internalise. As will be explained in Chapter 6, because these layout plans are directly transposed onto the ground and determine the spatial configuration that the settlement will take, they have direct implications for the production and reproduction of risk.

³⁸ Historical analysis shows that 90% of invasions happened on barren government land. It was deemed easier than to occupy private land because there were fewer stimuli for a reaction since no one was directly being affected (de Soto, 1989).

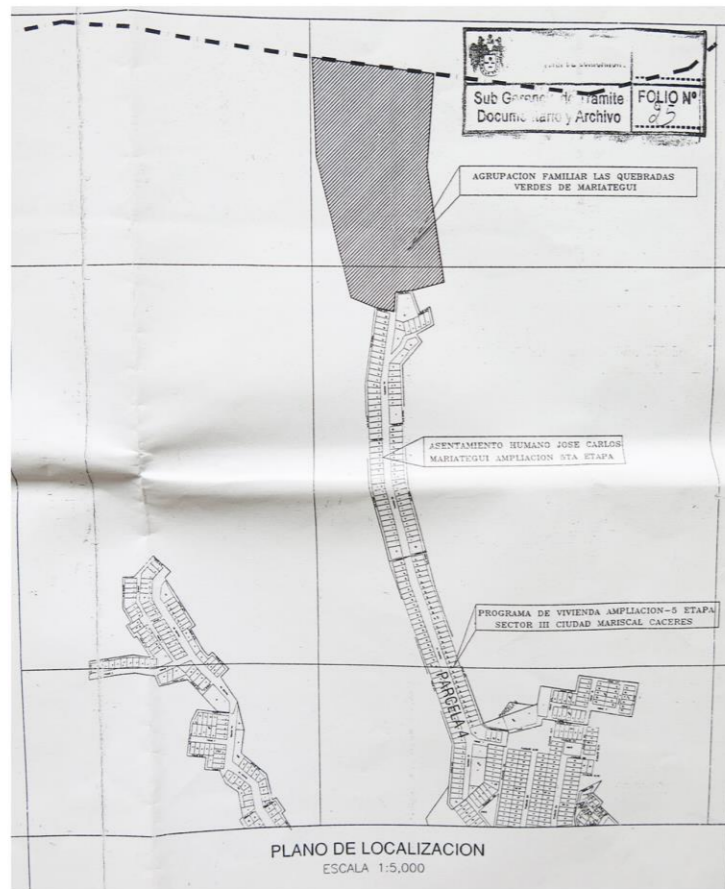
5.3.2 The hierarchy of actants brought from the past

Not only are particular conventions and standards stabilised but so are certain actants inherited from the past that take a powerful position to structure the practices and outcomes in the present day. The research has revealed how some inscriptions and cartographic systems have direct implications on the plans that are produced by newer *barriadas* emerging on the slopes. In drawing the settlement layout plan, the civil engineer, contracted by settlement leaders, must make sure that the new plan fits with other maps/plans. To avoid rejection in the recognition stage, he has to avoid at all cost any visual clashes with particular dominant inscriptions.

This is the case with the base maps of the Commission for the Formalisation of Informal Property, Peru (*Comision de Formalizacion de la Propriedad Informal* - COFOPRI) produced since the early 90s under Fujimori's government. With the responsibility to create an inventory of government land, and formalise 'the informal', COFOPRI undertook the mammoth task of putting in place the cartography of the city to serve the massive titling efforts. As explained in Chapter 4, once settlements in the final stages of development enter the process for titling, COFOPRI's technicians must redraw the settlement plans using their own geodesic net³⁹. The resultant map, containing all the titled areas, constitutes the base map of the city and acts as a fixed framework onto which any new plans (whether drawn by engineers commissioned by inhabitants in the initial stages, or by COFOPRI's technicians in the final stage of titling) have to be inserted without superimposition if they are to be officially accepted and certified. The COFOPRI cartographic base thus dominates, taking a hierarchical position over any other inscriptions that succeed it. The problem arises because in order 'to fit', newer settlement plans have to be manipulated and deformed during the process of production, as observed in the field and explained in detail in Chapter 6.

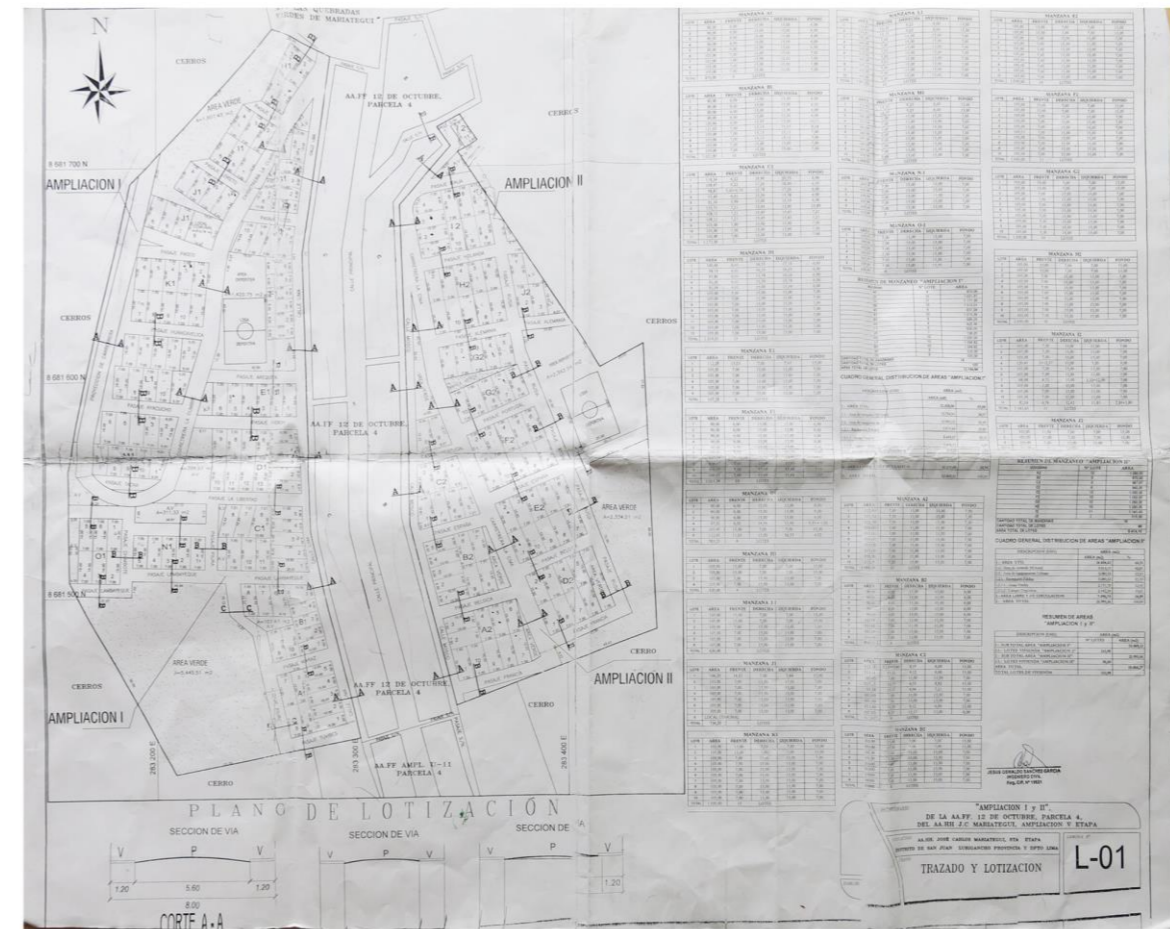
The central State seeks to govern by fixing the type of inscriptions that each settlement has to conform with, as well as the larger framework which receives these inscriptions. There is therefore a system in place which ensures that local information is, from the onset, articulated to that at the city scale.

³⁹ A geodesic net is made of the triangulation of points and serves as a control for new points. After a cartographer registers key points in a digital map to the real-world coordinates of those points on the ground, the map is then said to be "in control". Having a base map and other data in geodetic control means that they will overlay correctly.



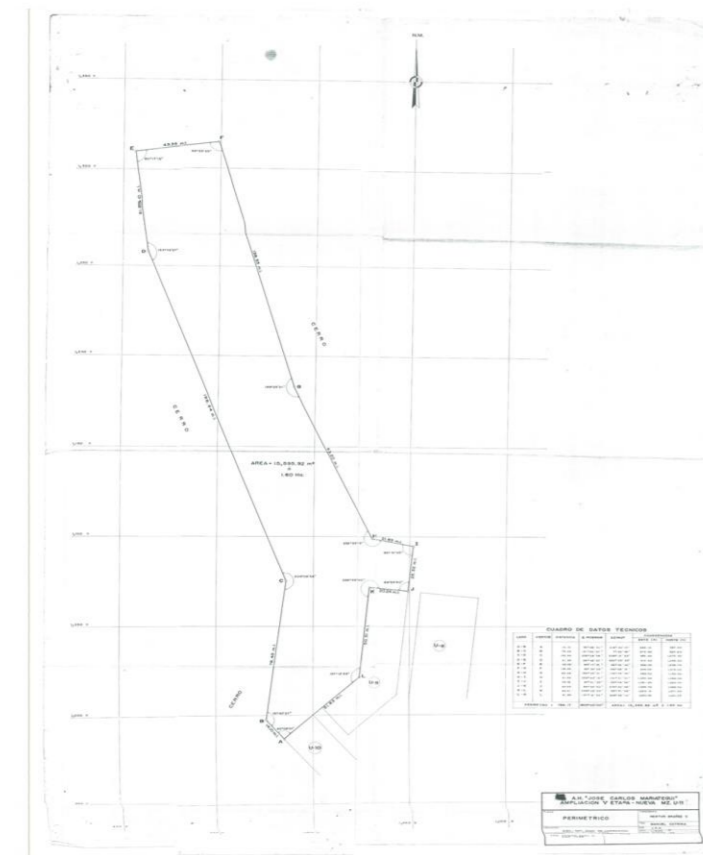
The Location plan
Plano de Localización

The Plano de Localización does not always come as a separate drawing and in some cases it is integrated in the same sheet of the plano de lotización at a scale of 1:5000. This plan shows the hatched area within the perimeter of the settlement in question. The settlements in the immediate vicinity, which have also been recognised by the municipality are also drawn. Those that are labelled are the ones that share the main access route with the proposed settlement.



Layout plan of plots
Plano de lotización

The plan of plots is considered the most complete plan. It includes the perimeter within which all the plots and access routes are drawn and labelled. The plots of rectangular shape and similar in size, take an orderly gridded layout, within well defined blocks (manzanas). Where the perimeter angle changes, or a road cuts through, plots take irregular shapes that are contained within the left over space ensuring that the other plots maintain their regularity. Sports ground are clearly marked, and so are 'green' areas. Outside the perimeter the label 'Cerro' remains with the names and outlines of any adjacent settlements. Section lines are labelled for every street which in turn are keyed into a generic section types with varying widths. On the side, of the drawing, a table for each manzana is drawn and is an inventory of plots. Manzanas are all numbered and so are the plots within each manzana. The table also shows the area of each plot, and the dimensions of each plot's perimeter. A summary table provides the area of each manzana and the number of plots within it. Another table shows the area for each use (housing, facilities, green areas, sports field, 'equipamiento urbano', area for circulation, and the total area). The North arrow is also drawn.



Perimeter plan
Plano Perimetrico

The main features in the perimeter plan are 1) the actual lines that delimit the boundary of the settlement; 2) labelled points where there are angle changes; 3) the angles themselves between the lines joining to make up the perimeter; 4) a North arrow; 5) a table compiling all the coordinate information. The total surface area is also labelled in the middle of the outline. The outlines of adjacent settlement are also drawn and labelled in their basic form. Outside the perimeter the label 'Cerro' is used to refer to the vacant hill. The sheet has a grid with Y and X axis marked and a table capturing each line from point to point eg A-B, B-C and marking the vertices, the distance, degree, azimuth, and the X and Y coordinates.

Figure 5.11: The location plan, the perimeter plan and the settlement layout plan.

Source: JCM settlements leaders

Although the standardisation of the cartographic production is a way to achieve coherence in the information, in reality, the integration is flawed; COFOPRI maps have many irregularities and the set procedures contribute to disorder and the propagation of errors. These negative consequences have an impact on the cartography and the title deeds, and moreover lead to irrational spatial outcomes because the settlement layout plans, manipulated to suit COFOPRI, are directly transposed onto the ground (as explained in Chapter 6).

The discrepancies and errors in the COFOPRI base first emerged during its production in the 90s (interview with official from COFOPRI, October 2015). Various interviewees have revealed how the production of spatial information was a massive undertaking. Most recruits for this endeavour were architecture and engineering students from the various universities in Lima who had to work through uninterrupted night and day shifts. Informants recount the many errors that manifested on the cartographic base in the form of misaligned plots and distorted settlement perimeters. They describe how plots that existed on the ground were altogether missing graphically because they could not be inserted between the other lines drawn (interview with former COFOPRI engineer, May 2015). With the short time frame, and the inconsistencies in measurement and referencing systems, the resultant drawing was often undergoing a manipulation on the drawing board to make the different parts come together. As one interviewee recalls: *"we would come back to the office, and at times there was no way that the lines could join up, we would therefore use our own judgement to make it fit and just decide what shape it needed to be"* (interview with architect, May 2015).

Only after three or four years of work did COFOPRI acknowledge there were big errors in its cartography. Although it introduced a geodesic net to 'control' the new cartography from then on, much of what was already drawn was left unchanged (interview with former COFOPRI engineer, May 2015). This resulted in widespread superimposition, where lines overlapped. These lines might refer to different plots in reality, but graphically they collide. This has implications for new settlement plans. Although the engineers commissioned by inhabitants to produce plans can create more precise boundary drawings using the latest instruments, the perimeter lines are purposefully distorted once measured so that they fit the COFOPRI base. This allows settlements to advance in the processes from recognition to formalisation without having their plan rejected but it also keeps propagating errors. The errors are often discovered when someone is buying, selling, or claiming new areas, and the paperwork does not correspond to the reality. There are consequences in these cases as one informant explains:

"If I am buying a plot but the dimensions are different than those that are there in reality, I have less security because down the line I might be asked for proof that

the entire area belongs to me. So, I need to have another plan produced that better reflects the reality, but this can never be accepted to rectify the official base. We have had conflicts in this community between neighbours and there is a 'war of plans' as each seeks to make their plan stand as legitimate over the others" (interview with elder from JCM, October 2016).

The discrepancies between the reality and the cartography also have productive consequences, facilitating the activities of land traffickers to claim areas illegally. As explained by a former official of MML:

"It is quite messy; we have plans that do not correlate to what is on the title deeds, or title deeds that do not have location plans. This disorder in the documentation is problematic because it is taken advantage of as people come with falsified documents and are somewhat accepted. Knowing that their own records are flawed, officials accept them (interview with former official of MML, October 2016).

She adds that authorities themselves take advantage of the disorder and accept documents as 'true' in exchange for a bribe, in the knowledge that it would be difficult to detect their illegal activity.

Notwithstanding that the COFOPRI maps are ridden with inaccuracies known to authorities and professionals who work with these maps, they nevertheless take a kind of ultimate 'untouchable' status. They are stabilised as different actors continuously support their legitimacy through their practices. They thus continue to dominate and structure all the new cartography produced, thereby contributing to the discrepancies and errors accumulating over time and space.

Furthermore, because the COFOPRI base, as an official cartography, is used by various governmental institutions, they also play a role in further propagating inconsistencies. For example, the Public Registry (*Superintendencia de Registros Públicos- SUNARP*) uses the COFOPRI base for the registration of properties. As one informant from the IMP explains:

"Errors proliferate because when an institution takes the COFOPRI base, it positions it differently and the technicians work with it differently and finally it does not fit with the cartography from other institutions which have also started off with the same COFOPRI base map" (interview with official from IMP, February 2015).

The calculative rationality of the central State instils a framework and socio-technical configuration which regulates all cartographic production. However, this configuration

becomes so dominant and fixed that even though many professionals know of the externalities it produces, it is not malleable. It has been stabilised to such an extent that it structures the system which supports the work of many government institutions. Any rectification or revision might lead to the collapse of such a system. To correct COFOPRI's base to better reflect what is on the ground, would mean redrawing everything which, as the head of COFOPRI suggested "*requires prohibitive resources and would be a painfully slow process*"(interview with head of COFOPRI, October 2016).

Summarising the findings above, cartographic representations are determined by inherited inscriptions that dominate and set the frame for what is possible within the cartographic calculations. Standardisation, far from being a closed and predictable way of controlling outcomes, creates externalities which propagate chaos. One learns that in the process of governing through a technology like cartography, a territory that cannot entirely be governed is created. Moreover, there comes a point when the central State can no longer govern its cartography, which escapes the purpose for which it was initially designed. Inevitably this chaotic state with regards to spatial information means that muddling through becomes an everyday practice and is the fruits of the labour of a rationality that seeks to do the precise opposite: order and manage.

5.3.3 The limits for operationalising technologies of calculation

The central State has made various efforts to have an integrated cartography at the city level. Over time different institutions have been allocated the responsibility for the production of spatial information and the coordination between organisations. Despite this focus by incoming administrations over time, the efforts have not been consistent primarily because different emphasis has been placed on the importance and use of spatial information (interview with IMP, May 2016).

Currently, the cadastre is being promoted by the central State as an essential device to govern the territory⁴⁰. COFOPRI, as the entity with the most cartographic information about housing, has been given the ministerial responsibility for assembling the general mosaic of the city in order to better manage the social projects and interventions within each ministry (interview

⁴⁰ The officials interviewed iterate that the main objective for this is primarily to help in the collection of taxes rather than planning per se.

with COFOPRI, October 2016). COFOPRI has an agreement to gain access to the orthoimages⁴¹ of 150 cities produced by the National Geographic Institute (*Instituto Geografico Nacional-IGN*) and other institutions that hold relevant spatial information. One of COFOPRI's technician interviewed confirms that:

"It is a complex task... it is not a job that can be done in a few months. We have started by cleaning up, looking at all the sources, the year the information is from so we can start assembling the mosaic. Then we can incorporate basic variables that will allow the different institutions from the Ministries, and their different social and physical programmes, to use this information to intervene in different areas" (interview with COFOPRI, October 2016).

Besides sieving through information which has already been produced, one of the main tasks consists in enabling the production of the cadastre at the municipal district level which can then travel to COFOPRI for integration. With this objective, COFOPRI offers technical assistance and training to each district municipality. As per the regulations, 5% of the total municipal budget for each year has to be dedicated to the production of the district's cadastre. The Ministry of Economy and Finance (MEF) incentivises this endeavour by giving a fund to municipalities that manage to achieve their yearly target. This bonus is intended to be reinvested towards the cadastre. The technical cartographic conventions for the cadastre have been standardised with the view that every governmental institution aligns themselves with these standards. Despite these efforts, there are various barriers, internal to the State's rationality, that hinder the production of a coherent city-wide cadastre, that in turn have implications for achieving the integrated planning of the territory that many authorities uphold as a normative position. The sections below explain some of the important barriers revealed during this research.

Differential importance given to technical devices

Although spatial information is framed by many officials as paramount for planning, not all give it the same value and views are dependent on backgrounds. The approach towards the use of spatial information determines how much is invested in its production and what is mapped, thereby also determining the absences and errors that are propagated.

⁴¹ An orthoimage is an aerial photograph or image geometrically corrected ("orthorectified") such that the scale is uniform: the photo has the same lack of distortion as a map

As an official from the Ministry of Housing notes, there is generally more preoccupation with statistical information because that is what "*gets published and is used by the ministry to show its achievements*" (interview with official from Ministry of Housing, May 2015). Planning is therefore seen purely from a budgetary perspective which is not necessarily tied to a spatial vision of the territory; that is, economic and spatial planning are not considered together. He explains:

"It's a historic problem that we have, the focus is on economics, statistics and numbers. This happens in various spheres of government. There is a limited understanding and importance given to a spatial approach and this is why cartography in Peru is in its current fragmented state and urban planning has not advanced. The few institutions that took the spatial aspect seriously have disappeared because no one used them. For example, the National Institute of Planning was closed because firstly, planning was not a priority in Fujimori's government, and secondly the spatial aspect was never well understood. It is a lot of work for us to coordinate with the Ministry of Economy, to allocate the investments in the various cities of the country. I have been here in the Ministry of Housing for 20 years and only recently are we managing to get a few people within MEF to understand the importance of spatial planning. This has permitted us to get their support in evaluations, to determine the efficiency of plans and the importance of cartography as a goal within the incentives that MEF proposes"(interview with Ministry of Housing, May 2015).

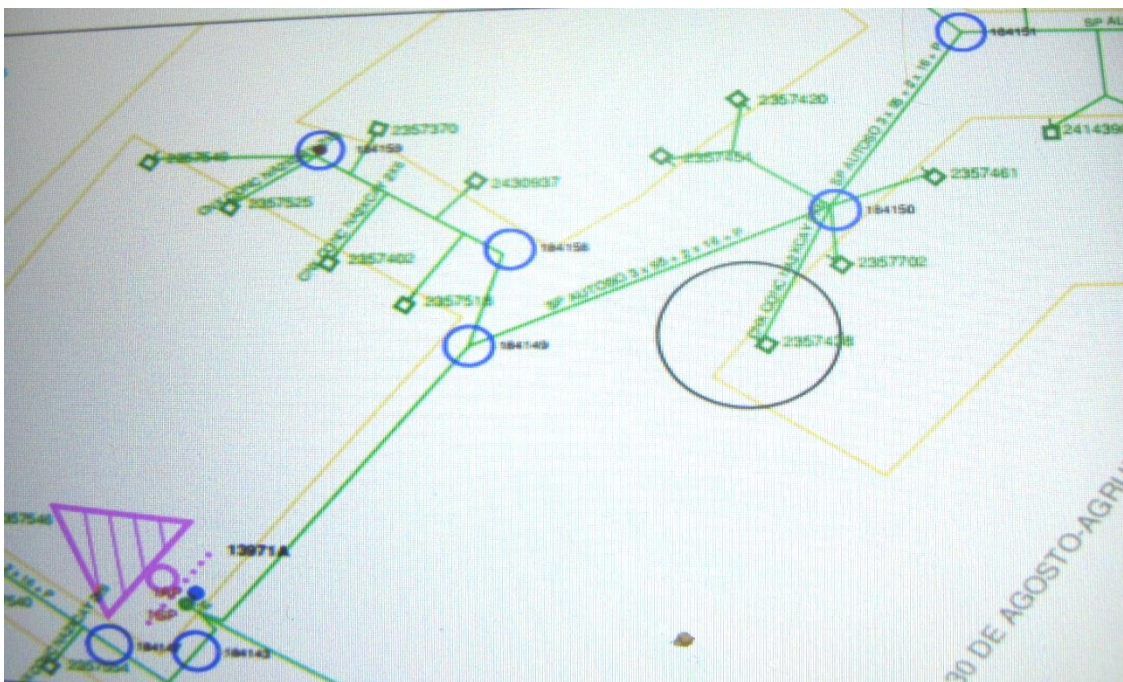
As he expresses it, it is difficult to prioritise investments and focus efforts without the acknowledgement that a spatial approach is important; as such many opportunities are missed for an integrated planning approach. The district municipalities have to decide and organise the budget but do so without a spatial overview. Officials within different institutions also corroborated this view. For example, one informant notes:

"The cadastre under COFOPRI is a commercial matter, it is for tax purposes more than spatial planning. Now the MEF has a GIS data bank based on their own investment themes but not urban planning. They basically look at where the money goes to, and how much. They do not consider how this relates to what is existing, for example the money might go towards the building of a communal space when a few steps away there is one already. This careful assessment and planning of projects is much needed" (interview with official from Ministry of Transport, May 2016)

The differential importance given to cartography and to different aspects of mapping within different State institutions also means that each takes it upon themselves to produce what they deem useful. Rather than having one unified system, this further results in very selective variables being mapped which do not necessarily relate to one another. The type of elements and how they are represented depends on the purpose for which the information will be used.

For example, as discussed in Chapter 6, each institution such as the electricity company- EDELNOR, amongst others, includes only the information that pertains to its remit, mainly the electrical system, which is left in isolation from other important elements such as the urban layout of streets and plots (Figure 5.12). The format the EDELNOR information takes means that it also cannot be integrated with the information produced by the water utility- SEDAPAL (interview with EDELNOR engineer, May 2014). When it comes to implementing the works on the ground, there are clashes that physically manifest: location of electricity poles clash with access ways or water pipes. The consequences for inhabitants are real as they have to incur costs to rectify problems created by these clashes.

Figure 5.12: Extract from an EDELNOR map used for the implementation of the electrical system on the ground*.



* The map is devoid of context such as the location of staircases, contour lines or water pipes.

Photo © R. Lambert (2016)

Another issue that comes into play is the understanding of what constitutes the cadastre and the resources and skills required to produce it. The head of cadastre in COFOPRI notes:

"Many municipalities don't actually understand why cartography is useful and they also don't know how to do it, even though we are supporting on the technical front. There are also different interpretations of what the cadastre is. They tell us they are producing it but when we ask them to show us, they take us into a back room piled up with physical files. The data collected has not even been spatialised on a drawing or systematised in digital form. It is inaccessible. One cannot make sense of this amount of information because it is not organised as it should be. In this sense it is useless, yet the budget for it keeps being allocated"(interview with the Head of Cadastre of COFOPRI, October 2016).

Another COFOPRI informant explains the difficulty many district municipalities have in producing their own cadastre:

"The cadastral survey designed by the national cadastral system, is very rigid and very extensive. The municipalities do not have the funds to record all the information which in practice needs to relate to approximately 450 variables and every variable is time and money. It becomes unmanageable particularly for small municipalities who have a limited budget and personnel" (interview with technician from COFOPRI, October 2016).

Faced with this onerous task, municipalities leave aside the standardised cadastral survey forms and collect only the limited amount of information they deem necessary. The Head of COFOPRI in Ate notes:

"the full utility of the cadastre is not understood by many of the local municipalities. They do not see it as an investment but rather as an expense. It is an issue of the capacities of those in power. In the better off districts such as Miraflores, San Isidro, Surco, La Molina, they have seen its value, invested in it, and reaped its benefits, but for the municipalities at the periphery it's a different matter"(interview with Head of COFOPRI, May 2016).

The districts that have produced the cadastre as the regulations stipulate have been able to collect the taxes efficiently and effectively based on the comprehensive information collected such as land uses, number of buildings storeys, number of occupants and state of buildings, amongst others.

Even though there is a general agreement that a district needs to produce its own cartography, there is no guarantee that it is done in the way stipulated by the regulations despite the funds allocated to it by the MEF. In practice, there is only partial compliance and no enforcement or checks, because of which district municipalities can "*just tick the box as though they have done it and keep receiving funds for it*" (interview with Head of COFOPRI, October 2016). The lack of skills as well as the general positioning vis a vis spatial information also contribute to the absences on official maps. Moreover, as expressed by several informants, there is always a tension between the political and the technical. According to them, the political often overrides the technical; that is, even when the technical work has been completed, substantiating the way a decision ought to be taken, it is overruled by interests. Several technicians from various institutions at national and local government level interviewed for this research highlight how progress is stunted, mainly because as one interviewee expressed: "*development decisions are handled politically rather than being evaluated for their technical merit*" (interview with technician from IMP, October 2016). This means that instead of

decisions being taken based on expert assessment regarding the future of particular areas, they are decided according to parameters which are not altogether clear and are rather in the benefit of more powerful actors with vested interests. This, as the technicians explain, leads to the cutting of corners and issuing information for the purpose of supporting political statements and advancing interests so "the *time is spent on capturing what needs to be or rather what politicians want people to believe rather than what is, and would be useful to truly inform decision making*" (interview with official from IMP, October 2016).

Moreover, those in positions of power, such as heads of institutions, more often than not, do not come from a technical background and do not adopt a spatially informed vision. As an official from INDECI explains:

"In every administration, those that are put in places of confidence are politically chosen and not because they are the best people for the job. Us technicians at the bottom know what the job entails and perform it. However, if there is no incentive or direction from the top and no adequate allocation of resources, it is impossible to deliver. The Ministerial Council (*Consejo de Ministros*) should have a repository and be responsible for coordinating, distributing and devolving the information. But it has no capacity. There are people who have a lot of clarity on what should happen, but they don't have the power" (interview with official from INDECI, February 2015).

Corroborating this view, an official notes that before closing the 50 year old National Institute of Planning that regulated different entities at national level, Fujimori placed a captain of the marine as its head. He highlights: "*what would a captain of the marine know about spatial planning? it should have been an architect, an engineer... only a visionary can take up such a challenge*" (interview with official from IMP, May 2016).

The limited coordinative possibilities of technologies

Over time, different technologies have been developed by government institutions to map the city. However due to the lack of resources and skills, new technological advances are not necessarily applied to remap what has already been mapped to provide one consistent cartographic base. Different cartographies exist in parallel: those that have been inherited from the past and those that are used in the present. This results in an incompatible patchwork of cartographic information for the city.

