Of dreams and deeds: the role of local initiatives for community based environmental management in Lima, Peru

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In this chapter, we will get to know the neighbourhoods under study. We will start with their history (Section 5.1), to see how they developed into what they are now (Section 5.2). Special attention will thereby be given to the classification of neighbourhoods into four types, based on their age (old, intermediate or new) and organisational structure (cooperativa, asociaciones or asientamiento humano (Section 5.2.2)). Next, we will describe the natural system (Section 5.3) and the support systems (Section 5.4) of the settlements, bringing the latter in relation with the type of neighbourhood.

5.1 Setting the context: history and development of Pamplona and Pampas

5.1.1 The history and development of Pamplona

What is nowadays called Pamplona is an aggregate of many small settlements of different origin; relocations, ampliaciones (extensions) of existing neighbourhoods and later on from invasions. The first settlements of Pamplona originated by the end of the 1960s, when some families from the older Ciudad de Dios started to claim land there and form their settlements. Others emerged because of government-induced relocations from other parts of the city. By the early seventies Pamplona had experienced a massive invasion (see Box 5.1). Many of the invaders were relocated, but some of them stayed and formed what later became Pamplona. Under the Velasco regime (see Chapter 4), the large neighbourhoods were divided into housing blocks that each sent a representative to the neighbourhood council. The formation of representative neighbourhood organisations was strongly supported in the Velasco era, although it was also criticised for politicising the neighbourhood organisations.

The specific circumstances during the formation of Pamplona gave rise to two basic differences between it and Pampas de San Juan:

1 Settlements in Pamplona are larger than the settlements in Pampas de San Juan (over 1,000 households per settlement in the early settlements in Pamplona, whereas the largest settlement in Pampas de San Juan has 750 households, but many of them have fewer than 300).1

2 In Pamplona, the state supported the formation of neighbourhood organisations in the early stages, with a state-imposed organisational structure of representation through street block representatives.

1. See Annex A1 for details on the settlements and their exact location (map a 2).
Box 5.1 The origin of Pamplona

In the night of 27 April 1972, an estimated 200 families, mainly from the city centre, invaded the hillsides around Ciudad de Dios in the district of San Juan de Miraflores. Although it started as an ‘invasion as usual’, it was unusual in that the site chosen bordered on hacienda properties in the wealthier Surco district. The land had already been parcelled out to be sold to well-to-do Limeños, so the owners of the haciendas were not pleased with their new neighbours. As usual, the invasion was organised by a group of leaders who had contacts both in the popular sector (to mobilise invaders) and in different layers of government (to enable successful negotiations afterwards). In return for their work, the organisers expected several plots which they later could sell.

The original invaders’ first plan was to form an asociación de vivienda (housing co-operative) to negotiate their land title, but after the first morning, many new squatters joined the invasion. The chosen site was situated very close to the Panamerican Highway, 200 metres from a major traffic junction, so everyone passing this southern exit route became aware of the invasion. Since there was no immediate government response, giving the impression that this invasion was being tolerated, even more people joined in. The first signals from the government seemed to indicate that the invaders would be recognised if they agreed to be relocated.

On the night of 4 May, the government reacted differently. The newspapers on 5 May reported that dozens of invaders had been wounded and one killed in serious riots. The police reported 51 policemen injured. From that moment on, the government received pressure from different directions. Landowners, including the Jesuit owners of the nearby urbanisation of Loyola, pressed the government not to tolerate the invasion. The auxiliary bishop of Lima, Señor Bamberén, pressed in favour of the invaders. During a mass on 9 May, Bamberén declared his solidarity with the invaders, and consequently was imprisoned. The events were front-page news by now in all the newspapers.

The government was at this point in a very uncomfortable position. A high-level and politically very important meeting of the Interamerican Development Bank (IDB) was to begin the day after Bamberén was arrested. Also, the ministers of Economic Affairs from all of Latin America were visiting the country, which had brought the international press to Lima. Confronted with international outrage around the arrest of the bishop and the killing of an invader, President Velasco had no other choice but to fire the minister responsible and enter into negotiations with the invaders. An agreement was reached on relocation to an area further south, 32 kilometres from the city centre. This was the origin of the Villa El Salvador district.

The invasion has left its marks in the Limenean vocabulary, in which it is known as ‘El Pamplonazo’. Some invaders stayed in the original area, founding neighbourhoods such as 2 de Mayo, Alfonso Ugarte and Ollantay of what is now known as Pamplona Alta.