Peru began its cartography using the geodesic datum⁴² PSAD56. From 2005, a norm was established by central government that all state institutions needed to adopt a different coordinate system (WTS84) and that gradually, all had to migrate to this new system (interview with technician from IGN, May 2016)⁴³. Currently, the law gives validity to both coordinate systems.

Many institutions have therefore introduced the WTS84 system but retain their older information in PSAD56 without updating (interview with technician from IGN, May 2016). The incompatibility between the two systems makes it difficult for different institutions to coordinate between them or between their own information which exists in the two systems. As the head of the cartographic division of COFOPRI states:

"The superimpositions and errors are propagated. The tools themselves used add to the inconsistencies; for example, the outcome is different if traditional surveyors' equipment is used or the cartography is generated using Aero photography. There is no institution to this day that has the complete mosaic of the country in WTS84. All institutions have made an isolated effort at the level of their own sector. There is no correlation that permits the efficient and effective compatibility of the cartography" (Interview with head of cartographic division in COFOPRI, Nov 2016).

Having knowledge of the errors generated and the inability to coordinate efforts between institutions, the result is that each institution works in isolation. Each generates its own information, compatible with its own internal system and in line with its interests. In this way efforts are duplicated, resources wasted, and the atomised manner of operating is instilled. This is problematic because institutions cannot coordinate between them to achieve integrated planning. This makes way for actors outside the formal sphere of planners to take it upon themselves to plan but they do so with a limited vision. The technicians from IMP notes:

"We ask the districts to have a development plan but how can they do it if they don't have the information needed? We cannot do it, we do not have the resources and cannot even start to rectify all the accumulated errors, so we carry on doing business as usual and leave it to the settlements to do the planning. They are the real pioneers" (interview with technician from IMP, October 2015).

⁴² A geodetic datum or geodetic system is a coordinate system, and a set of reference points, used to locate places on the Earth. The system used can vary from region to region in order for a more accurate cartography to be produced.

⁴³ PSAD56 (provisional South America 56) uses the ellipsoid as the basis for a national or regional datum and positions it to best fit the area of interest, while the WTS84 is used as the basis for a world datum, and the ellipsoid is positioned relative to the centre of the earth's mass.

5.4 The politics of cartographic coordination

The tracing of how the maps and plans travel between institutions has revealed a complex landscape where the rationalities of different government institutions not only conflict but compete thus undermining the normative objective but also producing undesired outcomes. I explore this below by looking at the cartographic coordination and relations between different institutions.

5.4.1 Unwillingness to share information

Although the institutions that belong to the State are in theory organised in a way that information can be shared to coordinate their efforts, the findings show that each institution works in isolation to produce their own cartography, and also their unwillingness to share the information with other governmental institutions. As one informant explained:

"Some authorities refuse to share information and are very protective over it. Their argument is that they have invested in it and don't see why they should give it away so simply to those that haven't made the same effort" (interview with official from the Ministry of Housing, May 2015).

This is the case for example with SEDAPAL's cartography which is considered one of the most advanced and potentially ideal as a base for other institutions since many cannot produce the information to the same level of detail. Unlike the other official bases, SEDAPAL's cartographic efforts include untitled settlements since these are future clients. They thus have a much better understanding of the occupation of the territory and how the city is growing. The head of the technical department in SEDAPAL notes:

"We manage our current clients but also those that do not have water yet. We consider them even though they have not been formalised. We have their information at the level of the plots. In many cases we rely on the settlements' own plans even though they might not be approved yet. We take note of how people live in each settlement and add their plans to our base. Until the plans are approved and certified by the district municipality, we cannot provide water, but we nevertheless know where they are and how many are waiting for water. In this way we can plan better" (interview with head of technical in SEDAPAL, October 2016).

Although the information is comprehensive, it remains private and does not travel to other institutions because as an informant notes: "*SEDAPAL has invested many resources and therefore money to produce this information and they want to protect it. They operate as a*

single entity rather than part of other governmental institutions " (interview with official from the Ministry of Housing, October 2016).

Surprisingly, the protective attitude over information prevails between different departments within the same institution. For example, COFOPRI, SEDAPAL and the Ministry of Housing do not share information between them despite being closely linked, as the first two are located under the Ministry of Housing. In this way a competitive stance rather than one of cooperation is instilled between institutions. The only instance where an exchange of information occurs is in the face of a large-scale disaster where an emergency decree activates the emergency commissions within each ministry and the cartography of each is shared between the entities involved in disaster response.

5.4.2 Muddling through the continuous erasure and reconstruction of memory

The state of cartographic information, held within governmental institutions, is at the mercy of the various cycles of incoming administrations. Intentional cartographic erasure is a common phenomenon used by outgoing administrations to create stumbling blocks for those taking over after an election.

Elections, which affect the way the city of Lima is managed, occur every two years. Presidential elections and mayoral elections are inter-phased, each taking place every four years. In practice, this often means that there is a high turnover of officials in positions of authority, as well as limited continuity in project and programmes⁴⁴ if these do not align with the objectives of an incoming administration. Moreover, the periodic political shifts have repercussion for the spatial information of the city, which I was able to directly observe in 2014/15 as Luis Castañeda succeeded Susana Villarán as MML mayor in January 2015.

I interviewed various heads of department, as well as a number of technicians, from the MSJL when they were still in office in December 2014, and again a few months later after they had left their positions. They reported how with every change of administration, spatial information was lost or manipulated. I witnessed this directly by comparing an AutoCAD file containing the perimeters of settlements of the district, given to me in November 2014 by the head of the Urban Development Office in MSJL, to one that was held in February 2015 within

⁴⁴ An incoming administration has no obligation to complete projects that were agreed by a previous administration and are already underway.

the same department. Focusing on the higher parts of JCM, the area I knew in detail, I was able to note the stark difference as many settlements who had already received their certified plan from MSJL were absent from the digital files held by the Urban Development Office. The head of the MSJL Cadastre Department explains the incongruence between the two AutoCAD versions:

"Much of the information produced within the ruling period of the previous government has been lost. They have erased everything. It is easy to erase files or take them away from the office because everyone works locally on their computer and keeps the files on their hard drive. If we now have maps of the district, it is because we have rebuilt them. We have searched for the information to reconstruct them... some people have brought it in pieces, but it is still incomplete, we have a long way to go" (interview with head of MSJL, February 2015).

The spatial information of settlements, in the form of perimeter and layout plans, which have not yet been formalised is particularly susceptible to tampering. As the process from recognition to formalisation can take many years to complete, the memory of many settlements is at risk of being erased, unlike formalised settlements that are sedimented in COFOPRI's data base thus acquiring an intangible and permanent status. Besides the loss of settlements' information, the institutional memory of the district is also affected to the point of requiring a substantial investment to reconstruct it. Planning cannot be a priority as the district's work processes mainly focus on reconstructing the past and present. The head of the MSJL Cadastre Department explains:

"I should be dedicating my time to the cadastre and planning for the time ahead. Yet look at my desk full of files. I need to go through them all. Most of them are from settlements that have already been recognised but have an irregularity because of the incompatibility with the information we currently hold in our computers" (interview with head of Cadastre in MSJL, February 2015).

This situation also has consequences for the inhabitants. During one of my visits to MSJL Cadastre Office, I found one of the community leaders of JCM, whom I had known for a couple of years, waiting to be attended. He told me how he has been in and out of the MSJL offices every week because he received a notification from the municipality refusing to accept the boundary of his settlement because it was showing superimposition with an adjacent settlement's boundary. He explains that the municipality is using an old plan. He therefore has to prove that the copy of the certified plan he has at hand is indeed genuine and was issued by the municipality itself, in order for the current municipal records to be updated.

The head of Cadastre corroborates that such cases are many:

"We don't have their information anymore, so we ask them to bring their plan back to us. In effect, it has been approved by 'us' as the municipality, but it does not appear in our data base. We therefore take a copy of the file and give it to the department of Private Works (*Obras Privadas*) who are responsible for approving it. We can then update our data base. We have endless cases like this. In reality they [previous administration] have done much damage. Although they were targeting us in this new administration, the damage is mostly to the people because they are the ones who suffer delays caused by the process of rectification, and they have to make the extra effort to come back here and follow their case" (interview with head of Cadastre in MSJL, February 2015).

The loss of information creates confusion and incapacitates the new administration, making any planning difficult as the municipality cannot fully grasp the extent of its territory. What was previously rendered visible and therefore amenable to government is rendered incalculable until such time that the necessary investments are made to reproduce the information lost. In this way governing the ever-growing number of settlements in the periphery of the city is embroiled in a continuous process of muddling through the absence of spatial information and the reconstruction of erasures. The work load and investments that have to be incurred to rectify/redraw/reassemble the spatial information become a burden to the administration as much as to the inhabitants.

This burden is everlasting because time often runs out before the information is fully updated and new erasures are brought about with a change in administration. Therefore, the spatial information can only ever be an incomplete patchwork of records. Many inconsistencies may also remain unnoticed as settlements may never seek to rectify their information if they are not undergoing a process requiring them to approach the municipality. The accumulation of errors over time is unavoidable and generally there is the acknowledgement, amongst authorities, that out-of-date information coexists with up-to-date information within a single working file. This has direct implication on how far it can be used as a technician notes:

"This [coexistence] is sometimes paralysing because we know that this information cannot be relied upon. So how can we engage in spatial planning as such? We can only do so to the extent that we don't have to rely on precise information and can work at a very general level. In any case, as a municipality, we have to leave it to the people to plan their settlement because at the end, they have better knowledge of what the reality looks like" (interview with technician from MSJL, May 2015).

The storing and centralisation of data, although seen as important, are not put in place and the same technician tells me that this is because there is no time, the pressing matters of everyday take priority.

Many officials interviewed accept their constraints with regards to urban planning and acknowledge the limited calculation they can undertake given the state of the spatial information. However this does not restrict all calculations as many also highlight that it is precisely this context which enables the continuous occupation of the slopes and the infiltration of land traffickers as explored in more detail in Chapter 6 and 7. Areas where the cartography is contested and not yet fixed are susceptible to the activities of land traffickers who can take advantage of the state of the records to have their own paperwork certified, sometimes claiming land that has in effect been claimed by others already.

The district municipalities can only wait for the different actors to undertake their cartographic calculations to occupy, claim and divide the slope and make this information available only once they enter the municipal process for recognition and services. They are thus on the receiving end of whatever information comes their way without the systematic ability to verifying it. This is the case with new information or indeed with the recovery of lost information. The planning system is therefore dependent on others outside the government institutions.

5.4.3 Strategic informality in the appropriation of cartography

Although State institutions depend on the coordination of spatial information between them since many do not produce it themselves, the regulations stipulate that only information which is deemed official can be accepted and used. This means that even if various sources of information are available to authorities to verify the reality on the ground, these need to be considered only if officially endorsed. The research reveals that in practice, there is a selective appropriation of 'official' or 'unofficial' information which goes hand in hand with diverging discourses of different institutions. There is, as Roy (2005) has suggested, a calculated informality with regards to what is acceptable. But because this varies with some institutions following the protocols for what is acceptable, it further points to the contradicting rationalities and the deviations that are embedded within the institution.

As explained in the section above, the district municipality depends on the information from local inhabitants to reconstitute the information it once held⁴⁵. The information thus travels 'backwards'. Such kind of movement is viewed differently by authorities within the various departments. In many cases once information is no longer housed within the 'official' institution because of having been erased, its status changes; in theory, it can no longer be used. The calculation possible is therefore structured to an extent by what is deemed 'official'. As noted by various interviewees, the 'official' information is that which is considered to be 'true' and verified. For this, it must have gone through the established technical processes for its production and verification, and it must also be located within a governmental institution.

In the case of the MSJL, the head of Cadastre explains:

"Once the information has been erased, even if someone like you brings it back, it is not official. What matters is what the municipality holds. So, there is no way we could use it as if it was official" (interview with head of Cadastre in MSJL, October 2016).

Although there is a verbal stance to refute such information, in practice, at least for MSJL, the erased settlement files have a way of making it back, albeit informally.

Besides this gap between the discourse and practice, 'official' information is in many instances limiting for the technical work processes that need to take place because it cannot always keep up with the fast-changing reality on the ground. Authorities therefore are forced to look at sources outside the 'official' realm. For example, this is the case for governmental institutions that have to, by law, use the cartography produced by the IGN and by the Superintendence of the Cadastre. However, their information is not the most up-to-date as noted by the head of IGN:

"we are limited by the lack of resources, so we can only update so often and of course this means that newer settlements might not be photographed. Our last sweep was in 2004/5 and much has grown in the last ten years. Also, the flights undertaken in 2004/5 do not capture all the areas in the periphery" (interview with head of IGN, May 2014).

⁴⁵ For the settlements that have not yet been formalised or for those established after the cut-off date of 31st December 2004, the spatial information is held in fewer and more local places such as the district municipality. Once it gets lost, it is more complicated to get it back since it is not held by governmental institutions at higher levels.

Institutions such as COFOPRI, who need to verify whether a settlement was established before the cut of date of 31st of December 2004 in order to proceed with land titling, cannot always rely on IGN's spatial information. As a solution, various officials use Google maps or Google Earth. However, the MSJL rejects (discursively) the use of Google for being an unofficial source. The head of MSJL Urban Development Office iterates this:

"Even if we can clearly see on the satellite images of Google Earth that settlements were not there before the cut-off date for formalisation as their documentation suggests, we cannot do anything, our hands are tied, we cannot use it as proof because it is not officially endorsed by the government of Peru" (interview with head of Urban Development Office in MSJL, October 2014).

Taking this position, where MSJL decides not to consult sources which allow it to check whether a settlement existed before a certain date and is therefore eligible for entitlements, means that all settlements will be equally considered by MSJL regardless of when they were established in reality. In this way the process of recognition and formalisation are in effect facilitated and the occupation of the slopes supported.

The research also found discordant accounts within the same institution. For example, officials in COFOPRI's cadastre department state that they do not use Google Earth, whilst those in COFOPRI's legal department admit to using it to verify what is on the ground and to check whether settlements existed on the date stipulated in their documents. The Ministry of Housing also uses Google Earth. There is a dedicated department in charge of getting tariffs for the valuation of plots in the entire city. The district municipalities to whom these tariffs apply are obliged to give the information on their cartographic base to the Ministry of Housing, but this does not always happen, as noted by an official of the Ministry:

"We don't expect to have a cadastral map. If we have it great, but if we don't have it, we don't worry about getting it and we use Google Earth instead. We don't have the capacity to produce the plans. Our technical assistance team just supervises the municipalities that contract their own technicians. If municipalities do not invest in producing the plans, there is nothing we can do about that, so we find an alternative" (interview with official from the Ministry of Housing, October 2014).

Discourses are contradictory and loosen the frame for calculation and open it to discretion. This supports action to be taken in line with the governmental rationality as much as it favours inaction. When the MSJL rejects the use of satellite images to verify the date of occupation of the slope, it is in effect enabling and supporting the urbanisation of the slopes through their inaction. The discourse on what can and cannot be used is tied to the evaluation of benefits for

the authorities themselves. For MSJL, it is more convenient to keep titling and assisting settlements. Besides the humanitarian aspect and the electoral favours which can be won, there is also an economic incentive for technicians and authorities within different departments, as they receive bribes from inhabitants for pushing their files forward in the process of entitlements.

The time it takes to make 'unofficial' information 'official' again can itself be productive for various actors as they can take advantage of the nebulous cartographic space to illegally capitalise on the slopes (as explained in Chapter 7). As one of the COFOPRI informants has noted: *"As much as the silences within norms, absences and disorder in cartographic information are taken advantage of by different individuals whether these are within or outside the administration"* (interview with official from COFOPRI, October 2016). The selective appropriation of information demonstrates that the set frame or standards devised for any calculation to take place in order to govern is inherently open to discretion; this can further contribute to a chaotic cartographic landscape and a territory that is difficult to manage.

5.5 Conclusion

Having interrogated the different cartographic calculations and coordinations of various government institutions that have direct and indirect consequences for the peripheral slopes of Lima, this chapter has highlighted the complex relationship between regulatory frameworks, practices and outcomes. These findings contribute to the rich planning scholarship that demonstrate that the State has neither the unity nor the functionality ascribed to it for governing and remaining within its own rules. Using practices as an analytical lens many studies have shown how actors can behave in contradiction to the stipulated administrative processes (Alexander and Faludi, 1989). Moreover, the 'muddled' nature of policy making in practice is brought to light. Rather than displaying comprehensive rationality, the planning process is seen to be *"characterised by rules of thumb, past precedents and what could be got away with"* (Campbell, 2002). The findings in this chapter corroborate with studies that have shown how planning practices are not always in line with stipulated regulations and that there is a level of discretion exercised by officials who intentionally deviate from the regulations or comply unevenly, and therefore outcomes are also uncertain and unpredictable.

However, this research highlights an important consideration that adds to the existing planning scholarship. Unintended outcomes are not entirely produced because of the deviations of State officials from the rules or the State's 'calculated informality' but can be the

result of the complex assemblage of the social and technical. Politics and technology play out in unexpected ways. Technology can restrict what can be done and therefore limit the possibilities of calculation. Moreover, technology which is adopted towards particular political ends can produce effects that can paradoxically go against the rationality in place.

The findings demonstrate how different institutions and officials are involved in seeking to govern through cartography, as well as to govern cartography, but paradoxically the rules, regulations, standards and instruments they abide by play a part in creating and maintaining a chaotic cartographic landscape ridden with inconsistencies, errors, and absences. The internalisation of these undesired outcomes becomes an ever-increasing challenge which makes muddling through not only inevitable, but the status quo and the work of government. The state of the city's cartography has implications for planning as it makes it increasingly difficult to work towards what many authorities verbalise as a desirable goal: to plan with an integrated vision of the territory.

As practices seek to abide by the regulations and comply with the system in place, outcomes emerge that move further away from the objectives of those regulations; hence in seeking to control and order, there is a move towards disorder which in turn has a direct implication for spatial outcomes. This is illustrated for example by the practices of engineers who graphically manipulate and distort the 'true' measurements on the ground to produce a settlement layout plan that fits the COFOPRI base. But the settlement plan is then transposed to the ground directly generating the true shape the settlement will take and, in the process, irrational spatial outcomes are produced such as unexplainable alignments of streets and plots.

The analysis has also revealed that practices that deviate from regulations might be necessary precisely to enable the continuous 'performing' of the stipulated regulations. Thus, deviations are not only to be understood as corruption. On the contrary, they are necessary to remain within the rules. For example, this chapter reveals how officials must consult information that is considered 'unofficial' in order to undertake their work or how the 'backward travelling' of spatial information from the settlements to the district municipality is necessary in order for the latter to reconstruct the erased data, even though this is considered to violate the official protocol.

The unintended consequences that stem from those practices seeking to conform to the regulations, also create spaces that can be appropriated by illegal practices such as those of land traffickers. This can further lead to the production of undesired outcomes. I explore this aspect in more detail in Chapter 6 and 7. But it is important to here note that different

networks can come to exist precisely because they are supported by the socio-technical assemblage of others facilitating their operations.

Finally, this chapter has revealed the different rationalities at play and how these are not always working towards shared governmental objectives and in effect create paradoxes. For example, the rationality that seeks to control invasions clashes with that of risk management thus generating an unresolved contradiction: neither 'invasions' nor risk are contained but rather promoted. Moreover, one notes that not only conflicting but also competing rationalities characterise the State. This is for example revealed by the reluctance to share data. Interestingly, the competition is also projected into the future as demonstrated by how outgoing administrations use strategies of erasure of information and institutional memory to handicap the incoming government.

The next chapter adds to the analysis presented so far by disaggregating even further the actors within government institutions, as well as those operating outside. Using the community organisation as an entry point, it will trace the various municipality processes that the settlement plan travels through to get close to the everyday practices of actors and relations established that enable and sustain the urbanisation of the slopes in Lima.

Chapter 6 Entering through community organisations

6.1 Introduction

The previous chapter used the State as an entry point, focusing on some of the most important government institutions that engage in the production, use and circulation of cartography and have implications for how the slopes are urbanised. The chapter made evident the ideological and discursive stances of different institutions, the rationalities under which they operate, and how they coordinate amongst each other to deliver (or not) the broader normative objective of the State to plan and govern the territory. The chapter demonstrated how regulations, practices, and outcomes are interwoven in complex ways and give rise to paradoxes which go against the intended objectives and produce undesirable consequences. It also revealed that rationalities at work may be conflicting, and practices may be driven by competition rather than collaboration. Chapter 5 brought to light some of the socio-technical arrangements to control *barriadas* which come to be embedded under the planning system devised by the State. This chapter seeks to further the analysis by using a different entry point: the *Agrupaciones Familiares* (AF) or community organisations that, de facto, govern all collective affairs in the settlement. It thus focuses on the modality of invasion on government land which accounts for the main form of land acquisition in Lima (Dietz 1977; Turner 1969; de Soto 1989; Collier 1976). Entering through a different entity that operates on the slopes is expected to inevitably reveal another set of actors, practices, rationalities and relations that enable and sustain the urbanisation of the slopes thus adding another layer of understanding to answer RQ1, RQ2 and RQ3.

Having partially disaggregated the State in the previous chapter and interrogated how the institutions that constitute it impact the representation of auto-constructed settlements and the actions in the periphery, this chapter analyses the networks that are formed to support the AF's objective to secure a place to live and thrive. It seeks to provide a transversal reading across state and non-state actors through an examination of the cartographic calculations and coordinations that take place throughout the different stages of the *barriada's* development. These stages include the moment of land occupation as well as the various municipal processes within the *Saneamiento Fisco Legal* which relates to the physical and legal regularisation of settlements enabling them to climb the ladder of entitlements from recognition to the acquisition of basic services and finally land titling. The different

development stages can be grouped into five which I have reconstructed through fieldwork and captured in Figure 3.4 in Chapter 3. These include:

Stage 0- The occupation of land and the preparation of prerequisites to enter the process of *Saneamiento Físico Legal* which include the production of compulsory settlement plans (location, perimeter and plot layout plans shown in Figure 5.11 in Chapter 5).

Stage 1- Recognition of the AF by the district municipality which legitimises the settlement's leadership committee and perimeter.

Stage 2- Certification of the settlement plan by the district municipality after which basic services can be acquired.

Stage 3- Application and obtainment of water and electricity from service providers.

Stage 4- Land titling through COFOPRI provided the settlement was established before 31st of December 2004 and it has also reduced its levels of risk on the slopes from high to moderate/low as well as passed the risk evaluation stage.

As explained in Chapter 2, it is important to analyse the different development phases of the *barriada* and take a longitudinal approach, because every phase involves different practices, processes and actors. The chapter is therefore structured as a linear account following the various stages and work processes that occur with and on account of the plans. Following the settlement plan as it travels through the various processes, one notes the critical moments where the course of action and the development path of the *barriada* is determined. The chapter identifies and focuses on these important moments, examining the cartographic calculations and coordinations that have direct implications for the production of hazardous living conditions on the ground. The chapter relies on thick description to reconstruct the relations and networks that are formed and to observe the effects these precipitate.

The findings for this chapter stem from a specific geographical area: the higher parts of Jose Carlos Mariátegui (JCM) in the district of San Juan de Lurigancho (SJL) whose location is shown in Figure 6.1. Settlement on the higher parts of the steeper slopes of JCM began in the 1990s (Figure 6.2) as people from various regions migrated into Lima in search of employment and education opportunities. Additionally, inhabitants arrived from other parts of Lima because, as explained by many informants and expressed by an elder: "*the area provided the opportunity to break away from the shackles of rent and slowly but surely, build a place that could be called one's own*" (interview with elder from JCM, May 2014). The slopes of JCM are being urbanised

through invasions, expansions and the establishment of housing associations by large-scale land trafficking. In this chapter I focus on the first two modalities, tackling the third in Chapter 7.

Figure 6.1: Google map showing the location of JCM within the district of SJL and a satellite image of the ravines which make up JCM.



Source: Google maps

Figure 6.2: The occupation of the slopes in JCM.



Photo © R. Lambert (2015)

6.2 Stage 0- Claiming and securing land

6.2.1 The initial occupation of the slopes

Typically, the majority of settlements in Lima have formed on government land through invasions as well as the expansion of established settlements. The sections below explain what these two involve contextualising the discussion and the calculations that are undertaken prior to entering the process of *Saneamiento Físico Legal* in Stage 1.

Invasions follow a rigorous functioning logic and a pre-agreement between invaders, taken as the 'contract of invasion', which constitutes the extralegal normative agreement of the settlements (de Soto, 1989). The clauses in the contract can be divided into two categories: those that refer to the creation, demarcation and distribution of the settlement; and those that determine the functions and responsibilities of the organisation to execute the terms of the contract. An agreement is made regarding the contribution to a common fund, the distribution of responsibility for negotiations with authorities, the control of public order, and the formation of groups to resist any attempts of eviction (interview with elder from JCM, May 2013).

There is usually an original group who plans the invasion but before they go through with it, they need to attract others to be part of the group⁴⁶ to form the critical mass necessary to avoid the possibility of political repression and also protect any free areas within their settlement from being re-invaded by others (Matos Mar, 1967). The group elect the leaders of their *AF*, set up their statute and also register each member (interview with elder from JCM, May 2014).

Statutes are the rulebooks that define the principles for cohabitation in the settlement, and establish the settler's rights and duties, as well as provide a vision for the future of the *AF*. The statute binds all inhabitants of settlements into an agreement which they have to abide by in order to live in that settlement. One of the main rules is that all inhabitants have to contribute to weekly communal works to ameliorate the settlement. Statutes are generally written by the *AF* founder, based on examples from other *AFs* and are seldom updated. The statutes also define the number of members and responsibilities of the committee (interview with settlement leader in JCM, May 2014).

The decision of where to invade is decided a priori. Either the group itself identifies the free area, or this is done, for a fee, by middle men who have access to spatial information held in the Public Registry or within the district municipality and are able to pinpoint available government land (interview with community leader in JCM, October 2014). Already at this stage, one notes that alliances are forged with officials to enable the acquisition of classified spatial information from governmental institutions and support the occupation of land.

The invasion takes place on a pre-established date (de Soto, 1989). Generally, the land claimed is larger than can be occupied by the original group and with time more people join the settlement. As people join the *AF*, they can either buy a plot or be given a plot. Every settlement has different rules for how newcomers are integrated. Some highlight that it is against their statute to 'sell' plots. Instead newcomers (often relatives, descendants of existing dwellers, or single headed families in need) are expected to pay a fee to the *AF*. Such a fee not only goes to a reserve fund towards future works but also, and most importantly, acts as a way by which newcomers adhere to the local statute. Moreover, fines are also used to bind all inhabitants to take part in the weekly collective work days, in which all are expected to contribute their labour toward common improvements. The leaders are the guardians of all

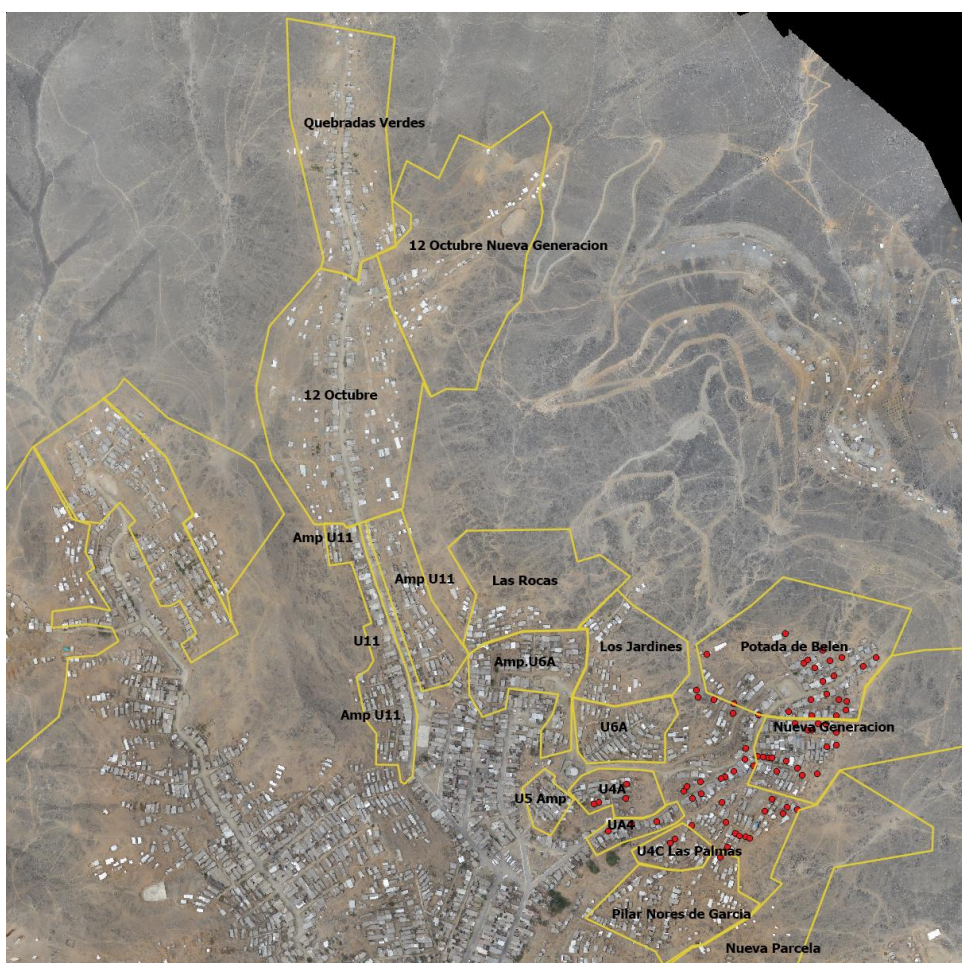
⁴⁶ People call upon their family and friends to form the group, or the group is organised between neighbours who live in rental housing in another part of Lima (interview with community leader, October 2014).

documents pertaining to the settlement since they govern all collective affairs in the neighbourhood and operate as the interface with governmental institutions as well as with neighbouring settlements.

Once established, a settlement may grow through **expansion**. Settlers will typically claim more land for their families beyond their original perimeter. Although a law was passed in 2004 making all forms of land invasions illegal, expansions are still tacitly accepted by the district municipality and these can organise into new *AFs* (interview with official from Ministry of Housing, May 2015). Expansions refer to the natural growth of the settlement where 'second generations' move out of their parents' homes to start families of their own. In these cases, the original settlement submits the settlement plan to the municipality to incorporate the new area as part of the original settlement. In some cases, a new *AF* is formed altogether.

As invasions and expansions take place, the slope is divided into numerous settlements, varying in size and each with well-defined boundaries (Figure 6.3).

Figure 6.3: The boundaries of the various settlements in JCM.



Source: ReMap Lima

The number of households in each settlement varies between 20 and 300. As the terrain is steep and is made up of various ravines, settlements typically emerge along the narrow valleys between hills and, as time goes on and the settlement grows, people start to settle on the steep sides of the slope (Figure 6.4). The newest settlers occupy the most hazardous areas and are often the most vulnerable.

Figure 6.4: Settlements higher up the slope in JCM*.



* Higher settlements tend to be more precarious than settlements established first lower down the slope thus resulting in a heterogeneous landscape with varying degrees of development.

Photo © R. Lambert (2014)

In many cases observed during the fieldwork, the plan of the established settlement is appropriated by a few inhabitants to create a new settlement because of conflict with leaders. It is usually inhabitants that live higher up the slopes that decide to break off because they do not benefit from improvements to communal areas in the same way as communal funds are often used for lower areas first. Newcomers are usually given the worst off areas higher up the slope, and are more vulnerable to everyday risks (such as those related to health because of the inadequate access to water and the risk of falls due to difficult access) (Allen and Lambert, 2015a). By creating a new organisation with people who are in a similar situation, there is a shared base line in terms of development needs thus ensuring that collective efforts can

benefit those previously marginalised. In this way, "*the tail becomes the head*"(Allen and Lambert, 2014). Fuelled by injustices, the process of expansion steadily continues as more tails break off from the heads.

Each new settlement that emerges joins to the one below through a primary access route that is extended by the inhabitants themselves (Figure 6.5). The resultant landscape is a series of individual and uniquely named settlements, working in an introverted manner within their borders. Each have their own leaders, sets of rules and priorities.

Figure 6.5: The primary road which passes through various settlements where banners mark each settlement's boundary.



Photo © R. Lambert (2014)

The occupation of the slopes happens at a relatively fast pace. There is competition to claim land before others do as suitable areas for habitation become ever so scarce. The race to secure land propels the production of settlement plans. These are pre-requisite to gain recognition from the district municipality and are therefore the first step towards gaining relative tenure security over the land. Moreover, the plan is drawn as a matter of priority because it has to work on two fronts: to enable the settlement's layout to follow the planning regulations; and to coordinate with various actors that come to be networked in the process of *Saneamiento Físico Legal*.

6.2.2 The production of the settlement layout plan

The process through which land is claimed is organised and careful calculations are undertaken to ensure that the spatial layout adopted by the settlement, as well as the settlement plans and various documents produced, are compliant with the regulations to advance in the process of *Saneamiento Físico Legal*. Because this process is lengthy and there are various stages with different requirements, the calculations made at the point of the plan's production are undertaken with a view to the future. It is therefore a highly technical operation which requires an advanced understanding of the entire process from recognition to titling. For this, the AF hires civil engineers to guide them through the various stages and to produce the layout plan that will directly inform the spatial arrangement of the settlement.

As explained in Chapter 4, when municipalities shifted their responsibility for producing settlement plans to inhabitants in the 1960s, the standards of those plans were nevertheless secured by making it compulsory that these be drawn and signed by registered engineers or architects. Nowadays, most plans are drawn by independent civil engineers who get their commissions through word of mouth, or through their own active searches (interview with civil engineer, May 2015). Another common place to get the services of these professionals is in the many shops strategically positioned around the district municipality of SJL (Figure 6.6).

Figure 6.6: Shops located around the municipality of SJL offering the many pre-requisites needed for settlements to advance in their process of *Saneamiento Físico Legal*.



Photo © R. Lambert (2014)

A settlement leader explains how these engineers are *"knowledgeable beyond just their technical ability and can navigate the system because many of them have once worked for the municipality and have links to people who provide them with information"* (interview with community leader, October 2015).

The AF needs to have their civil engineer in place before the invasion is carried out because the plan's production and parcelling of the land following the plan *"has to move very fast to ensure that the operation is successful and authorities, or others with vested interests, do not intervene"* (interview with community leader, October 2015).

The moment of invasion is marked by a specific date in which the claiming group delimits a rough perimeter and plants a Peruvian flag to signal that invaders are *"not committing an offence but making a patriotic bid for their rights and for social justice"* (interview with community leader while witnessing an occupation, October 2014) (Figure 6.7).

Figure 6.7: The Peruvian flag is planted on the land that is claimed.



Photo © R. Lambert (2014)

The production of the plan must follow soon after. The land is only secured when the plan of the settlement is returned by the district municipality with a stamp proving it has been recognised. This is a pressing stage as different groups seek to secure land before other do and this depends on who gets the plan recognised first. Until the plan is fully drawn by the civil engineer, the group organise themselves to guard the land. It used to be enough to guard the

land for 24 hours as the constitution gave people the right to possess the land if the government did not remove them within this time frame. However, as some interviewees have explained, this is no longer the case and all invasions are prohibited and can be removed at any time. In practice however implementing the new law is, as explained by one informant, *"extremely difficult, not just for the country's complicated bureaucracy but also morally, it is difficult because we see that many of these people are in need and have paid for land"* (interview with official in MSJL, May 2015). In the most recent invasions observed during the fieldwork, collective patrolling is continuously undertaken night and day until such time that the plots are allocated to individual families, by which time, each is responsible for securing their own plot. Although there is pressure to divide the land as quickly as possible, the process can take up to one week. The guarding during this time also ensures that the work process of the civil engineer is safeguarded by, for example, making sure that no one removes the control point from which his measurements are taken (Figure 6.8) or effaces the chalk tracings on the ground.

Figure 6.8: Civil engineer preparing to work*.



* A control point, marked with a stake on the ground, is fixed by the civil engineer from which all his measurements are taken. As the work process takes a few days to complete, the control point is guarded night and day by members of the community and hidden under earth and cardboard boxes every day until the job is done. The photo shows members uncovering the stake for the engineer to continue his work.

Photo © R. Lambert (2014)

The civil engineer takes all the coordinates on the ground (Figure 6.9 and 6.10) and produces a first draft plan which undergoes a number of manipulations. His cartographic calculations are framed by several factors outlined below.

Figure 6.9: Civil engineer inputting the coordinates taken the previous day.



Photo © R. Lambert (2014)

Figure 6.10: Positioning of total station.



Photo © R. Lambert (2014)

Factors structuring the plan and spatial layout on the ground

Avoidance of graphic clashes

Having detailed knowledge about the checks that the district municipality will undertake at the recognition stage, the civil engineer has to consider other spatial information before he draws the final perimeter plan. In most cases, he has contacts within the district municipality and he is able to 'informally' acquire the coordinates of the areas on the slope which are already taken and have been recognised. This is important because it informs the perimeter he will draw as he seeks to avoid graphic superimposition with the perimeters of other settlements thus ensuring that the plan is accepted by the municipality. The perimeter cannot be purely drawn using the coordinates taken from the ground because as explained by the engineer:

"there are too many accumulated errors and inconsistencies. The real coordinates of the settlements on the ground do not match the ones that are in the digital file that the municipality holds, so if I register the real coordinates I might clash with the perimeter of another settlement. Even if the clash does not occur in real life but graphically, my plan will be rejected. The graphic representation rules because the municipality does not come out to check the real coordinates on the ground but does this through the computer. So I have to distort the perimeter in order to fit with those of others" (interview with civil engineer, October 2014).

The other polygons he needs to acquire are those of archaeological zones, conservation areas and areas earmarked as public spaces. Moreover, as explained in Chapter 5, he also needs to consult COFOPRI plans of titled settlements to make sure that the perimeter he will draw will 'fit' the COFOPRI cartographic base. However, the COFOPRI base and many of the other official maps he needs to consider are ridden with errors (explained in Chapter 5). He thus needs to make several distortions to comply. This stage demonstrates how the engineers' calculations are determined by dominant inscriptions that work hierarchically to displace relatively accurate measurements taken from the ground, deforming them and in this process securing their compliance with official cartographic bases to pass all the checks. Therefore, the planning regulations and procedures themselves promote deviant practices shifting the work process from what it ought to be. In this case, there is an addition step which is introduced between the measurement of the perimeter on the ground using relatively accurate tools of the time, and the drawing of this perimeter on paper. This in-between step implies tampering with 'true' coordinates. Although this contradicts the regulations, it is nevertheless necessary to abide with them and progress in the process of *Saneamiento Físico Legal*. The compliance with

and divergence from planning regulations can here be understood as the two faces of the same coin because they are interdependent.

The economic logic

The civil engineer that draws the plan and the settlement leaders are mostly aligned in their interests. Both parties are driven by the maximisation of plots within the perimeter. For the engineer, he is paid by the number of plots he manages to draw out. For the leaders, the plots represent a system of banking which they can capitalise upon as needed, to finance the various works for consolidating the settlement. However, they have to make a careful calculation when deciding how many plots to show on the plan that enters the certification process and there are tradeoffs to be made.

From the leaders' point of view, they have two main considerations: on the one hand, they have to be able to afford the cost of the civil engineer who is paid per plot drawn; and on the other hand, they need to capture as many plots as possible because the certification process can be onerous. They, together with the engineer, design-in the stages of expansion with a careful calculation of what they can afford at each stage and how many plots should be drawn in each subsequent plan. Because of this staged process, the engineer secures his job in following expansion stages as the cost of switching engineers and redrawing from scratch the AutoCAD plan is avoided. Although there are exceptions, the leaders and the engineer are therefore tied in this endeavour till the settlement has reached its full capacity. This usually means that the growth of the settlement follows the same logic set up at the onset thereby leaving little opportunity to break away from the established path. Thus, certain relationships bind and stabilise a particular trajectory of urban development and as explained in Chapter 4, the resultant spatial layout is one that exacerbates risk.

Although the affordability is one determinant, the other consideration is the area of land within the perimeter the municipality will find acceptable. The civil engineer and the *AF* together have to strike a balance between the area of plots and the open spaces shown on the plan. To allow areas which can be plotted and sold in the future, the plan strategically earmarks reserves labelled as 'green areas', 'area for forestation' or 'area for communal facilities'. However, if these areas are too large, they may be rejected by the district municipality.

Once the civil engineer has undertaken all his manipulation and distorted the perimeter coordinates to fit within the various cartographic bases 'officially' held within the municipality,

he inputs these coordinates into his computer and used an automatic function in AutoCAD to maximise the number of plots that the area within the perimeter is divided into. There is no consideration of the topography at this stage and therefore no thought given to the adoption of a more sympathetic layout that will minimise the steepness of access ways. The sole aim is the maximisation of plots that goes hand in hand with the maximisation of earnings. The resultant grid is then shifted slightly to make sure that the streets lead to a main exit, which in turn joins to the main access road of the ravine. The alignment of access routes is necessary because, down the line, at the risk estimation stage within the process of *Saneamiento Fisico Legal*, the layout has to comply with requirements for evacuation routes.

The findings suggest that the computer, as a technology of calculation which enables the maximisation of plots within the perimeter, satisfies the economic rationality of both engineer and *AF*. It effectively plays a role in determining the final layout of the settlement. The exclusion of contextual determinants of risk such as contour lines leads to outcomes that exacerbate risk. Important to note is that these omissions are not only a decision that the civil engineer takes on his own accord, but they are the expected cartographic standards for the settlement plan. These omissions have real consequences as they contribute to access ways and evacuation routes that are difficult to negotiate. These not only increment risk, but also lead to considerable time and money spend by already underprivileged inhabitants to make the slope habitable following a layout which is costly and somewhat irrational. Arguably therefore there is a direct link between standards, regulations and risk. The latter is not necessarily produced through deviant practices but rather through the compliance with regulations.

Relationship between settlements on the slope

The final layout is also determined by the cartographic calculations that the civil engineer undertakes in response to the social relations within a given context. One such case I observed, during the shadowing of a civil engineer, relates to two adjacent settlements '*Fortaleza*' and '*18 de Marzo*' which were expanding simultaneously. Up to that point when the engineer was called in, there was a similar natural line delimited by the last row of houses for the two settlements, above which the slope changed gradient sharply. At seeing *Fortaleza* trace lines with chalk to occupy more land upslope, *18 de Marzo* decided to follow. The process of these two settlements was therefore simultaneous and the drawing of the boundary line between them became contentious as each sought to claim more land. When we first arrived on the scene, the relationship between the two settlements had broken down. In the process of

brokering between them, the civil engineer drew a layout, in agreement with the leaders, that minimised contact between the two settlements. The leader of *18 de Marzo* asked for his plots near the boundary line to give their back to *Fortaleza*, avoiding any shared roads, thus limit the need for coordination and communal improvements in the future. The findings suggest that social relations are not only manifested in the plan but are regulated through the plan.

Analysing the resultant layout on the plan and the chalk tracings on the ground, I noticed the jarring conditions as access routes through the settlement were in effect 'unnaturally blocked'. This however was the price the settlements were willing to pay to avoid contact. Despite the fact that the outcome materialised as an irrational layout resulting from the conflict between settlements, it was still compliant with the planning standards and regulations and therefore accepted by the district municipality. The findings demonstrate that the contingent leads to irrational spatial outcomes. These are accepted and upheld by the district municipality because they are evaluated in isolation and at the scale of individual settlements, without any consideration for the broader context and how settlements relate to each other.

6.2.3 The transferral of the plan onto the ground

Once the plan has been fixed, the process of division of plots is onerous and must closely follow the plan to ensure that the width of roads and plots comply with the planning standards. The grid is traced onto the ground using chalk at a 1:1 scale (Figures 6.11 and 6.12), and areas reserved for public facilities are also marked to indicate that they are not to be occupied. Once this process is complete (Figure 6.13), the leader allocates individual plots to members of the group (Figure 6.14). Each plot occupier can then commence the works to flatten the plot, build the necessary retention walls and install a prefabricated housing structure.

Figure 6.11: Two members hold a string to ensure they make a straight line before a third person passes over it with chalk.



Photo © R. Lambert (2014)

Figure 6.12: The transferral of plots from the plan onto the ground using chalk by nominated members of the community.



Photo © R. Lambert (2014)

Figure 6.13: The resultant gridded layout of plots on the slope.



Photo © R. Lambert (2014)

Figure 6.14: People waiting to be allocated a plot.



Photo © R. Lambert (2014)

As shown above, many factors structure the shape the settlement takes. There is reasonable room for manoeuvre to accommodate contextual factors, such as the relationship between neighbours, and still comply with the regulations. However, in many other instances, this flexibility within the regulations is not considered. For example, when large boulders come in the way of a grid layout, the lines are maintained passing straight through rocks (Figure 6.15) with no consideration for money and time to shift these which is transferred to the person who will come to occupy the plot. If the chalk lines laid on the ground were to circumvent large boulders, the layout would still be compliant with the planning norms yet as one interviewee notes:

" It is like this because we have always done it like this. If we start to think about doing it differently and avoiding this or that large rock, it would take more time and brain power to make everything line up. Also, we would be losing plots" (interview with community leader, May 2014).

Figure 6.15: Chalk lines transferred directly from the plan to the ground cutting straight through rocks and steep terrain.



Photo © R. Lambert (2013)

Once the settlement plan is drawn, it is used in several ways. I here highlight some of its uses before examining how it travels through the process of *Saneamiento Físico Legal*.

6.2.4 The instrumentalisation of the plan

The plans are wielded for a number of purposes. On the one hand, they regulate social relations inside and between settlements, on the other they also act as intermediaries between settlements and authorities.

Identity construction- The settlement plan contributes to the social organisation and governance in different ways. Firstly, it constructs 'the community' defining it spatially and ontologically as it groups people who might not otherwise refer to themselves as originating from there. By enframing, literally bounding, the plan gives shape to the settlement. Because space and territory are part of the process through which identity formation takes place and maps/plans are the territorial texts, they provide the means through which the settlement is established, and its identity strengthened. The sense of belonging fostered through the territorial bounding is crucial to mobilise inhabitants and to formulate common goals. The fact that the settlement has a shape also means that it is endowed with quantities and performances that can be measured and regulated. The plan of the settlement serves to define the priorities, organise the works, control and promote collective action.

Manipulation- The plan is an important artefact for generating a transcendental 'truth effect' which has the ability to convince of the certainty of the territory, validating the claim over the land. Having observed how the plan is used in conversations, I noticed that, although inaccessible to many who are unable to read it, they trust in its authority, and it is used as evidence in many disputes over encroachment. Furthermore, it also conjures a sense of progress and people easily buy into it. As explained by a former leader of one of the settlements,

"when people come here looking for a plot, they are shown the plan and they believe that the settlement can progress fast and that one day they will get their titles. They have no knowledge of what the different stamps on the plan mean. For example, some stamps might only say that the settlement has been recognised, while another only shows that it has been accepted for review by the municipality or another that says that it is certified for basic services. All these mean different things, but the people take it that if a settlement has its plan, it can be formalised" (interview with former leader, May 2015).

Conflict resolution- The plan operates within border conflict on the ground. Although there is a sense of entitlement and relative protection which comes with owning a recognised or certified plan, encroachment by adjacent settlements or land traffickers is a common occurrence. For example, I witnessed this in *Nueva Generacion*, a settlement in JCM, when I arrived on a Sunday to find that the communal works were dedicated to planting trees along the perimeter. As the leader explained,

"We realised that something was happening when some rocks tumbled down from high above. When we went to see, we found that the higher parts within our perimeter had plots drawn out with chalk and our metal rods that delineate our perimeter were removed. So, we had to bring the plan and with it redraw and locate the place of the metal rods. We then bought some plants and placed them along the perimeter, so it is clear what is ours" (interview with leader, May 2014).

Figure 6.16: The secretary of the settlement points to the works to re-demarcate the perimeter after it had been encroached.



Photo © R. Lambert (2014)

To retrace the boundary line, one of the older leaders, who had taken part in the demarcation of the original perimeter, was called upon. Using the plan and his memory, they reinstated a more 'permanent' edge with planting and the painting of rocks (Figure 6.16). Asking the leader how he translated the drawing back to the ground, it becomes clear that it is an approximate

interpretation which nevertheless is upheld because the leader together with the plan construct sufficient authority (Figure 6.17).

Figure 6.17: Leaders showing their certified plan during the conflict resolution.



Photo © R. Lambert (2014)

In the same way that the leader and the plan come together to form a strong socio-technical assemblage, this is also the case for the plan and the civil engineer, as these together are operational in the event of disputes. The civil engineer becomes a mediator, armed with the plan and his technical knowhow, to solve boundary issues. During negotiations, actors employ the plan to support their arguments. The plan itself plays an important role structuring the conversation and ultimately the outcome. This was evident in the example used above where two settlements were expanding simultaneously. The civil engineer manoeuvres the decision-making process reasoning with the plan (Figure 6.18) to argue where the boundary line ought to be. His authority is clearly acknowledged, so much so, that the leader of *18 de Marzo* asks him to explain the technical aspects to *Fortaleza*:

"The other side [Fortaleza] want everything for themselves: the whole hill! But we cannot accept this. You, as a technician, must explain it to them before the conflict escalates further... you must give me a hand so that at least we don't lose much space in this part (pointing to the boundary line with Fortaleza) and we can still fit people on our side. The Fortaleza leader must understand that it is not a whim. I have promised the new area to many people and I have to deliver" (extract from recording while shadowing civil engineer, October 2014).

Figure 6.18: Plan used by civil engineer to convince and decide how the layout and boundary line needs to be.



Photo © R. Lambert (2014)

The findings suggest that social actors, whether the civil engineer or the leaders, make themselves stronger and more authoritative with the plan. It therefore becomes productive to consider the association of individuals with technical devices as these have more power to precipitate actions and, in this case, to determine the development path of the slope.

6.3 Stage 1- Recognition from the district municipality

The recognition of the leadership committee is the first process in the *Saneamiento Físico Legal* for which the AF has to submit the perimeter plans, its statute, a description of the settlement's history and a list of its members. At this stage of the process, the Cadastre Office in the district municipality is in charge of checking that the area claimed is within the district's jurisdiction and there is no superimposition between the drawn perimeter and those of settlements already recognised, private property, areas of archaeological interests and other protected areas. The coordinates and polygons of settlement are entered in an AutoCAD file and, provided there are no amendments to be made, the polygon illustrating the new perimeter is sedimented onto the digital map. The physical plan is then stamped, and a document is released that recognises the settlement as being within the district.

Despite the fact that the perimeter is checked by municipal technicians at the recognition stage (Stage 1), as well as at the certification stage (Stage 2), the officials in the district municipality have emphasised that at no stage within the district municipal processes is the perimeter officially certified. As the head of the Urban Development Department in MSJL explains:

"Because people are informal, they are not owners of the land, they are only '*possessionarios*' (possessors). Therefore, we cannot delimit the territory as if it was theirs. We only take the perimeter as referential; it's a graphic issue" (interview with official in MSJL, July 2015).

However, he also goes on to explain:

"If a settlement come with its plan that takes over the perimeter of another settlement that we have certified, we refuse it and ask for it to be amended because we have already certified the section of roads" (ibid.).

A contradiction is evident: although the perimeter is not officially recognised, it is tacitly upheld. This demonstrates the complex and conflicting rationalities at play between controlling and enabling the occupation of the slope. The stamp from the municipality (whether for the recognition or certification) give the plans currency for claiming and defending territory on the slopes. In effect those that first produce a plan and submit to the municipality have their claim upheld as the municipality is unofficially safeguarding their perimeter by rejecting all others that are subsequently submitted and might collide. In this way there is a tacit encouragement for areas of the slope to be claimed since there is a relative guarantee of protection through the plan. This 'informal' recognition of individual settlements' perimeters encourages the occupation of the slope.

6.4 Stage 2- Certification for basic services

6.4.1 Sedimentation of settlement perimeters onto digital files

When the documents which include the location plan, perimeter plan and plots plan are submitted for the certification process, only the perimeter coordinates are transposed onto the AutoCAD digital file held by the Cadastre Office in MSJL. This file contains all coordinates and polygons of recognised settlements. The file itself is an empty background, with no contour lines. The settlements which correspond to the higher parts of the slope are left blank within the polygons; this is unlike the titled areas that are captured in relatively more detail with individual plots. The perimeter is the only element from the physical plan submitted by

the settlement which is transferred onto the working digital file of the district municipality. Figure 6.19 below is a snapshot of the digital file which apart from the plots of the lower titled areas, shows the empty polygons of various AFs. Arguably therefore, the official process involves a sort of decomposition of the plan and a further abstraction of the territory.

Figure 6.19: A snapshot of the digital AutoCAD file which apart from the plots of the lower titled areas, shows the various polygons of the AFs.

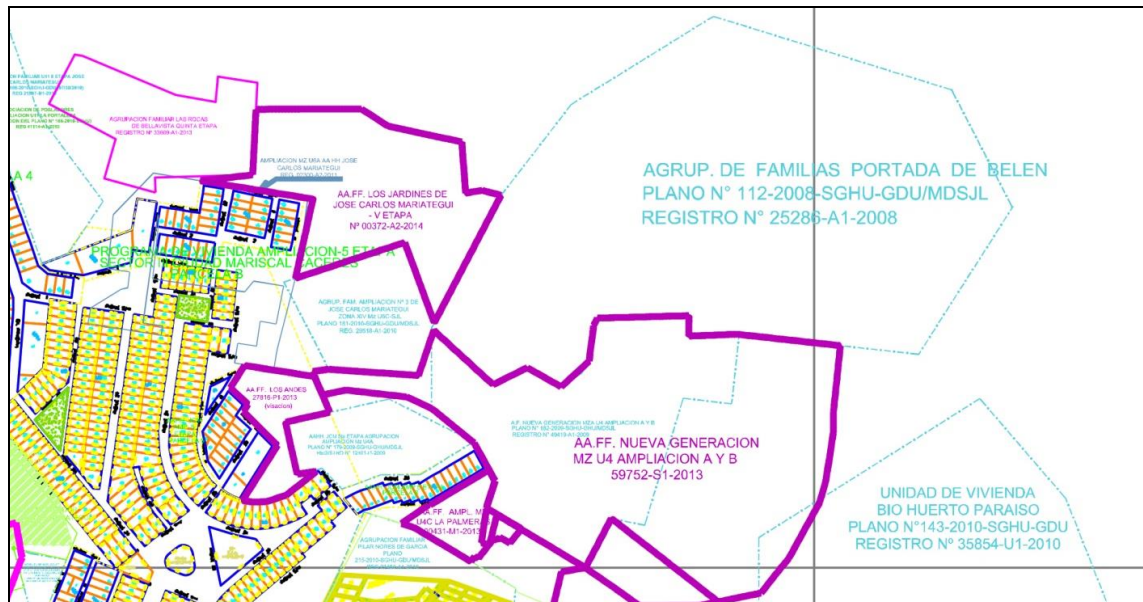


Photo © R. Lambert (2014)

Although only roads can officially be certified as stipulated by the norm, they however never make it onto an official plan; whilst the perimeter, which cannot be endorsed, is the only element that gains visibility. When I asked why this is, the head of the Cadastre Office explains: *"It is a technical issue with the computer. The file is too heavy. If we had all the plots and the roads it would take forever to load, and we couldn't do our work"* (interview with official from MSJL, May 2015).

The computer's capacity is therefore somewhat entangled in upholding the hierarchical position of the perimeter which, discursively at least, should not be considered at all. What is more, the perimeter is real because it has a material expression, but it is at the same time fictitious. The digression from reality and the errors that the file holds pushes a logic whereby newer perimeters are distorted to fit, thus propagating further errors. Consequently, what happens on the ground and what happens on the computer screen take on a life of their own and produce parallel but co-produced worlds. This mismatch creates productive spaces which facilitate the continuous claiming of the slope and the infiltration of land trafficking (explained in more detail in a later section and in Chapter 7).

6.4.2 Scrutiny of the relationship between plots and perimeter

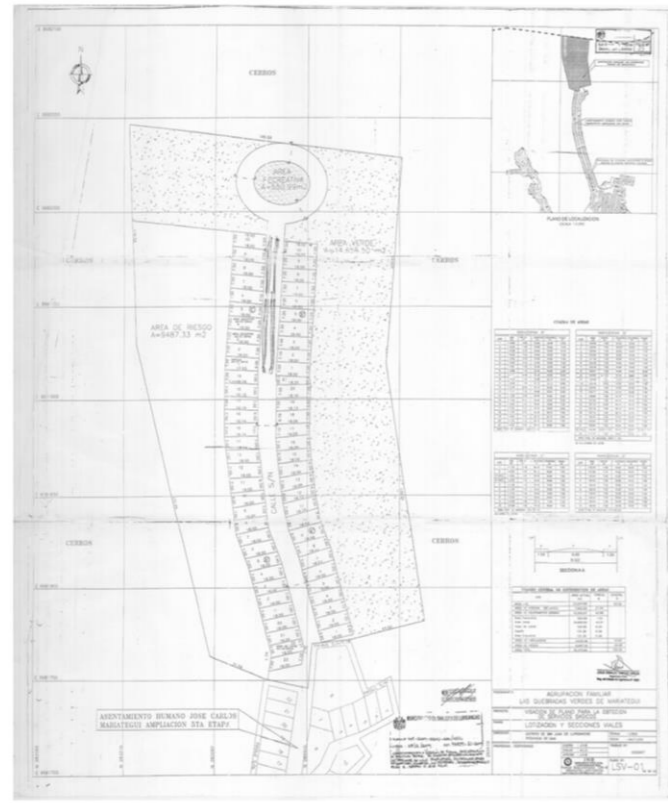
At the plan certification stage, the Department of Urban Development in MSJL undertakes the check to see the relationship between the perimeter and the area taken up by plots. As explained by the head of the department,

"we are not land traffickers here in the municipality. This is the law of the people who really want to live here, not for them to make money. So when they come here with a big plot, we ask them to reduce it to the area they are occupying. But how much is enough? Well, we just look at the plan and see if it looks right compared to the area of plots" (interview with official from MSJL, May 2015).