Most of the settlements in peripheral districts in Lima formed in the early 1970s share these characteristics, and it is a general trend that subsequent invasions have become smaller (see Chapter 3). The most recent settlements in Pamplona show characteristics similar to the settlements in Pampas.2

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2. Where we use the name Pampas, we refer to Pampas de San Juan.
5.1.2 The history and development of Pampas de San Juan

The plain desert areas around the waste water treatment ponds remained untouched for a long time. These areas were known to belong to the Catholic orphanage Ciudad de los Niños de la Inmaculada, and as private land they were considered more difficult to invade. The orphanage had stated for years that it would develop a park in the area, but since it never had, it lost its rights to the property in 1982. By law, it reverted into state hands, in this case the hands of the Municipality of Lima Metropolitana. Some land speculators were aware of this, and they started to offer the land to several housing associations.

The open area of Pampas was seen as one of the last remaining available areas, not only in the district of San Juan de Miraflores, but in the Cono Sur as a whole. One of the principal catalysts of the process of illegal occupation, however, was the first elected mayor of San Juan de Miraflores, the Acción Popular candidate Alfredo Moscoso San Miguel, who served from 1980-1983. It has been proved that he sold land to the Asociaciones de Vivienda Republica Federal Alemana and 13 de Octubre and to the Cooperativa de Transporte Señor de Animas. The sales were completely illegal, as the mayor had no property rights and, in those days, not even any say in land management decisions. In 1979 the first invaders started to settle in what later became Pampas de San Juan, claiming the land they had been paying for. Moscoso was later sentenced to several months’ imprisonment for this crime, but nonetheless the foundation had been laid for Pampas’ corrupt and contentious history (Núñez et.al., n.d.).

The Pampas area gradually filled up with similar cases of invasions. Some of them started as cooperativas and asociaciones and bought land. Others were simply invasions from the very beginning. After most of the land of what now is the second sector of Pampas was full, the area now called the ‘third sector’, the area south of the electric pylons, was invaded. These new settlements were all cooperativas and asociaciones de vivienda whose members had become aware that their leader and the mayor had cheated them and decided to claim the land they had been paying for. A massive wave of invasions started in 1983. All settlement formations were rapidly filling with newcomers. The invasions were characterised by similar signs of corruption and illegalities. The leaders constantly cheated the members of their associations. Money the members paid disappeared, they were misinformed on tenure issues, leaders manipulated member lists and subsequent voting rights or assured that they and their family members got more, larger and better located plots than the others.

In the first half of the 1980s, the situation was so complicated that most people had no idea of their actual tenure status. This resulted in households building their houses from durable materials on land they thought was their property, for which in reality they had no property rights at all.

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3. As explained in Chapter 2, neighbourhoods differ in the kind of organisational form the settlement has chosen. Asentamientos humanos (squatter settlements) result from invasions; whereas cooperativas and asociaciones are two types of settlement on land that was first bought before it was urbanised.
Photo 5.1  The Area of Pampas de San Juan in 1984

Source: Fotoservio Aerofotografico Nacional (San) Lima, Peru

1. Already established cooperativas 27 de Julio, Fortaleza, close to existing city
2. First cooperativas in the flat area around the stabilization ponds
3. Invasions of the asentamientos humanos, Trebol Azul and Heroes de San Juan
4. Republica Democratica Alemana
5. Sand extraction area, crater ‘El hueco de Pampas’
6. Isolated invasion, Altos Manuel Scorza
7. Stabilization ponds
8. Urbanización de San Juan, older area
9. Villa El Salvador (neighbouring district)
10. Villa Maria de Triunfo (neighbouring district)
The natural and support system in Pampas de San Juan and Pamplona

It was the alarming level of corruption, land speculation and illegality that brought Barrantes – the popular left-wing mayor of Lima Metropolitana who assumed office in 1983 – to introduce the Integrated Municipal Housing Project of Pampas de San Juan (Proyecto Integral Municipal de Vivienda Pampas de San Juan). The major objective of this programme was to legalise land ownership in Pampas to avoid further speculation (Nuñez et al., n.d.).

Participation in this programme took place on a voluntary basis for the settlements, with the prospect of a legal individual land title as a strong incentive. Despite this incentive, not all settlements participated, as there was also a strong disincentive. Participation in the Barrantes Programme limited the entitlement to one plot in Lima per couple, as is the rule for all asentamientos humanos. In other words, all those who owned a second plot, whether in Pampas or somewhere else in Lima, had to relinquish one of them. This was the major reason for settlements to stay out of the Programme.