Using the example of Quebradas Verdes, one of the settlements on the upper most parts of JCM, an examination of the different plans submitted to the municipality illustrates how the relation between the occupied area and the area within the perimeter of the settlement have to be carefully calculated. The first plan was submitted in November 2009 and certified by MSJL. Subsequently in March 2013, the AF produced another plan with many more plots and a larger perimeter. This plan was rejected, and the Department of Urban Development requested that the perimeter be amended. The AF then submitted a new plan with a reduced perimeter in September 2014. The latter was approved and certified. Figure 6.20 shows the various plans and the different areas taken up by the perimeter in red. Although there are mechanisms to determine how much territory is occupied and to control expansion, there are no set rules. The perimeter is considered in a subjective manner, and it is thus open to discretion and manipulation. As a community leader explains:

"How big the perimeter is depends on how big your pocket is. Look up there, there aren't even plots yet, their perimeter is nevertheless quite large. So I ask: how then did they [municipality] determine how big they allowed the perimeter to be?" (interview with community leader, May 2014).

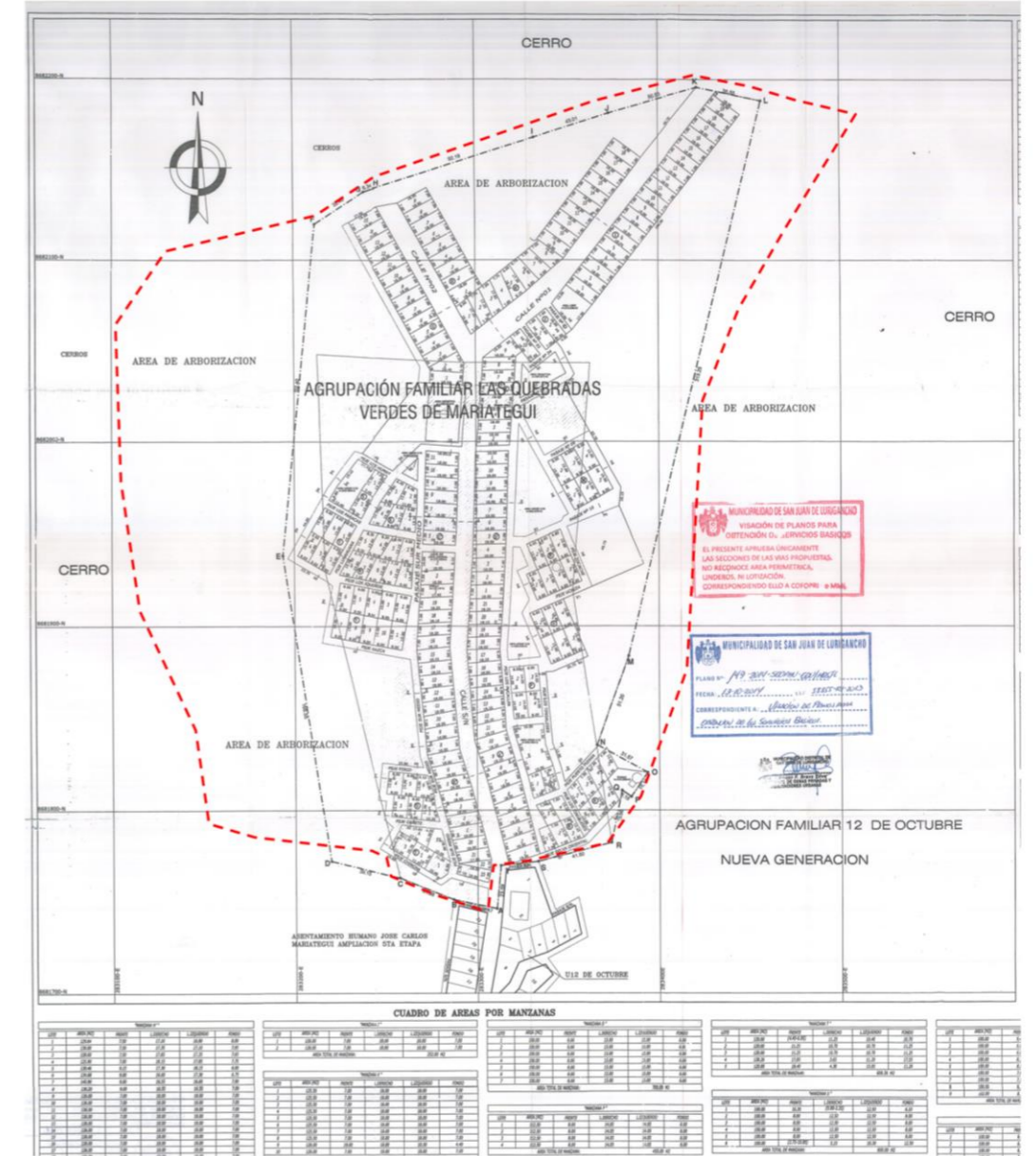
There are a number of checks that are undertaken to control speculation, namely the evaluation of the plot division within the perimeter. Many checks are desk based and are flawed, because the various plans of the settlement they rely on have a level of abstraction which is inevitable in all maps/plans. As explained earlier, the absence of contour lines is one of the most striking omission from all the plans. Because of this, the reading by the district municipality to determine how much land is enough, does not take the actual usable land into consideration or even whether the plots shown on the plan are indeed practically feasible considering the steepness of the topography. The plan thus convinces that the projected plots are achievable, dissipating any possible concerns from those checking the plan.



November 2009



March 2013



September 2014

Figure 6.20: Plans of Quebradas Verdes submitted at different times showing a different perimeter*.

* The dotted red lines in each plan show the outline of the perimeter previously submitted in the previous version of the plan.

Source: Quebradas Verdes

One of the first processes involves the verification of the plan with reality. This requires a visit to the field by a municipal technician who checks: 1- the width of roads so they comply with the regulations to accommodate future services; 2- the size of plots and size of public spaces; 3- the number of plots that are occupied as well as those that are still without habitation. As stated by the head of the Urban Development Office in MSJL:

"We at the municipality are here to stop speculative enterprises, and therefore have to verify whether there is habitation. 80% of the plots must have people living in them for the plan to progress" (interview with official from MSJL, October 2014).

Two different paths are therefore taken: one that works with the 'official' rules and the other that finds a way to override it. If the settlement has not developed good contacts with officials within the district municipality, the actual municipal process indirectly speeds up the urbanisation of the slope. Because the process to produce the plans and prepare the other requirements is costly and time consuming, the *AF* seeks to maximise, in one go, the number of plots it can get through without rejection. If it cannot bribe the officers, it enters into a logic that propels the delimitation, selling and occupation of plots in order to reduce the discrepancy between the plan and reality before it enters the municipal process. The occupation of the higher parts is thus spearheaded. The official requirements that are put in place to slow down occupation and ensure it is driven by genuine need paradoxically contribute to the very opposite.

In a similar way, should the 'unofficial' route be taken whereby the officer in charge, who checks for habitation, exercises discretion and overlooks the number of plots which are not occupied above the stipulated acceptable percentage, speculation is further enabled. Various actors, be they part of the *AF* or small/ large-scale land traffickers, can therefore take advantage and operate precisely through this discretion to appropriate land. Thus the 'official' and 'unofficial' routes that demand particular calculations with the plan and engagement with the regulations are here equally entangled in contributing to urban expansion in areas difficult to service, thereby producing and reproducing risk for inhabitants.

The 'unofficial' route whereby municipal officers are bribed is not uncommon. Various *AF* inhabitants have explained that the visual checks in the field need not always occur. The municipal officer can either do everything from his desk or if he does visit, he is paid off by the *AF* leaders to turn a blind eye. I found it useful to corroborate such claims analysing the extent to which the plan deviates from reality. For example, when comparing the 2014 certified plan

of Quebradas Verdes (Figure 6.21), with a drone image⁴⁷ produced at a similar time (Figure 6.22), one can note clear discrepancies. The drone image shows fewer traced or occupied plots compared to those drawn on the plan.

Moreover, a visit to the field in February 2014, also reveals that on the most upper parts of Quebradas Verdes the roads are not yet levelled (Figure 6.23). Furthermore, what might be considered inhabited plots on the drone image, showing building structures, are in reality empty shacks. These are used as place-keepers to safeguard from potential invasion by others but are also there to give the impression of habitation (interview with community leader, October 2014).

One of the leaders explains during a transect walk how land traffickers take advantage of the 'official' route and the process of *Saneamiento Físico Legal* to claim land.

“This is where Don Virgilio⁴⁸ operates, he has good friends in the district government and once he settles somewhere, nobody bothers him. He will present a certified map claiming that there is a new *AF* here, where as you can see, there are only rocks. Then little by little the shacks will be sold to those in need. They will be told that SEDAPAL will soon come and provide water to the area. Once people have bought a plot, they will just have to find a way to buy water from neighbouring settlements” (interview with settlement leader from JCM, May 2013).

The findings evidence the presence of loopholes within the regulations. Moreover, they show that the modality of the *AFs* can be appropriated by land traffickers and go undetected. The procedures are not only at the discretion of officials that divert from the rules in exchange for payment, but the regulations themselves have the ability to accelerate the occupation of the slope and facilitate the infiltration of land trafficking.

⁴⁷ The drone image was taken in February 2014 as part of the research project ReMap Lima.

⁴⁸ Don Virgilio is a known land trafficker in the area.

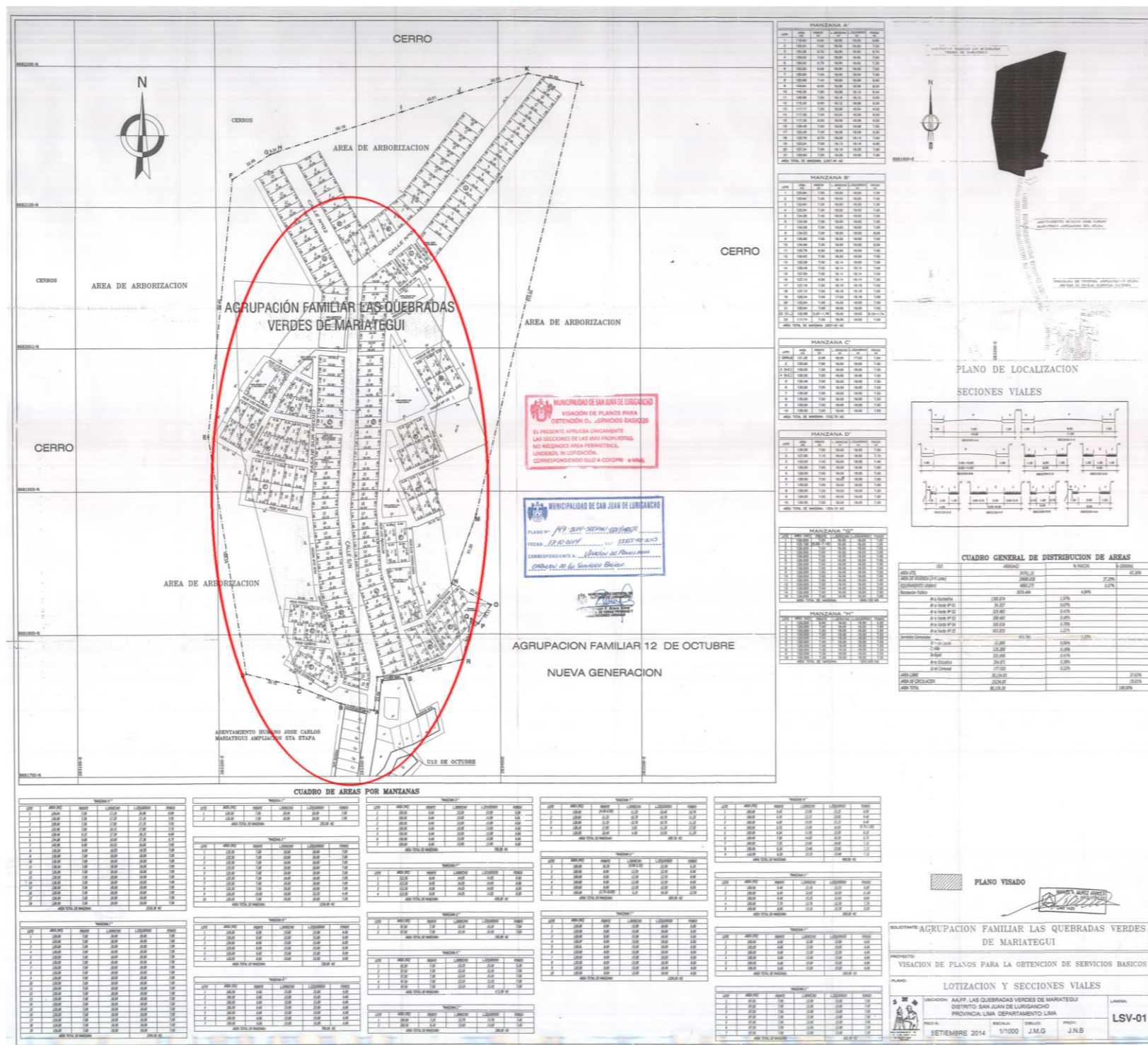


Figure 6.21: Latest certified plan of Quebradas Verdes*.

*The red oval on the certified plan and the drone image delimits the same area. Comparing the two images, one can clearly see that the plan shows many more plots than actually occupied in reality.

Source: Quebradas Verdes

Figure 6.22: Quebradas Verdes drone image.

Source: adapted from Remap Lima

Figure 6.23: The upper parts of Quebradas Verdes that on the plan appear to have clearly delimited plots and a well-defined road.



Photo © R. Lambert (2014)

6.4.3 Risk evaluation before certification

At the certification stage, besides the checking of a) habitation; b) superposition of perimeters; and c) the compliance of road widths with planning standards, a risk evaluation is also undertaken by the Department of Civil Defence within the district municipality. The areas on the slopes are considered high-risk zones. According to the COFOPRI glossary, the risk zones are lands that are not adequate for housing posing potential risk due to the characteristics of the soil, the proximity to rivers or water bodies, the proximity to electrical transmitters or other similar elements (Webb, Beuermann and Revilla, 2006). Although the areas of high-risk can be destined for reforestation and environmental protection, in reality a very large number of settlements are located in them (interview with official from COFOPRI, October 2015). According to an official from COFOPRI, for every 100 settlements that are programmed to be formalised, 80 to 90 are in risk zones.

Because the settlements are in areas considered uninhabitable, they must show that they have been able to mitigate risk and reduce the risk classification from high to moderate/low in order to get services. Inhabitants therefore organise and seeks to progress as fast as possible

through collective efforts to construct the necessary infrastructure such as roads, staircases and retention walls. Although most of the funds for these works are generated through newcomers' entry fees or the selling of plots, political campaigns can also be a productive time to obtain cement donations or other type of support from political candidates in return for votes (interview with community leader of JCM, May 2016).

Risk is officially classified by the Civil Defence Department under 5 levels: very low, low, moderate, high and very high. The risk evaluation stage encompasses the assessment of the structural and non-structural conditions of the settlement. The job of the risk estimator from the Department of Civil Defence within MSJL is to go to the field with the plan (Figure 6.24) to check that staircases and retention walls are well built and reinforced with cement, the house is structurally sound, and the electrical installations are safe.

He also verifies that the inhabitants are prepared in the event of a disaster, equipped with fire extinguishers (1 for every 10 houses) as well as sand buckets. He explains that:

"the people need to overcome their level of vulnerability, they need to become resilient and strengthen their capacity to respond. So to give the settlement viability, we at Civil Defence give capacity building talks and help with the organisation of voluntary first response brigades" (interview with risk estimator from MSJL, October 2015).

Figure 6.24: The risk estimator from MSJL uses the plan during his site visit to the settlement.



Photo © R. Lambert (2015)

While shadowing him during a site visit, he tells me that many settlements have not lowered their risk and are still precarious.

"From a technical point of view, it should not be approved but here what comes into play is the humanitarian aspect. I see their suffering, so what can I do? Can I really be the obstacle that prevents them from getting water?" (ibid.).

Speaking to the leader of the newly established settlement, he tells him that although he shouldn't, he will turn a blind eye to help them. The three of us walk around the settlement and it is evident that the inhabitants are quite far from complying with the requirements (Figure 6.25). Many of the access routes are still bare rock and only a few areas have been cemented. The actual inspection is quick, and the risk estimator tells us how he will have to manipulate some aspects for the file to progress.

"You see, I have to add pictures to the file and I have to think how to take them, so they are not contentious. I have to carefully choose the angles, so it is not so obvious that the settlement is still precarious"(interview with risk estimator, October 2015).

Figure 6.25: Image taken during a walk around the settlement with the leader and risk estimator from MSJL.



Photo © R. Lambert (2015)

When we have a chance to sit, he elaborates:

"I know that these settlements can improve given the time, so I help them to progress through this process because eventually, little by little, they will mitigate their risk as they consolidate. But until then at least they can have water. How can anyone live without water? not even a plant, not even an animal. So how can we expect them to survive and improve their condition if they don't have water" (interview with risk estimator from MSJL, October 2015).

Following him in the field, I see that he receives money from the *AF* leader. The 'help' he gives settlements is therefore in exchange for a bribe. He is not very discreet with this and tells me that settlements themselves approach him and pay him 3000-5000 soles (USD 900-1500) depending on the number of plots, so that he can keep moving their file in the certification process without making major observations. These findings therefore suggest that alliances are not only forged with independent engineers commissioned by settlements, but also with actors within government institutions that are less politically visible such as technicians. The relationship between the *AF* and technicians within the district municipality is one of familiarity as there is repeated contact throughout the various development stages of the *barriada*.

With regards to the actual work process, the evaluation assesses whether the risk can be mitigated in the future rather than measuring the risk in the present. Looking into the future as a means to justify the process in the present, takes into consideration the fact that there is another risk estimation stage closer to the land titling stage further down the process of *Saneamiento Físico Legal*. This second assessment is required by COFOPRI and is undertaken by a risk officer under MML who is therefore 'not as close' (geographically and familiarly) to the settlements, and therefore '*the rules are harder to bend*' (interview with risk estimator from MSJL, October 2016). At that stage, the settlement must have advanced in terms of the risk mitigation works because stricter checks are undertaken. Knowing that there is a time lag between the certification of the plans, the acquisition of services and finally land titling, there is an expectation that the settlement will have had the chance to sufficiently consolidate. Time is therefore the buffer that facilitates flexibility and the bending of the rules in the present. Nevertheless, the risk estimator from MSJL advises the settlements to keep working at a fast pace so that when the service providers, SEDAPAL and EDELNOR, get involved there are fewer issues raised and there is clarity with regards to the location of water pipes and electricity posts.

The risk estimation stage is more burdensome. Unlike the other stages before it, where the *AFs* can adjust the perimeter, or the number of plots shown on their plan, much larger investments are required to comply with the regulations. Moreover, should the application be rejected, it can leave the settlement in a long and painful process as inhabitants have to accumulate enough funds and undertake the works to satisfy the pending issues highlighted in their file. This also implies that they can be left without basic services for a considerable number of years and have to depend on neighbouring settlements for water. As many of the leaders have iterated, it is a difficult predicament to be in and it is better to pay one's way to ensure that they do not get stuck with the onerous requirements. In this sense, the risk estimator is a powerful actor who can allow or block the process with more damning consequences for the inhabitants.

Similar to the case of the civil engineer who produces the layout plan and makes the *AF* depend on him through the design of the staged occupation, the risk estimator's relationship with the *AF* also goes beyond the one-off certification process. He appears again to undertake the capacity building workshops required by MML further down the process, and also works as an advisor to the settlements. Acting outside his official role within the MSJL, he offers his services for a fee to produce the evacuation and signalisation plans required by COFOPRI at the titling stage. As a relatively invisible actor, one can appreciate how the risk estimator plays his part to help urbanise the slopes. Having interviewed him intermittently during various fieldtrips to Lima over 3 years, I also learned another facet. In 2014 he tells me:

"I work continuously with these settlements. When I see that they are a bit abandoned and they are not progressing in their development, I come every Sunday to motivate them, to get them to do their communal works. In this way, I have earned the love of the people and they have now asked me to become a congress person in 2016" (interview with risk estimator from MSJL, May 2014).

A year and a half later, in November 2015, I accompany him to the field, where together with a group of lobbyists supporting Keiko Fujimori in the presidential elections, he is going from settlement to settlement promising water, electricity and land titles. He tells me: "*They need me in this campaign because I know the settlements well, and I have gained the trust of the people because I have helped them over many years*" (interview with risk estimator, November 2016).

Technicians that are seemingly there to instil the rules and make sure the planning regulations and standards are followed, can take multiple identities which serve themselves and the *AFs* in different ways. Technicians are not only obligatory points of passage but also common to more

than one network since they can move and shift roles. They are supporters and mediators of the urbanisation of the slopes using their knowledge to navigate the seeming divide between the technical and political.

6.5 Stage 3- Acquisition of water and electricity

After the certification process is complete, the settlement can submit their request for water and electricity to utility companies. At this stage, several other actors come into play to plan and undertake the works. With regards to water connection, although SEDAPAL once designed the projects and carried out the works, it stopped doing so 20 years back. At present, both the design and the construction remain the responsibility of the AFs. The design is outsourced to an independent sanitation engineer who charges per plot. The sanitation engineer usually gets his commissions through recommendations or, as one interviewee noted, through *"walking the hills every Sunday, when inhabitants and leaders are in the settlement and I can promote my services"* (interview with sanitation engineer, October 2014). Although the design is a *"highly technical matter"* and can only be undertaken by a professional engineer, the installation of pipes involves the labour of inhabitants under his supervision and direction to save costs (Ibid).

To prepare the design, the sanitation engineer needs the spatial information from SEDAPAL to make sure that he connects to the existing water network. SEDAPAL's information is not public and is not shared (as explained in Chapter 5). Yet it is essential for the works to be carried out and the sanitation engineer gets it through other channels. He explains:

"I can't access the information, so I get it from a friend within SEDAPAL as a paper copy. I pay him with favours or a little something. We help each other. We need to plan for the water pressure, but if SEDAPAL is not installing the water pipes and not giving the information either, then there may be mistakes and higher costs to rectify them later" (interview with sanitation engineer, 2014).

SEDAPAL knows that its spatial information is vital to plan a viable project. However, by withholding the information, it is involved in promoting the leakage of its own information to an 'informal' market. Thus, in order to follow the stipulated procedures in the regulations, technicians have to resort to the informal acquisition of information. Paradoxically, in these situations, the regulations can only be upheld through deviant practices.

Moreover, as the sanitation engineer highlights, errors are promoted in this way which leads to abortive time, work and investments. Furthermore, the losses are aggravated by the logic of

reversed urbanism. The roads have to be well built and staircases cemented before the plan is certified by the district municipality, for which the AF invests much effort and money. But to install the water pipes, the roads and staircase are broken up. After installation, these needs to be fixed or made anew leading to abortive costs and contributing to a patchwork landscape.

Unlike SEDAPAL, which limits itself to the inspection and approval of the design which is implemented by others, EDELNOR, the electricity provider, operates through subcontractors to do both. In the case of JCM, the subcontractor is a Spanish company called SATEP Peru. For this stage, the AF submits the certified plan as a physical copy to EDELNOR with a request for electricity provision. These are then sent to SATEP, who digitise them in AutoCAD. A technician from SATEP takes on the study of the project, calculating the amounts of posts, cables, type and level of lighting required. Unlike the sanitation engineer who goes out looking for his jobs, the SATEP technician cannot be recommended through word of mouth. As he explains, "*everybody has to pass by EDELNOR and EDELNOR then transfers the work to us*" (interview with SATEP technician, October 2016). The technician, using the certified plan as a base, first goes to the field and checks for inhabitation as well as the dimensions of access ways and plots. To be economically viable 60% of the plots must be occupied, and 20-40 plots are the minimum number considered before an electrification project goes ahead.

The technician fills an Excel sheet noting the number of plots, the material of the housing and details of the settlement. He also uses the plan to check whether the sections of the roads correspond to the drawing. If they are different, he makes notes on the file because as he explains:

"I examine everything on the ground with the installation in mind. I consider how workers carrying electricity poles will circulate. So, if the roads are not well made and they are still rough or rocky, I cannot go in with the electric lines. I tell the inhabitants, to improve things, such as staircases, so that the workers can go all the way up to place the electricity posts" (interview with technicians from SATEP, October 2015).

After the first visit, the technician sends the file to EDELNOR who in turn forwards it to the client with the observations to be corrected. The engineer explains that this process usually takes many visits as settlements find it difficult to make all the changes. Once these have been addressed and checked by the technician, a feasibility letter is sent to EDELNOR. A date is then given to the settlement in which each inhabitant is to present his/her ID, sign an individual contract and make S.300 (USD90) payment for the electricity meter.

At this stage, only the blocks without the plots are picked out of the certified plan of the settlement and make it onto the AutoCAD file. Besides the blocks, the EDELNOR digital plan shows the infrastructure, such as meters and transformers, as well as the connection between them. There are no coordinates and as the engineer explains, the interest is in the relationship between elements and the quantity of items for the electrification system (Figure 6.26). This phase is not synchronised with the work of other departments and does not consider other information, for example SEDAPAL's water network.

Figure 6.26: EDELNOR's digital file showing the blocks of the settlement in yellow and the electrical system in green.

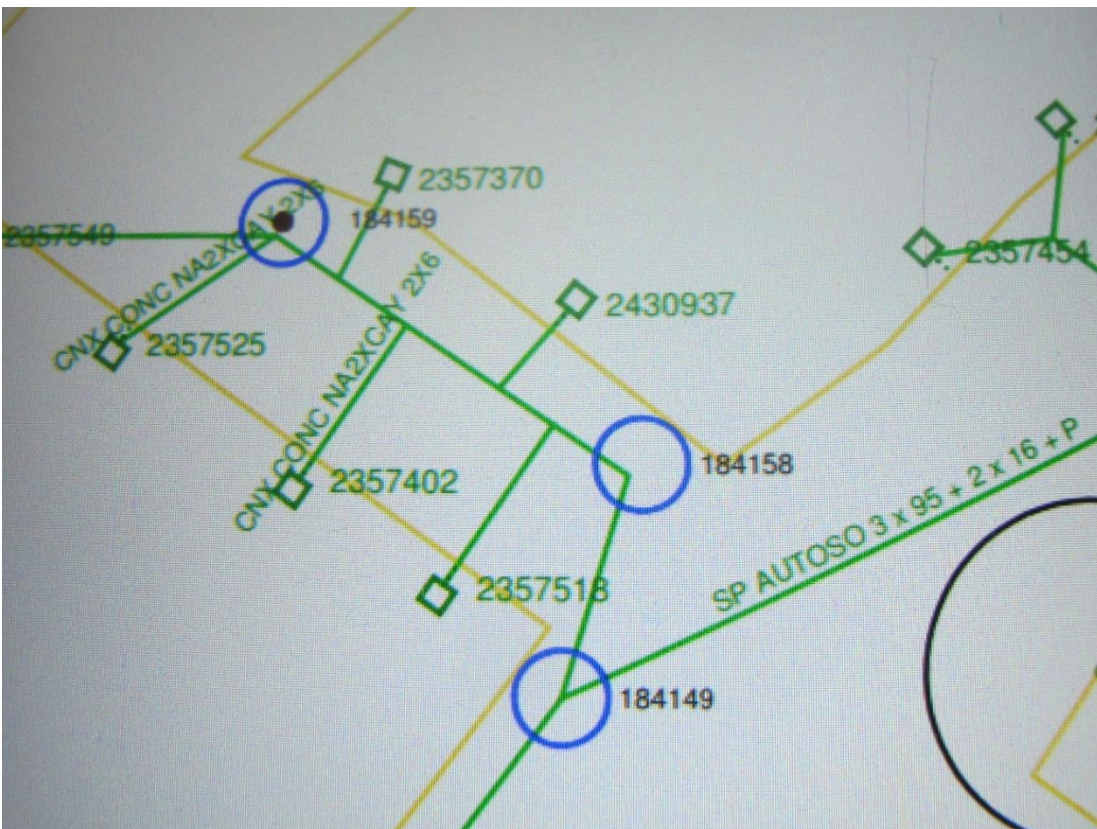


Photo © R. Lambert (2015)

The execution of the works is done by yet another subcontracted company. Changes can occur in the process of construction diverging from the design. Due to the lack of coordination between systems, a post might hit a water pipe and needs to be moved or be positioned in the middle of an access way because the necessary clearance dimensions were not secured. The lack of coordination contributes to a jarring landscape and arguably stabilises conditions of risk. Firstly, it traps already vulnerable inhabitants into cycles of abortive work and investments. Secondly, the resultant landscape increases risk as access ways are obstructed leaving evacuation routes potentially inoperative. For example, one can see in Figure 6.27 how an electricity pole and lamp post become obstacles in the middle of a staircase.

Figure 6.27: Image of electricity and lighting poles in the middle of a staircase making access difficult and contributing to risk.



Photo © R. Lambert (2015)

Once installation is complete, the precise location of poles is not fed back into the EDELNOR digital plan even though there might have been changes made during the construction works. As the engineer explains: "*as long as the quantity of the material does not change there is no need to inform. It is not of interest*" (interview with technicians from SATEP, October 2015). A 'lean' approach to spatial information is taken by each institution which is driven by the logic which resides in each. Only the bare minimum is taken from the context, and as shown with EDELNOR, the focus is on the electrification systems in isolation, and not on how it integrates with other systems or touches the ground.

6.6 Stage 4- Land Titling

6.6.1 Risk estimation within the Metropolitan Municipality of Lima

There are various processes and institutions involved at the titling stage. On the one hand, there is an important step of risk management and mitigation at the municipality district level, as well as the MML level. COFOPRI equally plays a key part in several different processes. The Land Registry Office-SUNARP is also involved at the very final stage to register properties. When entering the titling stage, the *AF* must submit the contingency, signalisation and evacuation plans (Figure 6.28). These plans use the certified settlement plan (from Stage 2) as a base, onto which the various signs for emergency exits, fire extinguishers and safe areas are marked. Again, these plans are devoid of contour lines and do not include any context beyond the perimeter of the settlement. Therefore, the evacuation strategy is designed independently and solely considers the evacuation routes within the boundaries of the settlement.

Figure 6.28: Signalisation plans prepared by the technician of Civil Defence in MSJL.

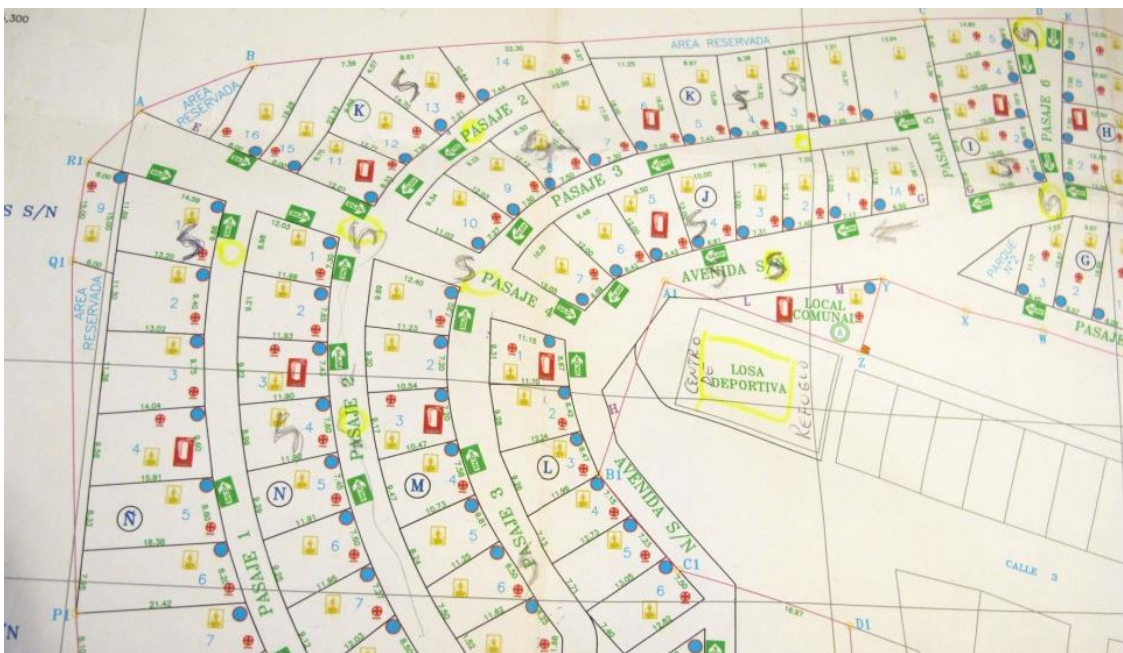


Photo © R. Lambert (2014)

As explained earlier, the settlement usually develops by extending the primary route of the settlement below and drawing out secondary routes from it. A disjointed landscape results because in most cases, secondary routes come to a halt at the boundary, and those of adjacent settlements take a different layout. Moreover, even if secondary routes have been planned by inhabitants to join other routes and there are possible exits through other settlements, they are not considered in the evacuation strategy. Having traced the way decisions are made about the location of evacuation routes and the checks carried out by municipal authorities, it has become evident that the possibilities imagined are confined within the settlement's perimeter. The prevalent logic in the signage, as well as the capacity building workshops, is that all inhabitants should escape through their own secondary routes and join the primary route. The risk officer explains:

"Inhabitants have control over their own settlement but not that of others. Also, they cannot depend on adjacent settlements because the latter might not be as consolidated. So, we have to follow the requirements and plan within each settlement's perimeter because inhabitants will also organise in this way" (Interview with risk estimator, May 2016).

In practice however, this logic can lead to unsafe conditions. For example, the evacuation routes may be dangerous and even impossible to negotiate should an earthquake or mud slide occur. When looking at the plans, because of the lack of contours and the seemingly flat ground, there is no indication of the steepness of the terrain and the existence of obstacles. However, when one examines the reality on the ground, irrational situations come to light. For example, Figures 6.29 and 6.30 show how exit signs are located in unworkable situations under potentially unstable retention walls/rocks or leading to a cliff like condition difficult to negotiate. The plan is convincing and gives coherence to a strategy which is questionable in reality. Besides foreclosing more appropriate solutions that take into consideration a broader scale and an evacuation strategy encompassing more than one settlement at a time, this way of working further instils the disconnect between settlements and exacerbates risk.

At this stage of titling, the risk estimation involves the MML and as noted by various interviewees, it is undertaken more 'coldly' and it is difficult to bribe one's way through. However, there is still room for manoeuvre. The supreme decree N° 028 of 2006 was formulated by the Ministry of Housing enabling the formalisation of settlements that have

pending issues (*Título con Carga*⁴⁹). Therefore, if a settlement has not managed to fully comply to reduce risk, it might still be able to advance to COFOPRI.

Figure 6.29: Evacuation route under potentially unstable retention walls and rocks.



Photo © R. Lambert (2014)

Figure 6.30: Evacuation sign pointing to a non-existent staircase and a cliff-like condition.



Photo © R. Lambert (2014)

⁴⁹ Titles with *cargas* means literally 'title with a burden'. The burden refers to the responsibility of the AF to manage risks in the area of occupation.

An official within MML tells me that normally, if the risk estimation area has made recommendations, COFOPRI sees this as pending issues which need to be addressed before titling; however, the decree overrides this. As one of the advisors in the executive directorship of COFOPRI explains:

"the norms that came out for titling were to benefit as much as possible the majority of population in need. The Ministry of Housing stipulated that titling could still happen with '*Carga*'. So, if the area in question is in a risk zone, the district municipality can still emit a document that confirms that risk will be mitigated by placing stairs and retention walls. So COFOPRI in turn declares that if the district municipality is committed to reducing risk then the area can progress to titling" (interview with COFOPRI official, Nov 2015).

The responsibility for undertaking the necessary work still lies with the *AFs* but the district municipality acts as a kind of guarantor without liabilities. Thousands of settlements, despite having pending issues, have thus been titled. COFOPRI does not have the mechanisms to follow whether settlements undertake the changes necessary to resolve the pending issues, as a COFOPRI official notes:

"If between the Municipality and COFOPRI, we have the obligation to take the necessary actions to make observations, then the mechanism is not complete because nobody follows up to see that the pending issues have been dealt with and we continue formalising settlements with pending issues (interview with director of Cadastre Office in COFOPRI, October 2015).

Creating exceptions and means to bypass the rules helps to propagate the occupation of the slopes. The double face of the State embroiled in controlling and enabling happens at different levels. Although there might be certain rules at the district level, these can be overturned by higher levels of government and in the same way, rules created at the higher levels might be bypassed at the local level. Various actors within government institutions are not necessarily aligned and might contradict one another, concurring with the findings in Chapter 5. As the State is not a homogeneous entity but is made up of parts, the fragmentation and different positionality within institutions at different levels of governance contributes to the urbanisation of the slope. One of the inhabitants of JCM explains this well:

"If the municipality itself is allowing the occupation of areas labelled as 'risk ridden' or 'natural reserves', so the same municipality is accepting and creating invasions and land trafficking. The same municipality and the authorities are authors generating informality and risk. They do not comply with the fundamental laws of the articles in the political, civil and criminal constitution. If in the political constitution it says that the government land must be preserved and the area of risk is intangible, why do they certify settlements? The political constitution

protects the civil code that says invasions are prohibited, but they permit them" (interview with inhabitant of JCM, November 2014).

The production and reproduction of risk can therefore be understood as an externality of this particular governance arrangement.

6.7 Conclusion

Examining the cartographic calculations and coordinations that are undertaken throughout the development stages of the *barriadas* helped answer the main research question of how the urbanisation of the slopes is enabled and sustained. The findings can be divided into four main areas which I elaborate below.

Strategic informality and forced deviations

Chapter 5 and 6 have shown the many moments of 'strategic informality' used by government officials and technicians, concurring with the writings of various scholars who explain how violations, unauthorised outcomes as well as elite capture occur (see for example Sundaresan 2013; Bhan 2016; Roy 2009a). These chapters have also illustrated the diverging discourses of different officials and how these inhabit different identities that do not unequivocally operate in accordance to the rules and procedures established by the State apparatus, thus aligning with current planning scholarship that examines the practices of planners (see for example Flyvbjerg 2001; Watson 2002; Healey 2006). Many existing accounts place the power in the hands of officials who can bend the rules at their own discretion. There are two aspects to consider. Firstly, it is important to highlight that officials do not act alone, and the practices of authorities and regulators needs to be understood in relation to other non-governmental actors. Secondly, the research has revealed that deviations from the rules are not always a matter of choice but can in effect be out of the hands of officials and technicians, and forced upon them as an effect of the socio-technical configuration they are embedded in.

Compliance and deviation are here seen to be co-constituted. The findings have demonstrated that to comply with the regulations, actors must deviate from the rules. For example, the civil engineer needs to manipulate and distort his plan to comply with the municipal requirements. Similarly, the various independent technicians such as the sanitation engineer must resort to 'buying' information illegally from government institutions in order to ensure an outcome which is compliant with the regulations. Strategic informality and forced deviations are equally

entangled in contributing to the urbanisation of unserviceable areas, thereby producing and reproducing risk for inhabitants.

Moreover, the findings also show that officials who use calculative methods are themselves constrained by the calculative apparatus they use. A network of the apparently precise, specific and quantitative emerges out of and is superimposed upon the contentious and the uncertain. Thus, practices and outcomes cannot entirely be controlled.

Although the research has revealed the many moments of bribes, between officials and AF leaders, between officials and land traffickers, between independent technicians working outside the State and those within, there are other important findings that put into question the idea that undesired outcomes are the result of corruption. This chapter has revealed that the regulations themselves and instruments used might contribute to undesired outcomes. For example, the official checks in place to halt expansion and the continuous occupation of land paradoxically contribute to the opposite, accelerating the urbanisation of the slopes.

Paradoxes within rationalities and calculations

This chapter demonstrates the paradox within the rationalities at play, and the contradictions between the desired outcome and resultant outcomes as well as the open nature of calculations. For inhabitants, tenure security and improvements in living conditions on the slopes are dependent on the adoption of a speculative logic that exacerbates their exposure to risk. For the district municipality, although the apparatus of control devised within the regulatory framework seeks to curb speculation, the calculations within the different work processes can paradoxically fuel speculation, accelerating the urbanisation of the slope and enabling land traffickers to operate. Moreover, the research reveals how different government departments undertake work processes that contradict one another, contradict the main discourse of the municipality or even contradict the very objective of that work process. For example, to stop speculation, the perimeter is reduced to reflect a closer relationship with the number of plots. However, the number of plots may not have any habitation to begin with and might not be checked. The 'cancelling out' of the various processes enables speculation which is also facilitated by technicians. The technical process itself contributes to abortive work, the propagation of errors in the spatial information, and the fragmentation of this information that inhibits the possibility of the coordinated planning of the slopes.

The findings demonstrate that every calculation undertaken is but partially closed and therefore never fully controllable. The framing process that enables calculations to take place also leaves many aspects out which escape calculations because reality is unruly and cannot be entirely framed. Goffman (1971) explains the dual nature to the framing process which is here useful. On the one hand actors employ cognitive resources as well as forms of behaviour and strategies which have been informed and structured by previous experience: the actors can agree on the frame within which their interactions will take place and on the courses of action open to them. On the other hand, the framing process does not just depend on this commitment by the actors themselves; it is rooted in the outside world, in various physical and organisational devices. Different actors operate with a desired outcome in mind. But how they operate is also determined by the different conditions they find themselves in which eventually structure the outcome.

Forged alliances and shifting rationalities

The findings suggest that the continuity of a particular development path and spatial outcomes are established through alliances amongst different actors in mutually beneficial relationships. As seen in this chapter, ties are formed between inhabitants and engineers or/and technicians within or outside governmental institutions. In the same way alliances are also forged with non-human actors. For example, the civil engineer or the settlement leader enrol the plan and make themselves stronger in relation to others, gaining legitimacy and precipitating effects.

The research reveals that the alliances formed between actors are more often than not driven by an economic logic where humanitarian and developmental considerations also get entangled. Officials and technicians are enrolled within the *AF* network. They operate through a kind of closeness with inhabitants, supporting their objective to secure a place to live on the slopes and develop. This aspect concurs with Koh's (2006) study examining the incomplete implementation of regulations that occur on an everyday urban level. He argues that there are differential abilities to negotiate existing regulations based on social relations. He uses the concept of mediation space where local officials, responsible for the law's execution, are socially embedded in their locality and are therefore often "compassionate" to members of the community. This opens space for the negotiation of laws and regulations between citizens and State actors. In the context of the *barriadas* on the slopes of Lima, the relationship between settlements and municipal officials, such as the risk estimator, are characterised by long-term interactions which are also dynamic. For example, this chapter demonstrates how the risk estimator might be evaluating the risk mitigation works of a settlement but further

down the line, provides his services to the same settlement to produce the compulsory evacuation plans. The relations of intimacy and familiarity between actors lead to cooperation. This brings into question the seemingly cold abstract logic of a rational bureaucracy and calls for an examination of the approximations and mutually beneficial relations that are established between actors from different spheres because these are essential in sustaining outcomes.

Moreover, there are certain alliances that are sustained in time with negative effects. This is the case for example with the civil engineer who first draws the settlement plan. He makes himself indispensable and binds his relationship to the settlement through the different stages of consolidation. This means that the growth of the settlement follows the logic set at the beginning with little opportunity to do things differently. Thus, certain relationships stabilise a particular trajectory of urban development on the slope that exacerbate risk and foreclose the possibility for a planning approach which considers the entire ravine.

This chapter has shown that different rationalities align; for example, the engineer maximises plots to maximise his earnings, or inhabitants maximise plots to secure future funds. The findings also demonstrate how rationalities shift. In many instances the competitive and economic rationality take over. For example, the AF does not always claim land because of the need to secure a place to live but rather as a pre-emptive strategy to capitalise on virgin land before others do. In this way, what might have been a needs-driven logic turns into one of speculation and thus resemble that of land traffickers.

Invisibility of obligatory point of passage and mediators

Tracing the circulation of the plan and analysing the work processes that occur with the plan and because of the plan, the research has brought actors who are otherwise made invisible into view. It has shown that rather than being neutral, they play an important role as obligatory points of passage and mediators. This applies to everyday instruments such as the computer or the plan itself. The research has captured the performative dimension of settlement plans that structure outcomes and contribute to identity construction which in turn strengthens collective action for the defence and consolidation of the settlement. The plans also coordinate work processes with external actors helping to reinforce the imperfect, expectative rights of the urban poor who settle on government land. Arguably, plans play a role in reducing the vulnerability of inhabitants but at the same time they facilitate the continuous occupation of the slope which increases inhabitants' exposure to risk. The plan, as

with any representation, abstracts the reality on the ground. As Mitchell (1998, 2002) notes, abstraction (the distinction between a 'real' objective world and the representations that it seek to capture) puts in place a new politics of calculation. The shape practices and outcomes take, for example in the official municipal process, are enabled by the absences on the plan: the lack of contour lines, the lack of context, and the authoritative conventional cartographic standards. These all come together to facilitate particular readings and framing of the landscape and support the speculative logic which fuels the continuous occupation of the slopes.

Following the circulation of the plan has also revealed the important but relatively invisible role of technicians, either commissioned by the settlements or part of government institutions (such as the civil engineer, the risk estimator or those who 'do work' with spatial information). These are strong obligatory points of passage and mediators who have the ability to determine the development path of the slopes.

This chapter has highlighted a number of instances where the regulations themselves and the work processes undertaken by technicians, create discrete spaces that can be taken advantage of by land traffickers. The findings demonstrated how the modality of the *AF* can be appropriated by land traffickers. Chapter 7 focuses on large-scale land traffickers as one of the important players on the slopes and seeks to better understand the actors that are enrolled, their practices and how this network overlaps with those explored in Chapter 5 and 6.

Chapter 7 Entering through large-scale land traffickers

7.1 Introduction

Saturday 17 October 2015

I first met Guanilo, the risk estimator from the municipality of San Juan de Lurigancho (MSJL) in his office early in the morning. He explained that he, and a few colleagues from the Civil Defence Department, would be undertaking a capacity building exercise on emergency response. Five of us in total got into the van and drove to Mirador de Las Lomas, a settlement in the East of San Juan de Lurigancho (SJL). Upon our arrival, we were warmly greeted and taken to one of the houses for breakfast. Victoria, who was introduced as the secretary of the AF, gave us soup with noodles and went off to call her neighbours.

As the inhabitants gathered around to listen to Guanilo, I sat with Norma (also from the MSJL) who was approached, for a brief moment, by one of the inhabitants whispering to her that there was a new development further up the slope beyond the perimeter. Norma asked me to walk with her to have a look. We walked up the hill about 200m past the last house into the desert (Figure 7.1). Turning the corner, we came across a large gate (Figure 7.2) with guard dogs that, in seeing us, started to bark. The guard was alerted and came out to greet us. Norma told him we were coming to see how the development was taking shape. He didn't ask many questions and let us through the gate. Guard: "So you are interested in buying, are you?" Norma: "Well we wanted to first see". He led us to one of the wooden huts by the gate, while in the background, a large digger was working, beeping loudly, moving earth and flattening the ground.

The hut was very small, and the plan of the whole development was displayed on one of the walls with a chart of the association next to it. The name on the chart under a box labelled 'Social support and other' was Victoria's, the lady who welcomed us and gave us breakfast from the settlement below, where the training was taking place. The guard openly explained the project and acquisition process. He gave us a flyer which read 'the best place to live' and told us that many who come to buy a plot find out about the area through word of mouth and flyers distributed by various agents. Talking with the help of the plan, he indicated the plots

already bought and those that according to him were good value for money. He showed us his own plot on the plan, which he was paying with his time as a guard and as selling agent. He allowed me to take a picture of the plan (Figure 7.9). As Norma kept asking questions and the guard guided her through the best plots to buy, the man handling the digger, stopped the machinery and approached the hut we were in. He was dressed in combat military wear. He came in, stood close behind our backs and listened to our conversation. He did not talk. His presence was heavy, and he looked quite threatening, unlike any other I had seen in Lima: dark sun glasses, bald, broadly built and with tattoos up both arms. I felt vulnerable. We prepared to leave, and the guard handed us more flyers as well as his telephone number in case we had any more questions.

In the settlement below, the training had finished. As we all stood talking by the main road, the pick-up van that was parked outside the huts in the gated traffickers' area, came down the road, driven by the man in combat wear. There were other people in the car. The man stopped by a kiosk near us and handed out stashes of flyers to the attendant. Quite a bit of commotion formed around his car. He called Victoria who spoke to him through his car window. I thought they were talking about us as they both kept glancing in our direction. At the same time a police car arrived and the two policemen in it signalled for Guanilo to approach and clarify what we were doing in the area. They let us go after Guanilo explained that we were there for a Civil Defence training. As we drive away, I saw through our car's rear-view mirror that the police also left.

In the journey back to the municipality, Guanilo, explained what we had just witnessed. He told us how he knew the full story as he had continuous contact with this settlement since it was first established. He explained that the leaders in Mirador de las Lomas had come to an agreement with land traffickers: for their cooperation, they would be remunerated with plots. Victoria herself was one of the key players as she was the secretary of Mirador de las Lomas as well as a member of the committee of the new development. Norma added that the police was probably called by the man handling the machinery. She noted how law enforcers, such as policemen, are part of the system. They benefit economically for turning a blind eye or actively supporting and diverting any opposition against the land traffickers' activities (fieldwork journal extract).

Figure 7.1: The houses before the gated development in Mirador de las Lomas, SJL.



Photo © R. Lambert (2015)

Figure 7.2: The entrance to the gated development in the desert, SJL.



Photo © R. Lambert (2015)

My encounter with a gated development in the desert on that Saturday morning in October 2015 will form the basis of the analysis in this chapter. As I here enter the interrogation through large-scale land traffickers, what is already apparent from the extract above is that their network connects in specific ways to the other networks examined in Chapter 5 and Chapter 6 and needs further questioning. Through the examination of the cartographic calculations and coordination which can be observed within this network, this chapter seeks to unravel land traffickers as a black boxed entity to better understand the actors that are enrolled, the practices they undertake, and the associations that enable and sustain a form of urbanisation which exacerbates risk for inhabitants.

As explained in Chapter 1, *barriadas* on the peripheral slopes of Lima can form through different modalities. Chapter 6 explained how invasions and expansions are established on government land by the *Agrupaciones Familiares (AFs)*. It examined how *AFs* engage with the dedicated process of *Saneamiento Físico Legal* in order to access entitlements. The chapter demonstrated that in the process of reducing their vulnerability, inhabitants adopt a speculative logic claiming more areas up the slope, as a form of banking, to secure the funds for their future development. The chapter evidenced the paradoxes that are generated between regulations, practices and outcomes and revealed the different rationalities of the actors involved in urbanising the slopes. In doing so, Chapter 6 briefly explained how the practices of *AFs* and their engagement with the regulatory framework are in effect also adopted by land traffickers. The findings have demonstrated that the regulatory framework in place can itself create productive spaces for illegal activities. This, compounded with the deviations of authorities from the rules, supports the activities of land traffickers.

As Chapter 6 has explained how land trafficking works at the scale of settlements established by *AFs* through the staging of a seemingly genuine 'invasion' and the following of the process of *Saneamiento Físico Legal*, this chapter exposes the modality used by large-scale land traffickers to subdivide and capitalise on illegally privatised land. The research undertaken in the district of SJL has revealed a typology with little coverage in the literature consulted for this thesis: the gated 'real estate development' on 'privatised' peasant community land. In this modality, land traffickers supposedly 'buy' large areas of land from the peasant community and act as 'informal' real estate brokers or developers setting up an association "for housing" or "of housing" or a cooperative which account for very large areas of the slopes that are claimed and urbanised at a fast rate (interview with JCM elder, May 2016).

For being on 'private' land these developments must, by law, abide to the municipal process of *Habilitaciones Urbanas* where the conventional urbanism model has to be followed with the completion of infrastructure and installation of services before the inhabitation of structures. This chapter, like Chapter 6, recounts, in a linear manner, the different stages of development. Seeking to better understand the relationship between the regulatory framework, practices and spatial outcomes, I here adopt a slightly different approach from that used in Chapter 6. In the previous chapter, I was able to trace how the settlement plan travelled within the process of *Saneamiento Fisico Legal*, to then reveal the actors, practices and relations that enable the continuous claiming, defending and consolidation of settlements. In the case of land traffickers, it is difficult to follow the plan, and even more so to undertake an ethnographic interrogation of the cartographic calculations that take place in the sites the plan lands in. This is because the plan travels in a less visible way and to areas that are not entirely accessible. Moreover, because the process of *Habilitaciones Urbanas* is only partially followed, to remain at the examination of the municipal process would limit the scope of the analysis. I thus seek to provide a description of the linear process from the claiming of land, the recognition and certification stage by the district municipality, and finally the selling and abandoning of the land. Within these stages, I capture the moments where the spatial information of land traffickers is made visible. In this way, I seek to reveal the actors who engage with this information and in the process are enrolled to support the interests of land traffickers.

The chapter will first offer a historical and current contextualisation of land traffickers and their operations, explaining the unique condition of the study area. It then moves to analyse the cartographic calculations and coordinations undertaken throughout the various development stages of a 'real estate development' on the slopes. Working with the limitation of researching such a hidden topic, the cases chosen to illustrate this chapter do not claim to offer a comprehensive explanation of how all land traffickers operate. They nevertheless contribute by making visible (even though partially) the actors involved and the socio-technical assemblages that support the system.

7.2 The enabling environment for large-scale land traffickers

Although much of the government land in SJL has been exhausted and the remaining land is said to belong to the Jicamarca community⁵⁰ (interview with the head of MSJL, October 2015), there is a unique situation in the research area whereby communal land is divided to form large enclaves of private properties. These are claimed by groups of individuals who operate as powerful mafias and are referred to as 'large-scale land traffickers' by inhabitants, authorities, and the media alike. Notwithstanding that communal land is by definition "*intangible, indivisible and imprescriptible*" (Riofrío and Cabrera, 2010) according to the constitution of 1993, the illegal subdivision of relatively large pieces of raw land on the peripheral slopes is nevertheless happening at a fast pace. The land is allegedly 'bought' from peasant communities and is subdivided into plots and sold, without any infrastructure or services, to the urban poor in search of housing. As peasant community land cannot be subdivided, bought or sold according to the constitution of 1993, it is not always clear how it is converted into private property. There are different and conflicting accounts from the ground. On the one hand interviewees mention that 'developers' falsify documents and property deeds and are in effect land grabbing. Others recount how these pay out or 'bribe' certain leaders from the peasant community.

As seen in Chapter 1, the term 'land trafficking' encompasses a number of practices from those of speculative leaders who expand the *AF* boundaries claiming more land; to those of individual inhabitants who occupy a plot for a period of time to then sell it and move to another plot; to those of middle men who do not live in the area but take possession of a plot to sell; and to the activities of 'mafias' or criminal organisations who operate at a much larger scale. In this context the latter are differentiated from the other modalities by the term 'large-scale land traffickers' or 'land mafias'. The activities of these land mafias are similar to those in other Latin American contexts such as Brazil, Mexico and Colombia where they are referred to as 'pirate urbanisers' or 'pirate subdividers'. Doebele (1977) notes that the notion of 'subdivider' is more appropriate than 'urbaniser', because "*urbaniser is simply too grand a term to use for persons who typically only lay out dirt roads, stake off plots, and install an occasional water spigot*" (Doebele, 1977, p. 536). I here also adopt the term pirate subdividers

⁵⁰ The Jicamarca Community is a peasant community with a legal status whose territory comprises 100,000 hectares and extends from the hills of Lima to the limits with Chosica, Huachipa and Carabayllo (Germinal, 2012).

to differentiate the land mafias from the other modalities of land trafficking which I have mentioned above.

In Lima, pirate subdividers were rife before the 1960s and were responsible for many *barriadas* in the 50s. Even though at the time, municipal legislations prohibited the sale of non-urbanised plots, it nonetheless occurred at a large-scale opening up the possibility for numerous abuses (Riofrio, 1991). In many cases, land which could not be urbanised due to its legal status, was sold. Moreover, plots were also sold with a promise to urbanise which never occurred. While in other Latin American cities such as Bogota, Mexico and Caracas, pirate subdividers continued to act, in Lima and the coastal cities of Peru, this group radically disappeared with the 1961 Law of *Barriadas* № 13517. The Law № 13517 contained a broad definition of what could be considered a marginal neighbourhood (as seen in Chapter 4) and would be eligible for the process of *Saneamiento Físico Legal*. The process included the expropriation of the land in case of private property. Under these conditions, the pirates' source of profit disappeared because they could no longer sell land for housing since people stopped paying for their plots and requested for their settlement to be declared a marginal neighbourhood (Riofrio, 1991). In the 80s however, the pirate subdividers re-emerged providing a modality for much-needed access to land. In a typical sequence, they took over a relatively large piece of raw land which they bulldoze to establish a street pattern, and drive stakes or other markings to indicate the boundaries of specific plots which they then sell (interview with official from Ministry of Housing, May 2015). Often the land claimed is located in a municipal zoning that does not allow residential use. Also, the land might not even be their property but is barren land for which they start a process of adjudication, fully knowing that the result is likely to be negative (Ibid.). Nevertheless, it allows pirates to buy enough time to subdivide, sell and vacate.