Furthermore, only asentamientos humanos (squatter settlements) could participate in the Barrantes Programme, which also implied that settlements had to apply for a change in their legal status, a change that would mean a loss of social status, as well. Cooperativas and asociaciones have a better image than the asentamientos humanos, because in general the population of the cooperativas have a somewhat higher income, which enables them to buy a piece of land, whereas the people in the asentamientos humanos have had had no option but to invade. The choice between an asentamiento humano versus a cooperativa or asociacion is the choice between:

a) A legal individual land title in a lower-status neighbourhood, only one legal plot in Lima, but access to credit schemes designed for the asentamientos humanos (primarily loans for building houses and basic infrastructure); and

b) No legal individual land title, but a de facto security of tenure for the association or cooperativa as a whole through the recognition of its Urban Development Plan by the Municipality of Lima Metropolitana. It also implies the opportunity to own several plots, even in one settlement, and a higher status, but in theory no access to credit schemes.

This is not an easy decision, and it can lead to serious conflicts between the inhabitants. What makes the issue even more complicated is the fact that it is not uncommon for the leaders of the settlement, who own several plots, to oppose the change to asentamiento humano, whereas the inhabitants are in favour of the change. In the long run, all settlements will attain the status of Area Urbana, where the differences in status are no longer so relevant, and the short-term advantage of credit is more important to them. Six cooperativas changed their status to asentamiento humano, and nine cooperativas maintained their status. The José Carlos Mariategui cooperativa changed its status later, while the other eight have maintained their status as asentamiento humano until today and are classified as such in this study.

When the Barrantes programme started in 1984, Pampas numbered 29 different settlements, 14 of them applying for the status of ‘asentamiento humano’, and the 15 others cooperativas or asociaciones de vivienda, together housing an estimated 7,000 families. Most of them were entangled in ongoing fights over conflicting property claims, mostly due to the fact that some of the land had been sold by up to six differ-
ent associations. Just how intense these disputes could be is revealed by the story of Alfredo (Box 5.2), presently living in the second block of Republica Federal Alemana.

**Box 5.2**  The story of Alfredo

‘When we had just arrived, we had a much better located plot, at the Avenida Miguel Iglesias. This plot was perfect for us, since we wanted to start a building materials shop. Since I know everything about building, we only lived for several months in esteras [straw], and from the beginning, we had a concrete floor. After several months we had already managed to rob electricity, we acquired it from Villa Maria de Triunfo, all the way down the hills. Soon we started to build with plywood. But the pobladores of Cedros del Sur and Trebol Azul, from the opposite side of the road, thought that we had settled in order to invade their land. They felt their property rights threatened, so they started to fight us. First they only threatened us, trying to abuse us verbally. Then they started to throw stones at us. It did not help that we explained that we would live on our side of the road. Things got worse week after week, and they finally came to burn our shacks. They set fire to several of them, not to ours, but nevertheless we decided to move a little uphill. It makes no sense to fight that kind of violence, you risk losing everything. Our eldest son had just been born, and I could not leave my wife alone, not even during the day. Therefore, you find us now at this plot. Although it is not the optimal location for our business, our clients find us anyway, it is safer here’ (Alfredo, 43, Republica Federal Alemana).

5.2  The result today

5.2.1  General impression

Pampas today has 44 neighbourhoods, all dating from different years, in different phases of consolidation and of very different sizes, with a total of an estimated 50,000 inhabitants. The smallest neighbourhood has only 20 households, and the largest has 735. In general, the newer the neighbourhood, the smaller its size, and the higher it is situated on the hillsides.

It is an effort to climb the hills of Pampas. Two hilltops are marked by the two water reservoirs of the SEDAPAL Water Company. The steepest part features a 65-metre elevation gain over a 350-metre distance. Since the path meanders through loose sand and jagged stones, it feels even longer, but those who make the effort are rewarded by a marvellous view of the ‘three-districts-point’: the boundaries between the districts of Villa Maria de Triunfo, Villa El Salvador and San Juan de Miraflores. The different settlement histories are reflected in the urban morphology of each district, as can be seen on the aerial photo (Figure 5.2).

Villa El Salvador was carefully planned as a repetition of the same basic spatial unit (a rectangular block) throughout the whole district. This makes it easy to see from the hilltop where Pampas ends and Villa El Salvador begins: the border between chaos and order. From the top of the hill, there is a second striking characteristic: in Villa El Salvador almost every house seems to have its own tree, the crowns of which form a lacy dark green curtain over the streets.