Although the phenomenon is relatively well covered in scholarly literature about other Latin American contexts (see for example Gilbert 1981; Gonzalez 2009; Doebele 1977; Cunha 2015), the activities of such subdividers in Peru is less documented. Besides newspaper articles and the media reporting land trafficking cases, a detailed explanation of how they work is hard to find. Operating in a shady world, their claim to land ownership is dubious and subdividers are seen as exploitative and unscrupulous. This modality is condemned. Legal frameworks have been put in place, such as the Law № 30230 whose main objective is to stop the land trafficking mafias that promote invasion and "*take advantage of the needs and the lack of knowledge of the poorest*" (Ministerio de Vivienda, 2014). This is unlike, for example, the

pirate subdividers in Bogota who operate on private land and are not only tolerated, but also supported by the government to provide adequate conditions so that the subsequent urbanisation can follow regulations (Cunha, 2015). The acceptance of pirate subdividers in other contexts, stems from the fact that they provide the poor with land and the means for credit in the form of payments by instalment, and as Carroll (1980) notes, "*for the most part the pirate market successfully and competitively supplies a relatively low-quality good for which there is a high demand at the modest price and for which there is no satisfactory alternative*" (Carroll, 1980, p. 91). It is acknowledged that the urban poor are taken advantage of because the precariousness of their juridical situation as purchasers makes it possible for the land trafficker to sell the same piece of land to more than one buyer, to evict dwellers in case of non-payment, and to engage in abusive contractual practices (Cunha, 2015). Nevertheless, official reaction fluctuates between rigid enforcement and tacit sympathy for a system which in an underground manner satisfies a large and real social need (Carroll, 1980). In Lima, despite the unlawful framing of land traffickers in official discourse and the existence of instruments such as the Law № 30230 to inhibit land trafficking, it is not altogether halted because pirate subdividers serve powerful groups in the city and people within the government sufficiently well to impede any substantial attempt at reform.

Besides the illegality in turning communal land into private property, there is another singular aspect to the study area as it is in a contested zone between two districts, SJL and San Antonio de Huarochiri (SA). Because the boundary line is unresolved, there is a disputed zone which is in effect a no man's land with unclear administrative responsibilities. The lack of control in this grey area further encourages land trafficking operations.

7.2.1 The misappropriation of peasant community land

In SJL district, as well as the adjoining province of Huarochiri, vast areas of land, other than those owned by the State, belong to the peasant community of Jicamarca. Being so close to Lima much of this land is under threat of invasion. Traditionally this land was used for pastoral purposes but from the 70s onwards, the area developed with two distinct characteristics: on the one hand it consists of an extensive mountainous area occupied by shepherds and known as the 'parent community', and on the other, it includes the coastal fringes of Lima occupied by human settlements and known as the 'annexes' of the community (Riofrío and Cabrera, 2010).

Originally, only the parent community existed. However, from 1945 onwards annexes were formed in the community of Jicamarca with the aim of preserving the territorial integrity since the land was under threat of invasion from migrants to the city in search of housing solutions (interview with academic, May 2017). Each of these annexes was led by community leaders from the Jicamarca organisation. To protect the land, the parent community authorised migrant populations to settle in the annexes in return for their commitment to preserve the land from illegal occupation. These migrants, positioned as guardians of the land, integrated into the peasant community. The leaders of the annexes were in charge of recruiting families from specific neighbourhoods in Lima who were given a plot. As these were not originally born within the Jicamarca community, they were known as 'integrated members' of the community (Gutiérrez, 1998). With time, more people joined through personal relations and in assimilating into the community, also received a plot. The size of plots range between 300 to 10,000 sqm (Ibid.), much larger than in other parts of Lima, and are given out with the understanding that these remain communal whereby people have usufruct rights but do not, at any time, individually own the land.

From 1948 to 1980, there was a gradual formation of the annexes which accelerated after the 1980s. More than half of the total number of annexes were established between 1980 and 1990 (interview with academic, May 2017). In this period, a series of critical events affected the territorial and political organisation of the peasant community. The integrated members started to outnumber those of the parent community born in Jicamarca, and as such, sought to gain power and exercise control over the parent community and the annexes (Gutiérrez, 1998). A transferral of power from the parent community to the annexes happened in 1983 when the integrated members were able to participate in the election of the Jicamarca community for the first time. Three years later, during a period of legal and administrative impasse, the integrated members obtained the legal status of the community. The new authorities were officially recognised by the Administration of Communities and from then on, tense relations arose between the parent community and the annexes (Ibid.). As explained by Gutiérrez (1998), the transferral of power to the annexes happened under a confused process and certain organisations or land mafias, estranged from the community, started to emerge within the annexes and form private housing associations.

These housing associations were established in some cases by integrated members who had a conflictive relationship with the communal leaders and opted to break away into their own association (interview with academic, May 2017). In other cases however, the housing

associations were formed by speculative organisations whose objective were to capitalise on the land by selling plots to those in need of housing (Riofrío and Cabrera, 2010). Some claim to be part of the Jicamarca community whilst others declare that they have bought the land from the community and are thus private property owners (interview with elder in JCM, May 2017). Because peasant land is communal⁵¹ and therefore indivisible under the constitution of 1993, it cannot be for urban use (Romero Mallqui in Riofrío & Cabrera, 2010). Nevertheless, urbanisation is facilitated on the slopes through the falsification of ownership documents commonly reported by various news articles (Uceda, 2015) and the demarcation of areas, labelled as private property, on maps and on the ground.

The research in SJL confirms that many of the housing associations that claim to be on private land are indeed on communal land. Several settlement leaders I interviewed, as well as officials within the district municipality, report how pirate subdividers that operate in the border between SJL and Huarochiri position themselves as owners of the land bought from the community, or as members of the Jicamarca community, and thus entitled to the land they demarcate.

News reports give conflicting stories about land mafias being from the peasant community itself (Diario Uno, 2014a) with cases where the peasant community claims to be a victim of land trafficking and denounces the invasion of their land by pirates (Diario Uno, 2014b) or claim to falsification of property titles (Uceda, 2015). In any case, the operations are believed to be in the hands of very few individuals. The leaders of these mafias, often well known to the inhabitants settled on the higher parts of the slopes, are said to be entangled with the leaders of annexes (interview with elder from JCM, October 2014). They are seen as powerful individuals connected with public authorities and acting with the complicity of the police, public ministries and the judicial powers (Andina, 2013). In his article Gutiérrez (1998) notes how the leaders of the annexes have a linguistic baggage that differentiates them from the traditional leader of the parent community. They have more knowledge of the legal vocabulary, and of the judicial process. They know how to manage the simple procedures in public offices through to information from lawyers, police, and judges. The professional occupation of these leaders allows them to easily and efficiently manage various situations and

⁵¹ The livelihood of communal life resides in the conception that everything is for everyone and the land is to be exploited for the benefit of all. Because of the intangibility of such a territory, it cannot be fragmented and individualised.

social spheres; amongst these, public officials, journalists, professors, business people (Gutiérrez, 1998, p. 19).

Their activities are therefore not independently performed but are supported by the coordination of various actors at multiple levels. The slopes at the edge of the city become a major area for capital accumulation and speculative profits because they not only provide land which is now scarce in Lima, but also provide an environment where illegal practices can be concealed. The invisibility necessary is supported by two factors; the remote physical location that is hard to access in the desert, and the lack of control in the grey zone.

7.2.2 The fertile grounds of grey zones

The cases examined in this research are located in Annex 22⁵² in the district of San Antonio (SA). According to the province of Huarochiri, the district of SA was created under a 1945 law and has a clear territorial delimitation. However, the judicial powers and the constitutional tribunal questioned the municipal ordinances which were used in the law of creation of the districts. In 2004, the High Court established that the territorial demarcation undertaken by the provincial municipality of Huarochiri, is the competence of the Congress of the Republic and can only be established by a law from the judicial powers (Gutiérrez, 1998). Google Maps (Figure 7.3) show the boundary of SJL and Annex 22 of SA and when compared with official maps of SJL (Figure 7.4), one notes that much of Annex 22 is incorporated into SJL's jurisdiction.

According to the National Geographic Institute (IGN), in charge of the cartographic demarcation of the boundary on national maps, the resolution of the border between SJL and SA will take time because of the complicated establishment of the guiding principles for the demarcation (interview with IGN official, October 2014). The nebulous cartography of this area has tangible implications as it enables many actors to continue urbanising and capitalising on the slope in the absence of clear rules, administrative responsibilities and control. Whilst this zone is a no man's land awaiting a decision, the illegal practices take an extra-legal status and are facilitated by actors from diverse networks.

⁵² Annex 22 is the zone with most reports of conflicts related to the invasion of peasant community land (Diario Uno, 2014a).

Figure 7.3: Map showing the boundary of SJL shaded in pink and the boundary of annex 22 of SA without shading.



Source: adapted from Google Maps


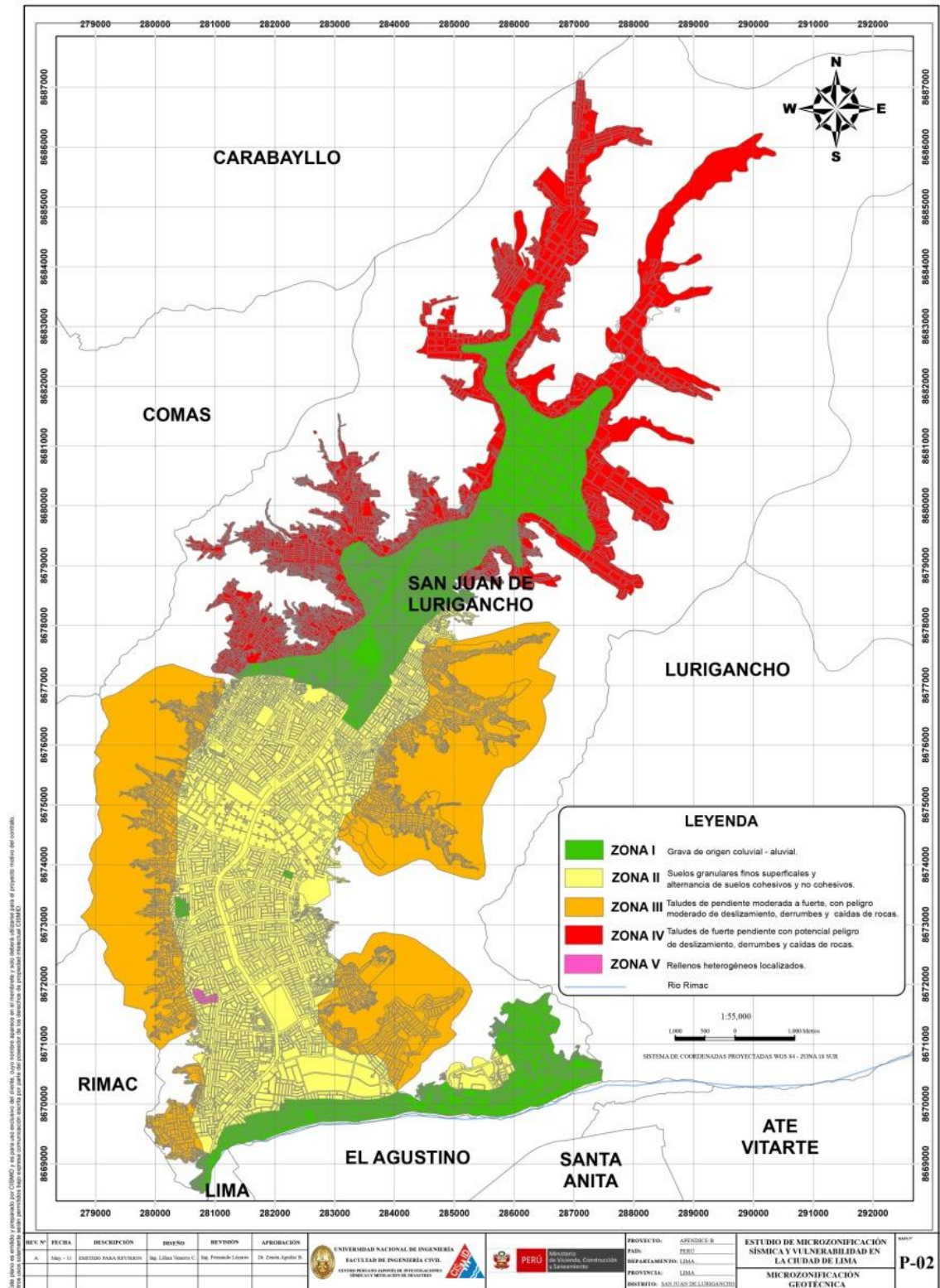
Scale 2km 

Figure 7.4: An official risk map of SJL shows that an area, which SA considers part of its district, is included in SJL's jurisdiction.



Source: Ministry of Housing found online at:
http://eudora.vivienda.gob.pe/OBSERVATORIO/Documentos/EstudiosyAsistencia/Estudios/MicrozonificacionSismicaLima/sjl/APENDICE_B_MICROZONIFICACION_SISMICA_sjl.pdf

Areas with blurred boundaries are fervent spaces for extra-legal activities (interview with head of IGN, October 2015). In contemporary politics, it is not possible to claim an unmapped area and therefore, the district administrations of SJL and SA cannot operate normally within this zone. In the case of the grey zone, several interviewees have highlighted that it is in the benefit of many, within and outside the State to purposefully maintain the cartography unresolved (and even unmapped at the national level). While waiting for the official verdict to fix the borderline, different kinds of documents that lay claim to territory can be used and upheld because they cannot be verified and tied to an authoritative cartographic base.

The effects on the slope are manifold. Firstly, powerful mafias can continue to appropriate virgin land further upslope and urbanise at a fast pace. Secondly uncontrolled developments and disorder are promoted and, as one academic notes, these are more evident in this area than in any other part of Lima; "*not only are the sizes of plots much larger in this area but the uses that are emerging, in what is essentially a desert at the border of the city, are out of the ordinary*" (interview with academic, May 2016). The University of Santo Domingo de Guzmán is such an example with its considerably large walled area of land, irrationally located beyond the extensions of the extensions at the top of the hill. Although the fact that the development is a university might lead one to believe that a different set of actors are at work, interviews with officials from the MSJL have explained how it is still the doing of land traffickers who, with enough time, can launder the development and make it pass as an entirely legal function.

Another astonishing trend in the grey zone, witnessed through this research and captured in the opening of this chapter, is the establishment of gated communities for the urban poor. These are large 'private property' lands fenced off from prying eyes, that develop like *barriadas* through reversed urbanism. These kinds of developments on the slopes are like amorphous giants, evolving as islands in the remote desert areas, supported by the administrative, property and border blurrings.

7.2.3 The enrolment of actors from different networks

Although the journal extract recounts a particular moment in time, the experience has corroborated many of the claims I have repeatedly heard that large-scale land traffickers are powerful because they are well connected. The presence of the police, who appeared moments after our contact with the guard from the gated development, shows how they operate with the backing of authorities. Besides having the links at high level, their social

relations extend to the local context. In the case of Mirador de Las Lomas, the leaders of the adjacent settlements (particularly those whose primary routes were extended) are enrolled in the land traffickers' network and facilitate the staking and development of the land uphill. The *AF* below the gated community provides the necessary support which includes several tasks. As described in the journal extract, some inhabitants of the *AF* act as estate agents, receiving the flyers to advertise the sale of plots. They also act as gate keepers reporting who passes through their settlement and controlling the only road leading to the development. Most importantly one can also see how key people within the settlement also become committee members of the new development, such as Victoria, thus showing how heavily invested they are in the operation.

Arguably therefore, the practices of pirate subdividers are stabilised on the slope precisely because they are able to create and maintain a strong network of allies from different scales and spheres, from the more local context of adjacent settlements to the police and district administration. Their network therefore enrolls parts of other networks that starts to support the very system and activities of land trafficking. The findings demonstrate that this is not only true of the people they mobilise, but also the information they draw in from different parts. For example, in many housing associations I examined which used the modality of *AFs* to come across as an expansion, the plan as well as other documents of adjoining older settlements were acquired for a fee by land traffickers. Documentation before the cut-off date of 31st of December 2004, are more valuable because they allow settlements to enter the process of land titling after consolidation (interview with civil engineer, February 2015). As explained by the civil engineer:

"Although they might have been formed in 2009 or 2010, they can simply come across as an expansion who have possession of the land since 2003 but have not legalised their documents. They therefore use the same stamp, signature, resolution and plan of the lower settlement to get legally recognition"(interview with civil engineer, February 2015).

Using satellite images which go as far back as the date of establishment declared by the settlement, I could corroborate that indeed many settlements did not exist before 2004 yet when speaking to the leaders they claim they were already established by that date.

This loophole that land traffickers have found in appropriating the plan of an established settlement to secure their recognition facilitates their operation. The official documentation of settlements together with inhabitants from neighbouring settlements, as well as officials from different institutions, are brought together and aligned. These form a strong network that

works towards the land traffickers' interest and thus sustains the continuous urbanisation of the slopes.

The following section seeks to examine the cartographic calculations and coordinations used to claim and capitalise on peasant community land by pirate subdividers in this zone to better understand their practices as well as the actors that are mobilised in the process.

7.3 Stage 0- Claiming and securing land

7.3.1 The strategic evaluation of areas to be claimed

In the same way that invasions and expansion are planned prior to the occupation of the land whereby available spatial information is used to identify government land that can be claimed, pirate subdividers go through a similar process.

The first step of pirate subdividers consists in spatially identifying the areas of land that are 'free'. Since no up to date map of the periphery exists, and no comprehensive records are held by the public registry⁵³, they have to resort to other types of information. Similar to *AFs*, they use information held in the district municipalities (*SA* and *SJL*) to identify the available areas between the perimeters of recognised settlements. As several interviewees have noted, such information is not difficult to obtain due to the links they have with the administration. Besides checking the existing perimeters, pirate subdividers also look for areas that are easier to appropriate in unconquered and remote areas (interview with road engineer, May 2017). One of the most important investments made to capitalise on the slopes is the opening of roads which gives a monetary value to remote land. As their central strategy is to identify potentially areas that can be well connected, they mainly embark on calculations regarding access roads (*Ibid.*).

In most cases observed around *JCM*, the area claimed simply adjoins to the primary route of an existing settlement. In other cases, much bigger disconnected areas between ravines are earmarked. Unlike the *AFs* who usually target land adjacent to an established settlement and demarcate an area of similar size to other *AFs*, pirate subdividers plan at a much larger scale. They consider far off routes in the hills that can be connected, thereby making large areas

⁵³ Registration of property is not compulsory in Peru which means that it is not always easy to identify owners of private property.

between ravines amenable for speculation. For this they use Google Maps and Google Earth, as it is the only information readily available that enables them a broad and relatively up to date vision of the territory with a clear understanding of the topography (interview with COFOPRI official, May 2017). Whilst visiting the gated development mentioned in the opening of this chapter, using the plan, the guard of the gated housing association explains:

"One day the road on the other side of the valley will join, and therefore these plots that, at the moment, seem without a way out will be well connected and valuable. So it is better to invest in these because you will have two access routes" (interview with guard of gated development, October 2015).

The grand projects and the scale of operation of land traffickers do not go unnoticed. As exclaimed by a technician at the Metropolitan Institute of Planning (IMP):

"These land traffickers are in effect the planners. They have a vision and an ability to implement projects and integrate the existing roads that we do not have. We at the IMP should be planning the roads but before we can do anything, we see that on the ground the roads are already there and all we are limited to is drawing them on the map. In this institution, our mission is to plan in an integrated manner, but so do the traffickers because they consider a broad territory and can foresee which roads are worth linking up in order to develop the in-between" (interview with technician from IMP, October 2015).

The satellite images from the JCM area, taken at intervals from 2006-2016 (Figures 7.5, 7.6, 7.7 and 7.8) show how the main road is carved from the top of the hill between two ravines. First appearing in 2009 (Figure 7.6) as a disconnected section with dead ends on both sides, the road is later extended to join existing routes within established settlements (Figure 7.7).

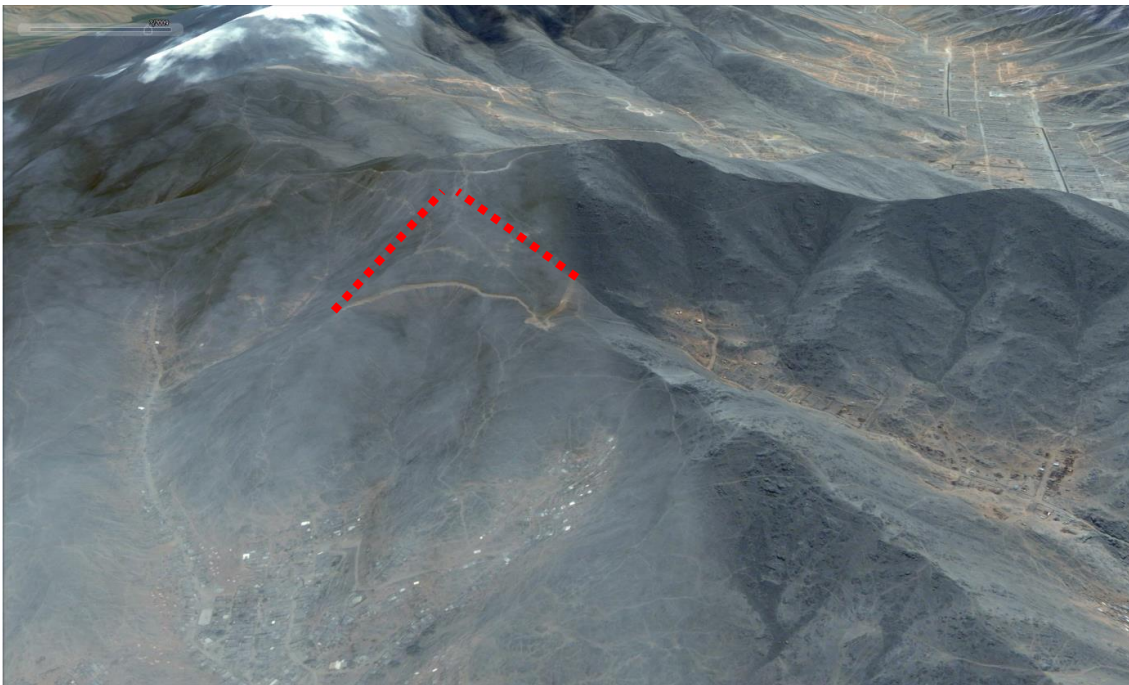
Before the land is claimed, there is a careful calculation of the investments that need to be made particularly in the opening of roads (interview with road engineer, May 2017). Besides strategically planning the new routes using satellite information to facilitate the 'god's eye view', pirate subdividers hire road engineers to design the roads and commission civil engineers to produce a similar plan to that used by *AFs*. The plan is used to delimit the perimeter of the 'private property' and to market the plots within the perimeter. Moreover, the plan facilitates the design and implementation of the projects but is also a compulsory document for the recognition and registration of the perimeter of the private property as part of the process of *Habilitaciones Urbanas* within the district municipality. This constitutes the first stage of the process in much the same way as the recognition of the perimeter of *AFs* explained in Chapter 6. Therefore, the production of a plan is a priority in order to secure the land.

Figure 7.5: March 2006 - Two ravines develop independently and are separated by a steep hill. The arrows show the direction of growth of the settlements.



Source: adapted from Google Earth

Figure 7.6: March 2009 - In 2009 a section of road emerges on the ridge between the two ravines.



Source: adapted from Google Earth

Figure 7.7: May 2013- The two ravines are connected and more winding roads are opened.



Source: adapted from Google Earth

Figure 7.8: January 2016- The roads are widened, and structures start to appear along the roads.



Source: adapted from Google Earth

7.3.2 The production of the real estate development plan

The plan of the 'real estate development' examined in this research is produced in a similar way to those of AFs explained in Chapter 6, using the same techniques and instruments. The plan follows the conventional planners' standards and is imbued with authority transmitted through the technical nature of the various tables, numbers and hard lines. Figure 7.9 provides an example of such a plan belonging to the gated community of Mirador de las Lomas.

Figure 7.9: Plot division plan of Mirador de Las Lomas, a gated community established by pirate subdividers in SJL.



Photo © R. Lambert (2015)

Section lines are labelled for every street which in turn are keyed into generic section types with varying widths. On the side of the plan, a table for each block provides an inventory of plots. All blocks are numbered and so are the plots within each block. The table also shows the area of each plot, and the dimensions of each plot's perimeter. A summary table provides the area of each block and the number of plots within it. Another table shows the area for each use (housing, facilities, green areas, sports field, infrastructure, area for circulation, and the total area).

Besides complying with the cartographic standards expected by the district municipality, these technical plans also serve another important purpose: to convince those who come to buy a plot of the viability and serious nature of the development. It is easy to imagine how those that come to consult the plan before buying are convinced of the legitimacy of the operation. Knowing that many who do so have a low level of schooling, the technical and official looking document also plays a role in persuading them to part with their money. As the guard notes: "*people can see that this is stamped by a qualified engineer, so they can trust it*" (interview with guard of gated development, October 2015).

Although similar to the *AF* plans, they differ in one aspect: the presence of contour lines. This corroborates the fact that the topography is taken as an important determinant. As explained by a road engineer who provides his services to these kinds of developments, the contours are important because pirate subdividers first plan the roads and therefore work with the contours to draw out the easiest routes for the diggers. Thus, the road needs to take the path of least resistance to minimise costs but also the path which is workable for the machinery (interview with road engineer, May 2017). The plots are laid out in a similar manner to those of *AFs* explained in Chapter 6. Plots are maximised between the main access roads, and secondary routes are drawn straight up the slope resulting in steep access.

7.3.3 The circulation of the plan

The plan of the gated development has a limited circulation compared to that of *AFs*'. In the cases visited, and as recounted at the beginning of this chapter, the plan is usually placed in a hut on site where people come to inspect it before buying a plot (Figure 7.10). Word of mouth and flyers are also used to advertise the sales and various individuals act as middle men. Figure 7.11 shows an example of a flyer. The flyer advertises the place as a 'registered private property' conceived as a 'gated community' with 'security, gates and a permanent guard'. It also explains the payment and timeframe. The location of the property is shown with a map highlighting the final train stop, the main avenues and the area as hatched within its perimeter. It specifies wide access roads that are already built and lists the services and facilities (such as electricity, water and sewerage, sports fields, school, market and health centre) in process of execution.

Figure 7.10: The two huts where the selling of plots occurs. The first hut houses the plan and the second is the office where people sign documents and pay for the plot.



Photo © R. Lambert (2015)

Figure 7.11: An example of the flyer that advertises the gated community.

**PROGRAMAS DE VIVIENDA
MIRADOR LOMAS**
SANTA MARIA - S.J.L.

**PROPIEDAD PRIVADA
CON PARTIDA REGISTRAL**
ÚNICO PROGRAMA DE VIVIENDA A SOLO
5 MINUTOS DE LA ESTACIÓN FINAL BAYOVAR
DEL TREN ELÉCTRICO (COMPLEJO)

¡EL MEJOR LUGAR PARA VIVIR!
Promoción y Venta de lotes
de 90 a 200 m², desde S/. 4,000
Directo por el propietario

**CON INSCRIPCIÓN DE S/. 150.00 SEPARA TU LOTE
ENTREGA INMEDIATA CON INICIAL DE S/. 1,800.00
SALDO: PAGADEROS EN 6, 12 MESES
Y AL CONTADO EN 3 PARTES**

**PROYECTOS EN
PROCESO DE EJECUCIÓN**
- Electrificación.
- Agua y Desagüe.
- Lozas Deportivas.
- Colegio.
- Mercado.
- Centro de Salud

**Amplias Vías
de Acceso
Construido**

**Seguridad.
Pórtico de ingreso
con vigilancia permanente.**

UBICACIÓN:
MIRADOR LOMAS
SANTA MARIA

PARADERO FINAL TREN ELÉCTRICO
COMPLEJO
AV. WESSE
AV. HEROES DE CENEPA

**Nadie vende terreno mas barato que nosotros.
NO DEJES PASAR ESTA GRAN OPORTUNIDAD**

OFICINA DE INFORMES Y VENTAS EN EL MISMO TERRENO MZ. K LOTE 1
Tomar de Complejo Combi color verde Letra CE y Mototaxi - bajar en Lomas del 7 La Canchita
Horario de atención: 08:00 am. A 05:00 pm. Telf.: **946272590**

Photo © R. Lambert (2015)

Although this flyer might travel far and wide attracting people to the area, it essentially encapsulates an important aspect of land traffickers' spatial information: it is visible more often than not only in fragments. Pirate subdividers function like black holes drawing spatial information from various sources to operate. Yet they allow little to travel out. Therefore, as explained in the introduction, the methodology had to take this into consideration and focus

on the sites where fragments of the information are made visible to understand the actors that engage with them and their practices. Although plans of 'real estate developments' do not visibly travel as much as the *AF* plans, they - albeit temporarily - make it into the district municipality digital files as explained in the section below.

7.4 Stage 1- Recognition from the district municipality

Land traffickers engage with the planning regulations and standards evidenced by their plan which is compliant with cartographic conventions and urban planning norms and directly informs the spatial layout of the development. Moreover, the plan is stamped and signed by a registered civil engineer following the regulations. Acknowledging that there is an engagement with the regulatory framework, it is important to understand how far this is the case.

Officially, the municipal process that pertains to private property is through the district's municipal Department of Private Works and Urban Habilitation. As the assistant director of the department explains, private property must follow the conventional urbanism model, where the typical processes of urbanisation such as parcelling, building and occupation are in a linear progression, and occupation only takes place when the housing structure and public realm are complete. The dedicated municipal path is therefore very different from that which applies to invasions on government land. The private property owner needs to first submit the proposed plans to the municipality who checks, before and during construction, that the norms and building regulations are followed (interview with official from MSJL, May 2016). In areas demarcated as high-risk, they also need to comply with risk mitigation works and obtain a certificate from the Department of Civil Defence within the district municipality before they can install services. Although these rules apply to private property, private subdividers partially engage with the process of *Habilitaciones Urbanas* in order to get recognition and registration of their perimeter to be able to fend off others who might claim land within their perimeter.

Although not all private properties have an official record held by the district municipality in Private Works, their perimeter is entered into the file when they register with a chosen jurisdiction. It is unclear how this happens as ownership documents are known to be falsified. Nevertheless, the digital file in the municipality contains the perimeters of *AFs* as well as those of 'private property' under such labels as cooperatives, housing associations and associations for housing. Because they are disguised under the modalities for accessing land that are

permitted by law such as housing cooperatives⁵⁴, their fraudulent nature is difficult to detect (Riofrio, 1991) and they are allowed to register. In this way they are upheld and tacitly protected by the municipality since successive settlements are rejected if their perimeter overlaps.

In the contested grey zone that belongs to both districts, recognition can be sought from either municipality. In most cases, *AFs* prefer to be recognised by MSJL because as one leader noted:

"there is nothing in San Antonio. At least in San Juan de Lurigancho, we belong to Lima province and we pay for our services to Lima. If we keep paying taxes, we will eventually see the results. The other side is underdeveloped, and it will take long before it sees any progress... so we would rather have our plan certified here [SJL]" (interview with inhabitant of JCM, May 2017).

Driving through from SA to SJL reveals the stark contrast between the two districts (Figure 7.12 and 7.13).

Although most housing associations decide to register under SJL and their perimeter makes it onto the MSJL digital file, I have encountered a case in the higher parts of JCM, which has opened up another level of complexity with regards to the cartographic calculations that take place.

The housing association in question, called Bio Vivienda, has its plan stamped by the district municipality of SA. It is located right at the edge between recently established *AFs* and the desert. The inhabitants of Bio Vivienda explained that the settlement was started as a private property by a land trafficker who registered the land with SA and made the subdivision of the plots. When inhabitants bought plots in the housing association, he promised them water, electricity as well as their individual land titles. He intermittently collected money from them with the excuse that it was to pay for various transactions to get services. Once the plots had been sold, he abandoned them without delivering the promised services (interview with inhabitants of Bio Vivienda, May 2017). At the time of my visit, with the vacuum left by the leaders' departure, they were recently organising having appointed leaders, and figuring out the process for obtaining services.

⁵⁴ A housing cooperative is an autonomous association of people that have come together in a voluntary fashion to satisfy their necessity and aspirations for housing. These associations have a legal status and their functioning is based on the democratic participation of its members and the equal sharing of the output of their activities.

Figure 7.12: Photo taken near the SA district municipality.



Photo © R. Lambert (2017)

Figure 7.13: The view of SJL from a vantage point showing the level of consolidation compared to SA in Figure 7.12.



Photo © R. Lambert (2017)

I was able to corroborate the fact that Bio Vivienda's perimeter is not on the digital file of MSJL but is indeed present in the SA's municipality file. During an interview with the chief of works of the municipality of SA, I asked him to show me their digital file. Curiously, the latter only contained spatial information up to a hard limit with SJL, which he says was drawn following the 1945 law of creation. Beyond the boundary line with SJL, no spatial information of SJL prefigures and the file is left completely blank. In contrast, the information that SJL holds includes a larger area past the limit drawn by SA. Moreover, in the grey zone where the two districts overlap, the SA file shows very few perimeters compared to SJL. Looking more closely, the Bio Vivienda perimeter was clearly delimited in the SA file but it was floating on its own with no adjacent settlements. When I tell the officer that their file seems incomplete because the property is in reality surrounded by other settlements that are present in the SJL file, he tells me that according to their records, the area around Bio Vivienda is free and can still be claimed. As I insist that the AutoCAD file wrongly shows the area as barren land, he explains that even if the area is occupied by settlements, and SJL's information reflects the reality on the ground, SA cannot enter SJL's information. As he explains:

"If we enter their [SJL's] information it is like we are accepting it and endorsing it as true and we would be going against the law. San Juan de Lurigancho's spatial information shows part of SA because it is unlawfully claiming it. According to the law we were formed in January 1945. We in San Antonio have the law of creation, San Juan de Lurigancho does not. They have a decree from the Mayor. So who has more right judicially speaking? It is us of course" (interview with official from SA, May 2017).

The purposeful omission of information, which is not in itself difficult to acquire, is a means to withhold validation of areas belonging to SJL. Notwithstanding that the information in question is considered official in both districts, because it is held by government institutions, it is not coordinated and integrated into one single file. This shows how discordant information can keep propagating even though it is under the bigger umbrella of governmental data.

Whilst the conflict over the border remains unresolved, the municipality of SA relies solely on the information passed on by the settlements and housing associations that decide to belong to the district. The choice of which jurisdiction to belong to is evaluated in relation to convenience. There are cases where settlements have a double certification, one from each district. The Chief of Works tells me: "*people take advantage of the chaos they themselves generate and within this they can facilitate their illegal activities*" (interview with official from SA, May 2017). The incompleteness of spatial information and the proliferation of inconsistencies in the cartography supports the reproduction of the illegal conditions which

expands the action space for pirate subdividers. To support their operation, different sets of information can be used and are upheld precisely because they cannot fully be validated or rejected.

I have come across conflicts generated when pirate subdividers claim land within an already recognised settlement in SJL. They use plans which have been stamped by the SA municipality to support their claims. In these cases there are usually three scenarios: a) the inhabitants of the settlement manage to mobilise and drive away encroachment on their land; b) the pirate subdividers are seen to be such powerful individuals in the area that AFs concede some land within their perimeters; c) both parties come to an agreement whereby plots within the perimeter of the settlement are sold by the pirates, but buyers pay a fee to the settlement and join their *AF*.

Although such conflicts are resolved on the ground, a competitive situation is fostered between districts because it is in the interest of each to facilitate the incorporation of new *AFs* or housing associations within their jurisdiction. In this way they not only secure future taxes but they can also influence the amount of territory that is won over the other district when the time comes to finally delimit the boundary. Because the demarcation of the line between SA and SJL will be decided by asking inhabitants of each settlement who they want to belong to (interview with official from IGN, May 2017), the cartographic scramble for registering settlements under one's jurisdiction and facilitating the various processes, is but one strategy to gain territory over 'the opponent'. After hearing from me that Bio Vivienda is part of SA, the head of Cadastre Office of SJL tells me that he will make sure to contact the leaders and facilitate their incorporation into SJL.

Although, in theory, the process for certification of plans to acquire basic services is the same in both districts, in practice, the lack of resources in SA, relative to SJL, means that cutting corners in the formal process is a common occurrence. SJL has a stronger ability to attract settlements. It also has more resources and capacities to process the settlement files. In comparison, the municipality of SA does not even have a cadastre area or a risk estimation area. The officer I interviewed tells me they are 3 people in total (the manager, the head of works and a technician who goes to field visits), in contrast to the 60 people in the Department of Urban Development in SJL. After discussing the certification process in detail with both municipalities, it is evident that there are more steps as well as more people involved in SJL which increases the possibility of settlement files being stopped or delayed. In SA on the other hand, there are fewer checks and onerous steps involved because of the lack of personnel.

Therefore, the choice of which jurisdiction to belong to is influenced by assessing the ease and speed of the recognition and certification process. For pirate subdividers this assessment is factored in as it forms the basis for capitalising on raw land. The Head of Works from SA explains how people have their plan certified for basic services; however, these plans are then used for a different purpose:

"They take advantage of people. In order to sell them a plot, they tell them it has already been certified. And people see the plan and believe that they are buying a plot which becomes their property. They realise later that they are only buying a 'possession', nothing else. In this way the traffickers take advantage of people's ignorance but also of the assistance we give them here in the municipality" (interview with official from SA, May 2017).

The competition between districts within this grey zone plays a role in propagating the speculation on the slopes. The certification of plans in a relatively short period of time, which is facilitated by the lack of resources and capacity of the SA district municipality to follow the rules of the formal process, supports the operations of pirate subdividers and speeds up the occupation of the slopes.

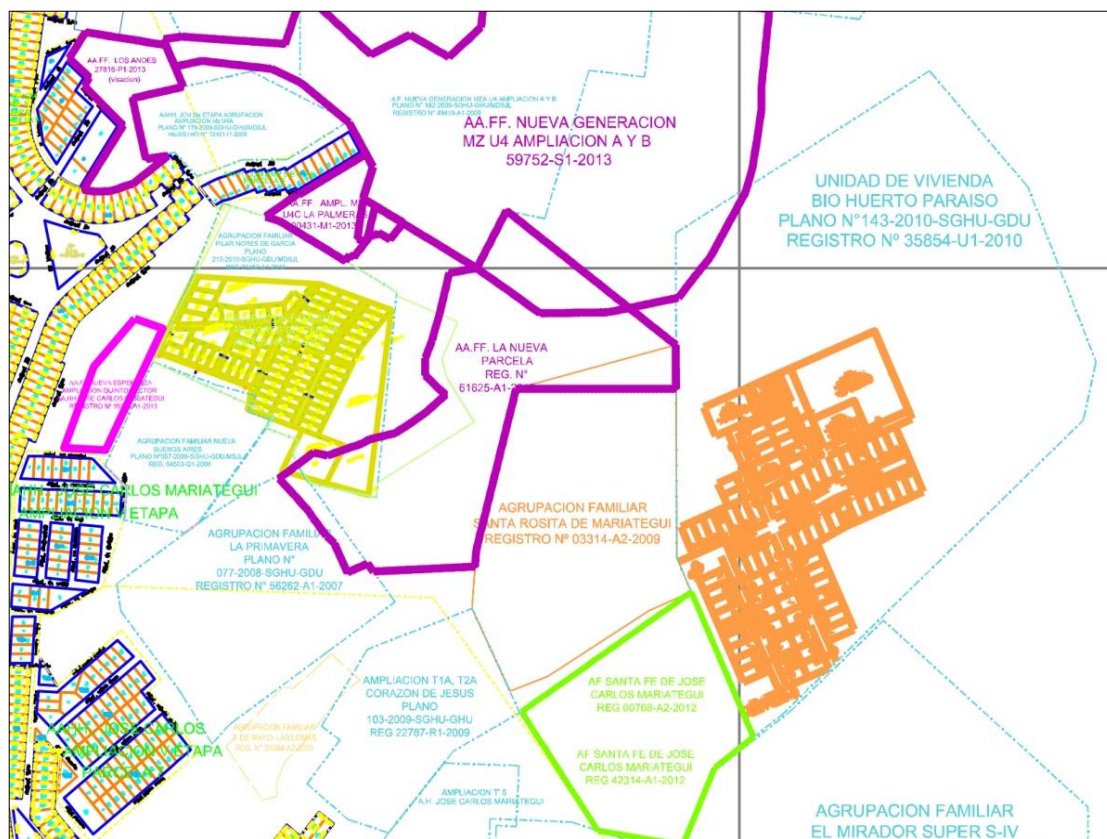
7.4.1 Temporary visibility

During the research, I have come across a kind of temporary visibility in the official sphere with regards to the plan of a housing association set up as a gated community in the East of SJL. During an interview with the head of Urban Development of MSJL, he opened the AutoCAD file which has all the perimeters. As we conversed, I asked him to zoom into the area I was studying. I saw that one of the sectors known by inhabitants to have large-scale land traffickers was drawn on the digital file to the level of showing the division of plots. Unlike all other perimeters around it, it captured the roads, plots and recreation areas (Figure 7.14 shows the area in question drawn in orange). Surprised that this should be so, as only perimeters of AFs on the higher slopes usually makes in onto the municipal file, I asked him to explain. He tells me that the file was given to them and does not want to elaborate further.

A week later, whilst interviewing the head of the Cadastre Office, I ask him to zoom into that same area, but the plots have disappeared and when I mention that the previous week there was something there, he tells me he does not know what I am talking about. This episode illustrates that information does indeed enter the municipality, even if the settlement is framed as 'illegal', but it does not sediment onto the files. Its visibility, although temporary, shows that various officials within the municipality are involved in supporting and facilitating

the activities of pirates. This kind of brief exchange between the illegal activities and the regulatory framework in place demonstrates that no matter how remote the areas targeted on the slopes, the district municipality has knowledge of their spatial location and can control/support them at a distance through the plan. Even though the information is readily erased from public view, the claims made with the plan are nevertheless upheld because, as an informant tells me, their perimeter is inserted as place-keepers so that municipal officials can, from their desk, deter others' from taking possession of the same area.

Figure 7.14: A snapshot of the digital AutoCAD file showing the subdivisions of plots (in orange) for the housing association Bio Huerto Paraiso *.



* Apart from the plots of titled areas, the file shows the various empty polygons of recognised AFs in stark different to the plot plan of Bio Huerto Paraiso.

Source: Municipality of San Juan de Lurigancho

7.4.2 Graphic Sedimentation

Whilst the perimeter becomes fixed on the digital files held within the municipality, and at times the entire project also appears temporarily, it was important to try and capture where

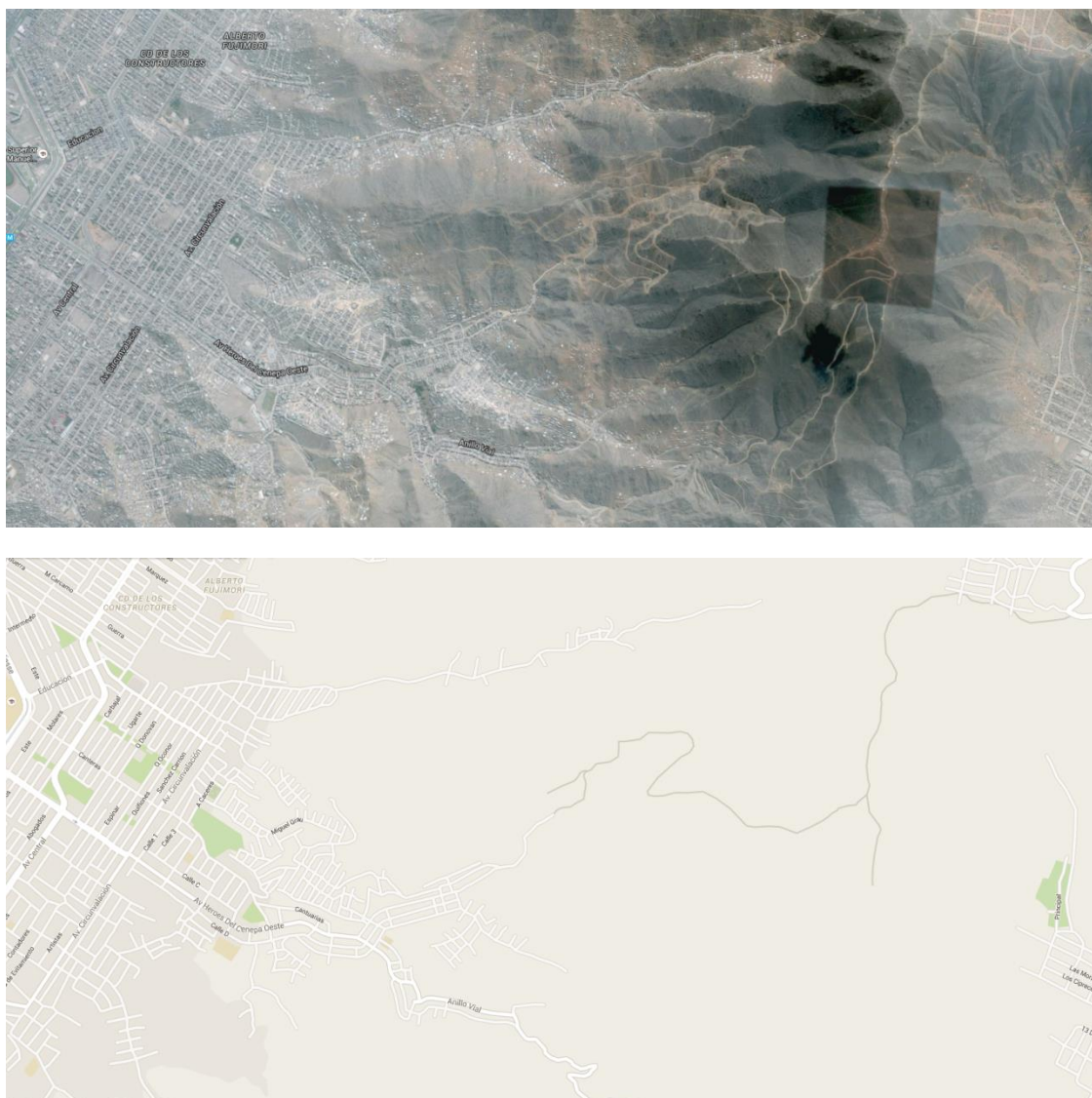
else land traffickers' spatial information appears and also when it starts to appear. As explained earlier, one of the most important works is the opening of roads in desert land. The MSJL has a Department of Transport; it is however separate from the Department of Urban Development and is mainly concerned with the licensing of transport operators. It does not engage in the planning of roads and surprisingly, does not have a map of roads in the offices. As for the Department of Urban Development, although it issues the certification for roads, it does not keep a record of them, limiting the spatial information on its digital files to the various perimeters as seen in Chapter 6. Moreover, for private properties, the formal process is through the Department of Private Works and Urban Habilitation. However, documents are not officially lodged as there is no intention to fully comply with the regulations. Therefore, the municipality has no official record of the roads that are being planned or effectively opened up on the slopes.

At a higher level, the Ministry of Transport and IMP should in theory prefigure the roads. However, as explained by an official from the Ministry of Transport, if the roads are unauthorised, they do not appear on any official map. When public transport starts operating on that route, the Provincial Municipality of Lima may consider that road within the plan of metropolitan roads as long as it has been asphalted. Therefore, much time can pass before it is represented on any map. As for IMP, the roads are eventually drawn on their maps even though they are not projected by the IMP itself. However as noted by the IMP officer, 'cartographic attention' and updates to the area would most likely only be undertaken if there was a project planned which would require up to date information. As seen in Chapter 4, the settlements on the periphery considered illegal occupations of risk zones are excluded from public investment priorities, thus also foreclosing the possibility of having up to date official cartographic representations of these areas.

As for the IMP, although it does not have the mandate to implement projects, it needs to capture them in its cartography. The IMP technician explains that it takes time for his department to draw these new roads on its maps even though these might be noticeable on satellite images (interview with technician from IMP, October 2015). The research suggests that new roads opened by land traffickers are excluded from maps that circulate in the official sphere or take a long time to be included. However, these roads are fully visible even though still incomplete on Google Maps. For Mirador de Las Lomas in SJL, the new road is not only prominent in Google satellite view but also on Google street view. The latter usually abstracts the context to the extent of hiding dirt roads, but it shows what is essentially still a dirt road in dark grey (Figure 7.15). There is thus a leapfrogging of technology which enables a visibility at

a scale beyond the local, yet no actions are taken at the district or metropolitan municipality level with such information.

Figure 7.15: Google satellite view and Google street view of Mirador de Las Lomas*.



* The satellite view shows an area visited during the research where large roads are being opened. The street view of the same area clearly shows in light grey the connecting road that has been traced over the ridge from Mirador de las Lomas, to the district of SA.

Source: Google Maps.

7.5 Stage 2- The selling and abandoning of the area claimed

Unstoppable because of the alliances they have forged and the scale and speed at which they operate, land traffickers continue to urbanise the slopes. Unlike the *AFs*' situation where much effort is placed on their consolidation and the acquisition of services, the pirate subdividers

solely concentrate on the basic structure of main roads and the tracing of the plan on the ground to delimit each of the plots with chalk markings.

The process of buying into the gated community is as follows. Interested people visit the office located on the site and consult the plan. The plots that are already taken are highlighted in yellow on the plan whilst those that are still free are left blank. Once buyers have identified a plot they want to buy, they pay S.150 (USD 45) as a 'separation' fee to reserve it. With this, the subdivider will hold the plot in the name of the prospective buyer. After a full calendar month, they need to pay 30% of the total. If further steps are not taken within a specified time, the separation lapses and the deposit is retained by the subdivider. The total price varies depending on the size of the plot and is approximately S.6000 (USD 1800) for a 90sqm plot (interview with guard of gated development, October 2015). Once the 30% has been paid, a buyer can take possession of the plot and is given a certificate by the 'owner'.

The flattening of the plots and the risk mitigation works is left to the buyers. The digger, used on site to open the main roads, can be hired for S.250/hour (USD 75) to flatten the plots. Because the communal areas are supposedly the responsibility of the pirate subdivider, they receive little attention until the inhabitants take it upon themselves to ameliorate them. As the development is most often than not on unsuitable land in remote locations, difficult to provide with services, the inhabitants are exposed to greater risks and have to incur larger investments in time and money to make the area habitable. Moreover, the sheer scale and speed of the road constructions, compared to conventional invasions on government land, affects the integrity of the entire ravine. As explained by the officer from Civil Defence of MSJL, there are no structural considerations when opening the large roads on the slope and retention walls are not built. Although road engineers are hired, their role is to find the path of least resistance when opening the roads so that investments can be kept to a minimum. The pirate subdividers work within a specific time frame: the slope has to maintain its stability for just enough time to allow them to sell all the plots. Considering the areas are topographically challenging (Figure 7.16), this mode of working destabilises the integrity of the slope placing not only the inhabitants of the housing association in danger but all settlements further down the slope.

The inhabitants living down the slope are not always aware of the large-scale works until these have considerably advanced. Often, it is only once the road makes its way down to connect to other primary roads, or the risk is immediately experienced by the inhabitants, that the latter realise what is going on. As expressed by one of the inhabitants in this area:

"We are so focused on our own settlement that we are hardly aware of what happens behind us. The traffickers are advancing, and we only realise when a rock is dislodged and falls towards us. By that time, they will have taken much of the hill above us and it is too late to stop them as they will also have sold plots to innocent people" (interview with inhabitant of JCM, February 2013).

Figure 7.16: Image showing how the main roads are cut into the steep slope and left without retention walls.



Photo © R. Lambert (2016)

Once plots have been sold, the pirate subdividers vacate the property without fulfilling the promises of a fully serviced development used to expedite the sales. In these cases, vulnerable inhabitants are left in a worse-off position than they would have been if buying into an *AF*. Firstly, the price of their plot is calculated at a higher rate than in an *AF* because it supposedly includes services. Secondly, unlike the typical invasions where the community organisation forms the basis of all collective works, in these cases, the buyers have acted in an individual manner up to the point that pirates abandon the development. They therefore find

themselves lost, not able to navigate the complexity of the formal processes to acquire services and not having the support of an established collective. Thirdly, because they are considered 'private properties', they find themselves trapped in a long process to consolidation. Since they are not on government land, they theoretically cannot follow the municipal process of *Saneamiento Físico Legal* for service acquisition. Moreover, they do not have the resources to follow the process of conventional urbanism that is demanded of private property. The head of MSJL explains how they have had to take a stance towards these situations because they were too many to ignore:

"We have accepted to support them because we cannot leave them like this. They are poor, they have been cheated and are now in a dead end if they remain as a private property because they cannot access services. So we allow them to do as a normal invasion would, and follow the same process of certification of plans for basic services" (interview with head of MSJL, May 2017).

For this to happen, the inhabitants of the private property have to organise like a conventional invasion and ask for the land to be expropriated and reverted to the State following the 1999 law of general expropriation. In the case of peasant community property, the norm declares that the communal land is imprescriptible except in cases of abandonment where it can pass to the State (Webb, Beuermann and Revilla, 2006, p. 25). In this way, expropriation became a means to formalise 'informal' possessions on communal land and private property land (Webb, Beuermann and Revilla, 2006, p. 27) but also a way of patching up and making good after land traffickers have abandoned.

Driven by the logic of speculation, housing associations on private property soon start to revert to the modus operandi of an invasion to gain the support of the government and secure their development. Although during the life as a private property, the government was involved in a hidden manner, it can now emerge and function through its official processes. At this moment, the plan, which was up to this point displayed in a far-off hut on site, starts travelling in the same way as described in Chapter 6 through the process of *Saneamiento Físico Legal*.

7.6 Conclusion

This chapter explored the cartographic calculations and coordination undertaken within the actor-network that supports the interests of pirate subdividers- one of the major players on the peripheral slopes of Lima that appropriate or illegally buy peasant community land to sell it to the urban poor. The research has revealed how the activities of large-scale land traffickers

are often hidden from view because they not only occur in remote desert areas, but any cartographic references are erased from public view. Although these actors are often framed as exploitative, illegal, and working peripherally outside the formal system, the findings show, through the tracing of the circulation of spatial information, that they have strong links with government institutions. Despite the many media accounts presenting authorities as unresponsive in halting land trafficking, the covert manipulation of spatial information revealed in this chapter proves otherwise; for example, the perimeters of land traffickers' developments are sedimented on the digital files even though these have not fully been certified. Authorities are therefore heavily implicated and are not blind to the locations and types of developments that arise on the slopes. They benefit economically from supporting the system and use the maps and plans to monitor and control activities. They take an active stance, effacing or hiding spatial information thus creating **cartographic blind spots** that productively sustain the illegal operations.

Moreover, the findings demonstrate how the competing rationalities of district municipalities perpetuate a discordant cartography that is fertile ground for land trafficking. Furthermore, the competition between districts fuels the urbanisation of the slopes as each district seeks to gain territory over the other by approving plans within its jurisdiction. The certification of plans thus supports the scramble for territory, and with it, urbanisation in risk. Thus, the resultant cartographic chaos does not mean that any activities on it freezes; regimes of urban governance can still operate through these systems but do so enabling illegality and violations to be part and parcel of practices.

The findings in this chapter suggest that the unmapping of the grey zone (in official maps at the national level) or the cartographic chaos at the level of districts, are in effect the result of competition within a conflicted State. This provides a counterpoint to how Roy (2009b) positions the unmapping of areas in the case of Calcutta. She argues that the State operates in a deliberate manner purposefully leaving the peri-urban areas unmapped because it allows it considerable *"territorial flexibility to alter land use, deploy eminent domain, and to acquire land"* (Roy, 2009b, p. 81). Although the findings concur with Roy, because some officials within the administration do benefit from the unmapping which gives space for corruption and the pursuit of other goals, they also highlight that the State is not operating with coherence and power. The unmapped area within the grey zone of SJL and SA is the manifestation of the fragmented rationalities that inhabit the State.

The research demonstrates how important the maps/plans become as a technology which are initially devised to work within the regulatory framework but are taken up within the land traffickers' network to further interests. Authorities and even inhabitants from adjacent *AFs* are also enrolled in the same network and take on the role of intermediaries and mediators for pirate subdividers. Thus, the practices that support land trafficking are those of actors (human and non-human) that are drawn in from diverse networks. Therefore, land trafficking is stabilised through the formation and maintenance of a strong network of allies configured as socio-technical assemblages from different spheres and scales.

The findings demonstrate that *barriadas* that come about through pirate subdivisions increment risk for inhabitants. Large-scale land traffickers take advantage of the genuine need of the urban poor to capitalise on the slopes operating with speed and at a grand scale. This exacerbates hazardous conditions for dwellers and threatens the stability of the ravine as a whole. The serious costs of this form of urbanisation and the intractable problems of the urbanisation process are passed onto inhabitants who are in effect worse off than they would be settling on government land within *AFs*.

The research demonstrates that the regularisation system is as heavily implicated in creating the conditions for illegality as it is in resolving them. This concurs with Lombard & Huxley (2011) who argue that regularisation has protected the illegal land market, and has had the apparently contradictory effect of promoting illegality at the same time as removing it. In the case of pirate subdivisions in Lima, once operations wrap up, the land can revert back to the government and thus processes of regularisation can begin. With this knowledge therefore, there is always the possibility of 'looping into' the municipal process devised for invasions on government land which allows inhabitants to climb the ladder of entitlements. Different modalities converge. The rationality of land traffickers is taken over by that of *AFs* and thus the actor-network shifts and changes. This mobility potentialises the continuous urbanisation of the slopes and makes it durable.

Chapter 8 Conclusion

This dissertation started with a vignette describing the difficulty I experienced climbing the steep hills in the periphery of Lima, where I witnessed the fervent competition for land and the dramatic sights of houses and empty grids waiting to be occupied in the most difficult of terrains, stretching as far as the eye could see. My research interest was guided by what seemed to me a perverse outcome: despite being declared uninhabitable by the State, the steep peripheral slopes of Lima are being urbanised at an unprecedented rate, in a manner that exposes an increasing number of low-income settlers to hazardous living conditions and with significant State involvement. With no other alternatives for housing, inhabitants invest a high proportion of their time, labour and money to make these areas habitable and mitigate the risk that this form of urbanisation produces. Faced with this realisation, three main paradoxes informed the focus of this research. Firstly, despite peripheral urbanisation being framed as emerging through illegal and informal processes, the State has historically been involved in its formation. Secondly, dedicated planning procedures have been developed by the State to enable settlers in areas zoned as high-risk to climb the ladder of entitlements, from recognition, the acquisition of water and electricity and eventually land titles. Thirdly, although from the onset of the settlements' establishment and throughout subsequent development stages, there is a close engagement with planning standards, regulations, professionals and instruments, risk is continuously produced across space and over time.

In the face of these paradoxes, my aim was to better understand the interactions between regulatory frameworks (that is the administrative procedures, planning standards and regulations) and the practices of diverse actors that operate on the peripheral slopes, to find an explanation for how and why this form of urbanisation is enabled and sustained. The main research question posed was: **How do various actors and their practices interact with the regulatory frameworks within the planning system to enable and sustain a mode of urbanisation that exposes an increasing number of inhabitants to hazardous conditions on the peripheral slopes of Lima?**

The thesis makes contributions to existing planning and informality debates by better understanding the relationship between planning and 'informal' urbanisation and developing a new conceptualisation of planning and peripheral urbanisation. It also informs future research agendas and provides a methodological approach through cartography for interrogating urban processes and planning in different contexts and at different scales. It is thus expected to be

of value to urban theorists. Moreover, the approach used is also relevant for planning practitioners and policy makers because it provides distinct and policy-relevant contributions by: (a) understanding the relationship between regulatory frameworks, practices and outcomes and how these can give rise to paradoxes that go against intended objectives; (b) developing a means to observe the micro-politics in planning; (c) raising awareness of the importance of non-human actors in structuring practices and outcomes; (d) providing entry points to disrupt the production of hazardous living conditions and devise paths towards a better quality of life and environment.

The sections below summarise the conceptual framing and research method. This is followed by the research findings and contributions, as well as the implication for future research. Finally, the thesis ends with a discussion of the scope for change of this pervasive form of urbanisation and the implications for planning practice.

8.1 Key original findings

Moving away from the informality lens often used to look at peripheral urbanisation, I developed an analytical and methodological approach in response to the specific conditions of *barriadas* on steep slopes of Lima that result from the practices of networked actors and their engagement with regulatory frameworks.

Drawing from actor-network theory and institutional ethnography, the conceptual and methodological decisions I took in this thesis are closely interrelated. Acknowledging that the *barriada* comes about through dynamic relations and includes different stages in a progressive process, a longitudinal lens was adopted to bring to light the various processes, actors and practices that come to play a role at different moments in time. Moreover, as the outcome is shaped through complex and diverse networks, the methods used were devised to identify and disaggregate the heterogeneous actors that make up these networks and observe the way they interrelate. Furthermore, non-human actors, often overlooked in planning theory, were also included in the analysis as these play a structuring role in materially mediated practices. Finally, acknowledging that peripheral urbanisation occurs through a transversal logic that works across the notional divides often maintained in discourse and academic scholarship between the legal/illegal, formal/informal, state/non-state, planned/unplanned, the methodology was devised to cut across these categories and offer a transversal reading to better understand the emergence and consolidation of *barriadas* as well as the stability of this mode of urbanisation.

The thesis used cartography as an entry point, for its ability to yield analytical and methodological innovation. It focused more specifically on cartographic coordination- the way different actors are brought into association through the sites of production, use and circulation of maps and plans; and cartographic calculation- the factors that structure the calculation and the negotiations and tradeoffs that take place between different actors; to enable a transversal and socio-technical reading across processes, practices and actors. Through an ethnography of these cartographic practices, and using a range of methods from interviews, spatial analysis, image analysis, transect walks, shadowing and landscape analysis, the research opened the black boxes that encapsulate the 'State', 'communities' organisations' and 'land traffickers', and exposed the diverse actors which constitute them as part of networks, shaping their relations, interests and practices. Through a better understanding of how different networks operate and engage with regulatory frameworks, this thesis sought to observe the micro-politics at play that precipitate particular spatial outcomes, more specifically those that are unintended and exacerbate risk for inhabitants. Through thick description, I sought to unravel how certain alliances, routines, practices and outcomes become durable reproducing negative effects with the aim of better understanding the scope for change and identifying potential avenues for progressive change.

The following three sections draw together the original findings in relation to how cartography, planning and technical rationalities provide rich analytical and explanatory insights into the urbanisation of the slopes in Lima, with wider implications for understanding the role of planning in auto-construction and peripheral urbanisation.

8.1.1 Cartography: analytical and methodological insights for planning studies

This thesis has demonstrated the productive possibilities of using cartography to research urban processes and planning. Because maps and plans work in multiple ways and are boundary objects that connect diverse networks, they offer productive entry points for research. More specifically, the ethnography of cartographic practices, that is the cartographic calculation and coordination that take place in the process of urbanisation, has provided a way of reading transversally across actors associated with peripheral urbanisation and made observable the micro politics at play determining specific outcomes.

The examination of cartographic calculation and coordination also provided a way of researching sensitive or illegal subjects by using technical aspects as entry points that are easier to observe and use as basis for interviews. Generally, the approach of tracing

information flows and money exchanges proved productive and holds potential for researching 'not so obvious' and hidden processes. For planning theory, cartography holds the capacity to identify the kinds of emergent alliances, processes and agency shaping peripheral urbanisation, thus contributing to extending the existing informality and planning literature.

Drawing from critical cartography and empirical studies within geography and development planning where cartography has been central for strategising, I combined ontologically different conceptualisations of maps, as intermediaries or mediators. As intermediaries, the tracing of maps/plans' circulation facilitated the disaggregation of the heterogeneous networks that play a role in the urbanisation of the slopes and unravelled the aspirations, interests and rationales of different actors. The methodology has revealed actors which are otherwise invisible to existing analytical categories but have a crucial function as obligatory points of passage and mediators determining and stabilising particular urbanisation paths. As mediators, maps/plans also draw attention to the important role of non-humans in structuring outcomes and bringing into view the transactions that take place between actors to produce effects. Future planning research could do more to engage critically with materiality and consider the politics in the interaction between the social and material world.

An interrogation of cartographic practices has demonstrated how the links between regulatory frameworks, practices and outcomes can effectively be researched, thus overcoming the theoretical divide that is often maintained between substantive and procedural aspects of planning. A focus on cartography in this thesis has provided a way to study transversal social processes and significantly stretched understandings of planning.

Furthermore, as a political and technical device, a focus on cartography has been productive to bring awareness to the interconnected and even co-constituted relationship between politics and technologies, concurring with a number of scholars (see Lascoumes and Le Galès 2004; Barry 2006; Rose *et al.* 2006). I would argue that in planning theory, the pendulum has swung too far towards social processes and practices with a neglect of the critical evaluation of technical processes. The practice and institutional turns in planning theory have made rich contributions towards understanding planning as constituted through complex political struggles (Silva *et al.*, 2015). But they have disproportionately focused on decision making processes and thus, according to Friedmann (1987, 2003), elevated the political above all else. This has meant the marginalisation of technical processes and procedures in planning theory, as well as a disengagement from the role of technicians, too often seen as neutral players in the planning process. In the planning scholarship, the analysis of 'technical' processes and

instruments is secondary and marginal by comparison with other variables such as institutions, actors' interests or beliefs (Söderström, 1996; Sabatier, 2000; Rydin, 2012). The material is political, and there is politics in the material. The political relies on the technical to achieve the desired goals, yet the technical also comes to determine what is possible and what is achievable thus framing the political. I would argue that in losing sight of the technical and the relationship with the political, one risks overlooking where the politics lie and therefore missing important dynamics.

Although I used cartography to interrogate a localised process on the peripheral slopes of Lima, the methodology I developed in this thesis would be widely applicable to interrogate urban processes and planning in different contexts and at different scales. Because of cartography's universalised use in planning projects and processes, as well as its ability to operate 'at a distance', it offers a practical way to unravel complex networks across space, convening the range of actors shaping planning processes and outcomes. For example, this methodology could be used to rethink the spatial distinctions maintained between the 'formal' planning and the 'unplanned' linked to the centre of the city and the periphery respectively, and interrogate planning processes across the city as a whole, understanding the interconnectedness between different areas. Similarly, at a broader scale of analysis, one could use it to understand the circulation of spatial knowledge and the networks that constitute the growing transnational market of planning ideas and projects. The approach through cartography and ethnographic methods has opened a new window for studying planning in practice.

8.1.2 Peripheral urbanisation and planning

Chapter 2 outlined how urban theory conventionally places the responsibility for peripheral urbanisation on the failure of planning. On the one hand peripheral urbanisation, approached through an informality/illegality lens, is seen to be inevitably produced by planning regulations that offer no alternatives to the urban poor but to violate laws and regulations in order to dwell in the city (see de Soto 1989; Payne 2000; Devas 2001; Dowall 2003; Kironde 2006). Here planning is held responsible but more so as a producer of externalities since peripheral urbanisation occurs as an unintended consequence of the planning system. On the other hand, the debates from post-colonial studies that centre around inequality and conflicts in cities of the global South (see Roy and AlSayyad 2004; Yiftachel 2006; Watson 2014; Bhan 2016), emphasise the appropriation of planning by the elite to create and maintain peripheral urbanisation as a form of domination and control. This thesis embeds the interrogation of

peripheral urbanisation within planning but, from the onset, moves away from placing responsibility either on failure or external interests, but rather seeks to recognise the highly contentious and contingent aspects of power which shape such forms of urbanisation. I here advocate that to understand planning processes there is a general need to develop and use frameworks that do not separate government and non- government actors and consider the wide set of processes that shape outcomes whether these are legal/illegal, formal/informal, state/non-state or emergent practices.

The thesis seeks to contribute to the existing debates by making a number of shifts: it moves away from the understanding of peripheral urbanisation through informality and focuses on the everyday engagements with regulations, as with the emerging socio-legal scholarship (see Das 2004; Valverde 2009; Van Gelder 2010; Datta 2012); it sees outcomes as effects of associations amongst diverse actors rather than attributing them to any specific actor; and it acknowledges the importance of considering the material world as it structures practices and outcomes.

The research reveals that planning and peripheral urbanisation are entangled and cannot be conceived as separate realms. Planning needs to be understood as socio-technical assemblages that have numerous and unexpected ways of interlinking with wider urbanisation processes. The empirical chapters demonstrate how certain parts can be severed from the assemblage they are originally part of and pulled into other assemblages. For example, planning standards, regulations, professionals and instruments, can be delinked from one another and serve the interests of other networks as well as be present in different networks at the same time. Planning as a coherent institution and centralised practice is thus put into question and one is called to look at the disaggregation of the social and material actors that constitute it and how these play a role in what can be considered disparate sites of planning.

The findings reveal the emergent aspect of these assemblages as the effects escape the control by any one actor and may contradict the desired objective and normative expectations. For example, the research reveals how the practices of different governmental institutions go against the governmental rationality. When analysing the cartographic calculations and coordination undertaken by those under the umbrella of the State, one sees the problems that the rules and norms create, undermining the possibility to govern, and to plan the territory. This resonates with Miller and Rose's argument that "*government' is a congenitally failing operation*"(Rose and Miller, 2010, p. 288). The application of administrative procedures, planning standards and planning regulations is heterogeneous and rivalrous giving rise to externalities. In this sense, "*things, persons or events always appear to escape those bodies of*

knowledge that inform governmental programmes, refusing to respond according to the programmatic logic that seeks to govern them" (ibid.). In the case of the urbanisation of the slopes in Lima, certainly the planning rules, procedures and practices devised to control contribute to disorder, no man's lands and grey spaces as seen in chapters 5,6 and 7. The intersection of one technology with another can lead to unplanned outcomes, or unexpected consequences can emerge from putting a technique to work. Techniques invented for one purpose may find their governmental role in a quite different situation. Moreover, unplanned conjunction of techniques and conditions arising from very different aspirations may allow something to work without or despite its explicit rationale. For example, this is evident in the way the settlement layout plan introduced by the State as a compulsory document to control invasions in effect facilitated invasion; or how the various checks undertaken to curb people from claiming high-risk areas on the slopes secures their perimeters paradoxically encouraging further occupation of the slopes. Once in place, technical devices, such as the settlement plan, like any other instrument, open new perspectives for use or interpretation, which have not been provided for and are difficult to control (see Fligstein *et al.* 2001).

The research shows that externalities arise from transactions that occurs within socio-technical assemblages. This is the case with the production of risk that needs to be understood as an outcome of the socio-technical assemblages. By extension, therefore, the hazardous living conditions that are reproduced in time and space are outcomes of planning since many of the constitutive parts of planning take part as actants within different networks to precipitate effects. Often undesired outcomes are seen as tangential to planning and not inherent to it. I imply here that one should examine outcomes that might or might not conform to institutional design and normative expectations by focusing on the micro-politics of the context that produce specific outcomes. I would argue that the production of risk as an unwanted outcome is stabilised and reproduced on the slopes of Lima because it emerges from the routines, practices, processes and local networks that are normalised and even black boxed to the extent that many of the constituting parts are made invisible. With this invisibility also comes the inability to identify the social and material aspects contributing to the production of risk and this in return makes risk a durable outcome.

The understanding of planning as a socio-technical assemblage and outcomes as effects of this assemblage contributes to current debates on the failures of planning by demonstrating that the material world as much as social actors has an important role to play in urban processes. It moreover puts into question the way monolithic and pre-given entities, maintained in numerous planning accounts, such as the elite, the powerful State and the developers, are

understood to have power and agency. There is a call here to examine how the ability to enrol others, to build alliances and to associate with technical devices is what enables action to have greater effects. The findings show how some actors make themselves stronger in association with other human and non-human actors. Their capacity depends on a set of relations through technical devices and discursive idioms, that make them more able to determine the course of action. For example, in Chapter 6, the engineer and the plan work together to convince; similarly, the leader and the plan assume an authority and legitimacy to redraw the boundary line which, from then on, is respected. It therefore becomes productive to identify these assemblages as actants that function differently when not in combination. For planning theory conceiving planning and cities as socio-technical assemblages means paying more attention to the materiality that is often neglected in the planning literature. Moreover, it also means taking a pragmatic approach to understanding the relations and connections before explaining why things are, suspending pre-existing grand narratives. As in the ANT approach, it would mean having an interest in the seemingly mundane, including standards, operating procedures, assigned roles, and shifting associations in order to illuminate power dynamics (Lieto and Beauregard, 2016; Rydin and Tate, 2016).

8.1.3 Conflicting, competing and conflating rationalities in the urbanisation of the slopes

The research provides a counterpoint to the notion of conflicting rationalities devised by Watson (2003) which she uses to characterise the relationship between the State, the market and the urban poor. The findings demonstrate that conflicted rationalities are not necessarily isolated in different networks associated with the rationality of the 'will to govern and improve' related to 'the modernising developmental State' and markets, and the 'will to thrive and survive' of the urban poor and marginal as Watson (2003) argues, but can be inherent and internal to a network stretching across both. Actors, held together under the same network, do not necessarily work towards the same objective and may in effect contradict it. For example, the network composed of various institutions and individuals that constitute certain configurations of State power might be characterised by conflictive relationships between them and might also contradict the overarching normative goal of the State. This concurs with the institutional turn in the planning literature that has provided a rich understanding of the State by exposing the disjunctures between different levels of government as they struggle for power (Sundaresan, 2013). This thesis contributes to the existing literature by highlighting how paradoxes and conflicts can emerge unexpectedly from the complex interactions amongst different rationalities.

Equally, the research reveals that competing rationalities are also at play in enabling and sustaining the urbanisation of the slopes. For example, different governmental institutions purposefully stall coordination between each other by not sharing spatial information, thus compromising the possibility of integrated planning as one of the objectives often verbalised by the various authorities interviewed for this research. The rationality between these institutions is not only conflicting but competing. Chapter 7 demonstrated the competitive relationship between two municipal districts to gain territory over one another. This effectively results in the production and maintenance of a grey space or no man's land, difficult to control but also fertile grounds for illegal activities that accelerate the urbanisation of the slopes. On the other hand, the competitive rationality is also instilled between established settlements. As seen in Chapter 6, neighbouring settlements are activated by one another in a competition to claim land higher up the slopes before others do.

Acknowledging that conflicting and competing rationalities drive the urbanisation of the slopes, the research demonstrates that rationalities can also conflate, making this form of urbanisation durable. Various moments of mutual benefit characterise the urbanisation process as economic and political gains, as well as humanitarian and developmental aspiration, get entangled. Officials and technicians deviate from the rules, operating through a kind of closeness with inhabitants, facilitating their chance of moving through the ladder of entitlements. The engineer, who embodies the State regulations and standards, draws as many plots as possible as he is paid per plot. His logic converges with that of inhabitants who also want as many plots as possible since these are the source of funds for the development of the settlement, even though the maximisation of plots brings long term risks and demands larger investments to mitigate these risks and stabilise the slope as a whole. The economic rationality is inevitably common to all. Networks that come under the interests of the land traffickers, AFs and the State overlap. Alliances are forged across networks that enable and sustain a particular mode for the production of space.

Another important finding of this research has been the conflation, with time, of different modalities through which *barriadas* are formed. The urbanisation of the slope might start off with diverse networks driving separate processes, but at a point in time, it is taken over by the community organisation or AF as the driver of the settlements' affairs. Modalities therefore converge. There is a looping-in of one modality into another, and therefore the taking over of one rationality from another. With this, the ambitions of existing inhabitants are secured and so are the expectations of newcomers, thus fuelling the continuous occupation of the slopes.

This mode of urbanisation is made durable precisely because of the ability of the actor-network to shift and change, in this case from the land traffickers' network to the AF network.

An important finding therefore, which deserves further research, is the notion that change, and mobility give stability. This understanding can for example be extended to understanding the power that obligatory points of passage have, such as technicians who are often invisible in analysis. The shadowing of these technicians over the course of a day, over months through various stages of the process of *Saneamiento Físico Legal*, and over the course of 5 years of research, has shown how they travel between diverse networks and operate as connectors between networks. As they work across the different rationalities, they might change identities, capitalising on their knowledge of the administrative processes, and the connections they have built over time. Their polyvalence is an important finding, captured in Chapter 6. For example, the risk estimator, who emerges as part of the district municipality processes to certify plans for the acquisition of basic services, resurfaces towards the titling phase as an independent service provider who draws the compulsory evacuation plans for the settlement. Following the same risk estimator over several years, I also reveal how he capitalised on his position and the relationship he has built over the years with settlements, to support his candidacy in the elections and his political aspirations. In the same way that analysing the mobility of people proves fruitful, the research reveals the importance of also looking into the mobility of artefacts. As explained in Chapter 4, maps and plans are powerful for being 'immutable mobiles' as much as they are 'mutable mobiles'. That is, they can transmit meaning across sites because they command a sort of ontological stability while moving across space; but at the same time, they are open to interpretation as their reading is not fully closed and therefore different courses of action can be facilitated through them. These inherent characteristics of boundary objects is also what makes them durable because different actors mobilise them for their own ends. Their mobility and durability makes them powerful in determining actions.

The conflating moments I have identified in this research provide a counterpoint to Watson (2003) by highlighting the dynamics of negotiation between institutions with rationalities that not only conflict, but also align in cases where interests are mutual. This insight represents a potentially fruitful area for future urban research and theory-building surrounding the politics of planning in contested Southern urban societies. Furthermore, the aspect of mobility and polyvalence of actors (human and non-human) explained above is also intellectually productive to understand durability in urban processes.

8.2 The scope for change: addressing risk through transversal planning

In conclusion to this thesis, I focus on the contributions that the findings and the approach taken in this research can make to planning practice and therefore to scoping the possibilities for change. To begin with, I offer a short extract from post-fieldwork reflections to remind the reader of the difficulties associated with seeking to halt the urbanisation of the slopes, and the reproduction of risk (Figure 8.1).

Figure 8.1: A man and woman taking a break from the back-breaking work to flatten the plot of their future dwelling on the top of the slopes.



Photo © R. Lambert (2013)

Privileged, I was able to see and experience the establishment of entire settlements on the steep hills. Not in the space of a few years, but months. Travelling back and forth to Lima, 10 times over the course of these last 5 years, I walked through many of these settlements and discussed with those working hard to make a life there, how things could be different, could be less hazardous. With the well-established inhabitants planning the next expansion, we spoke about how slight shifts in the grid could improve the access ways, making them less steep, allowing a place to rest from carrying the heavy loads, whether this be water for the day, a child in the belly or one's back. Similarly, as the engineer who had taken me under his wing, finished measuring the land and was back in his office with gridded plots on his computer, we spoke about the very same things. Could he shift the entire layout or allow pauses in these staircases? It made sense, not just to me.

However, in the acknowledgement that things could indeed be done differently, there was also powerlessness to divert from the course of actions rehearsed day after day and throughout the decades

preceding. Every time I returned, I observed more of the same rubber stamping. The pressing need to move fast does not allow for a rethink. Speed is indispensable to secure one's permanence here. The land has to be divided up and distributed very quickly to be successfully defended. Hastily, within 24 hours, people move in while the dust is still flying from the division of plots.

For those large-scale land traffickers that operate behind tall fences, gates, fierce dogs and 24-hour security guards, time could be less pressing for being able to better defend their occupation of the desert slopes. They however also have to move fast; move money before the slope moves; before it collapses from the scarring and destabilising works of new roads. They need to move fast to capitalise on virgin land and migrate to another area before others do. Settlers, traffickers, engineers are aligned in the hurry to divide land and maximise income. There is a shared logic: whether that of land traffickers to secure profits from the quick deal, whether that of inhabitants to get the most plots to secure future funds for ameliorating their living conditions, or whether that of the engineer whose pockets are as big as the number of plots he manages to draw out.

Short term gains versus long term losses. The expenditure needed to make life possible here in the long term is transferred entirely to individuals who have no other alternatives but to keep investing their labour and resources. Having already invested much, they keep going to make past sacrifices count.

But the dust does somewhat settle after the scramble to claim, divide, occupy. Slowness takes over after all type of land has been reverted to the government to give a chance of survival to settlers and let them get water and electricity. If speed and profits hinder change in the previous stages, what is the scope for change in this slower phase? I conversed with a number of officials within the district municipality about their conflicting procedures and instruments. No changes here either; "Even if we wanted to, we are out of our seats before we are able to agree and implement change" they say. They also seem to blame the speed of the years that pass too quickly without allowing them to make a real difference. The powerlessness and trap within the set mode of operating is transmitted by people at all levels.

*If one remains optimistic that change is possible, what does this change look like and how can it begin? Given the speed and dynamic of urbanisation; given that responsibility is difficult to locate, and complex sets of relations characterise this landscape; given that these relations are often invisible; given that rationalities conflate, and actors align in their objectives, what is the scope for change? how can one intervene in this planning process? How could it evolve to generate safer living environments?
(Reflections post fieldwork)*

Although this research has shown the diffused responsibility for the urbanisation of the slopes and shown the difficulty of disrupting particular processes and outcomes that exacerbate risk

for the inhabitants, it has nevertheless identified three areas for change that can potentially also be applied to urbanisation processes in other contexts.

8.2.1 Disassembling and reassembling towards progressive agendas

Understanding urbanisation as the result of socio-technical assemblages leads to a particular way of approaching the possibility for change. In the same way that actants are assembled in a given configuration that leads to durable processes and outcomes, these can be disassembled to then be reconfigured in ways that lead to positive outcomes. Identifying the assemblages and where these become problematic is a precondition to recognising how they can be reassembled. The thesis demonstrates, through the analysis of cartographic calculations and coordination how to make observable the assemblages at hand. By focusing on the mundane procedures, routines, instruments within the process of planning, policy makers and planners would gain a better understanding of the micro-processes of network formation and direct their actions towards a reassembling that creates and supports progressive agendas.

8.2.2 Entering through obligatory points of passage and mediators

The identification of functions that actors within a network take can direct action towards particular nodes that have structuring ability on the development path. The research has brought to light some actors that are strategically positioned and have an advantage over others in determining what form the urbanisation of the slopes will take. Some actors have knowledge, mobilising and negotiating capacity, resources and legitimacy that others do not have, placing them in a better position to influence outcomes, and they can thus also be entry points to foment change. For example, the research has shown how technicians who are located within and outside government institutions are embodiments of State's capacity and ambitions since their work is to make sure people comply with the regulatory frameworks. They have legitimacy bestowed on them by different actors from different spheres. They take on the role of mediators and negotiators between settlements as seen in Chapter 6 since they are called to arbitrate using their technical skills in situations of conflict. They make themselves indispensable because of the complicated processes which they are able to navigate and preempt some of the stumbling blocks that settlements might face that might slow down their progress. Their techniques carry weight, inertia and continuity. As obligatory points of passage that connect diverse networks, they are important entry points from which change could be conceived. Therefore, for planners and policy makers, being able to identify obligatory points

of passage and mediators and entering through these to reconfigure the assemblages provides an important entry point for effective action.

8.2.3 Addressing change through the technical/material

In the context of Lima, for many of those I interviewed, meaningful change is anticipated to come from a political shift and different administrations taking office. However, as illustrated in the research, authorities express the helplessness they feel in being the motors of change. They see their time in government as limited to contribute to significant transformations, and their actions as constrained by the established system in which they have to operate. Notwithstanding that so much emphasis is placed on the political as the driver of particular modes of urbanisation, in many instances the problem lies quite precisely in the formulation of a technical process. This is overall encouraging because it is easier to identify entry points for change and tackle them in a more directed way. Alliances between actors and between humans and nonhuman actors are technically determined. From a planner's perspective, this is important because not only decision-making processes matter but so do technical processes. In highly politicised contexts, the technical can be an effective entry point and a means to address the political.

Moreover, as revealed through the research, in the case of Lima technicians have a longevity in government institutions that other authorities do not have. When there are changes in the administration, heads of departments are always replaced while technicians remain. Hence change could be conceived through technicians as well as technical devices and procedures. In this sense, planners and policy makers could engage more critically with socio-technical processes particularly since these produce largely taken for granted outcomes. A focus on language, but also technical devices, opens new ways of imagining socio-material change. The thesis has shown that indeed focusing on the technical procedures and technicians is fruitful in bringing to light the negotiations and alliances that are formed and therefore insightful on the political and decision-making processes and how to intervene in them. To formulate not only better analyses and theories, but also better urban and planning practices, process that gives shape to the world as inhabiting the interstices of the social and material, as well as the technical and political.

8.2.4 Future research for change

Having presented the key original findings and the implications for future research in planning studies in section 8.1 above, there are also recommendations for the research needed to target change.

Focusing on the local context, without the formulation of long-term housing policies for the urban poor at the city level, it is difficult to see how any significant change can arise in the way Lima is growing. Further research and action are needed on this front to also earmark areas that can be urbanised without creating risk for inhabitants. Halting land trafficking activities remains a challenge because of the durable alliances with actors from diverse networks. Research on how to intervene politically and technically in each of the spheres is needed. Moreover, empirical research is also needed to better understand the different modalities of land trafficking as well as the practices and processes prior to the occupation of land to interrupt negative development paths.

Although this research was mainly based in the district of SJL, it touched upon the adjoining district of SA which brought stark differences into view with regards to the resources, practices, procedures, levels of development and outcomes precipitated. A deeper comparative study between peripheral areas in different districts would be important to better understand the engagements with planning and devise socio-technical assemblages that can work in positive ways across districts.

Broadening the attention to peripheral urbanisation in other contexts, for planning to be truly transformative it is necessary to find means to unpack it, to make the system readable and grasp the richness and diversity of actors and practices that are engaged in city-making and the reproduction of inequality and risk.

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