4. Carefully planned in the early 1970s, see Chapter 3.
By 1990 the area of Pampas was filled up. Even the steep slopes are almost filled with new settlements. The only empty area is the area the land under the electric pylons. There is a clear difference between the urban layout in Villa El Salvador (the same ‘stamp’ of rectangular blocks repeated all over the district), the wider plots of the neighbouring Villa Maria de Triunfo district, and the ‘spontaneous’ urbanization in Pampas de San Juan.

Source: Fotoservicio Aerofotografico Nacional (SAN) Lima, Peru

Villa Maria de Triunfo\(^5\) is a much older and more developed district, formed by the logic of private investments for urbanisation. Streets are wider, and planned ‘California style’ – wide, flat and as straight as possible. Plots in general are larger, and houses are more consolidated (i.e., at a further stage of construction). From the top of the hill, several industrial plots can also be seen with a great deal of truck traffic in the wide avenues. The boundary between Villa Maria de Triunfo and San Juan de Miraflores is more difficult to define, since the fringes of new informal settlements of both districts are on the slopes. For the time being, the district’s boundary can be identified by its street-lighting: the Villa Maria de Triunfo section has light, while the houses of the newest settlements of Pampas are in the dark. Of course, people do not wait around for official electrical connections to come, which results in a completely

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5. First invasions in the beginning of the 1950s, recognised as a district in 1961.
chaotic weaving of illegal electricity connections and cables connected with tape at the height of a person's head, as if they were clotheslines.

Turning to Pampas, one gets a completely different impression. The straw huts of the most recent invasions have reached the top of the hills. At first sight, it seems as if they just dropped out of the air at random, 'As if someone had thrown them down hill like dice, and they stayed where they landed'. They are connected by small goat trails, where sometimes steps have been cut to facilitate access to the top. From the North, the highest part of Pampas can be reached by car, thanks to a road constructed over innumerable Sundays of communal work by two neighbourhoods. What is striking is the strength of some individual initiatives. Some inhabitants have already converted their steep plot to an Andean-style terrace (andenes), to create some flat space. Others have taken great care in painting their plywood house. A surprising number of houses have their own little plant or tree, even if the water for it has to be carried hundreds of metres.

Coming downhill, more and more structure can be seen in the urban layout. Roads appear (although most of the time only graded, houses are to be found along them, and the houses look like 'proper' houses even although they are only made of plywood. They all have the characteristic straw 'silos'; a straw mat rolled into a cylinder, which serves as a latrine. These areas also have even more green space.

The further downhill one goes, the more consolidated the houses become. Many houses have striking architectural details. Although their layout is often similar, they have individual touches such as creatively shaped windows, a very special door or an unexpected addition. Most of them also have an outside staircase leading to an as yet non-existent upper floor, a sign of the hope for what will be constructed in the future. It is not uncommon for building materials to be stored on the roof.

This results in different kinds of street scenes. Some streets are obviously well taken care of by the inhabitants. As if planting one tree prompts others to plant as well, most often the heavily green areas are concentrated in one street. The result is a street shaded by trees, with some grass, or even flowers and maize or other vegetables. Trees are often planted next to the brick stone water tank. The combination of the moss-covered water tank, the little plants that grow wherever any water falls and the carefully tended tree or garden looks like a small oasis in the urban desert. The streets where several oases are concentrated have an attractive appearance, inviting passers-by to sit down and chat for a while.

Just around the corner is a completely different world of abandoned streets where building waste obstructs any possible traffic, and where houses are built of bare concrete or stone walls, sometimes even without windows. Instead of inviting people to sit down and chat, these streets seem to invite neighbours to dump their waste. Every small amount of waste inspires others to bring more. The larger the abandoned area, the larger the amounts of waste that can be found lying around. In areas that later in the research were identified as 'no-man's land' large-scale burning of waste is done, leaving stinking remains of charred sand where dogs try to find something to eat. It is difficult to get used to the image of children playing in these

6. Quote from an architect working in the district.
areas, sometimes even barefoot.

The sleepy sandy roads change character towards the boundary of the study area. These areas are the flattest parts of Pampas, and therefore are the easiest to build on and develop. Despite the fact that some of them are also close to the stabilisation ponds, which currently are plagued by stench and pests, these seem to be the favourite areas to invade. Here cooperativas could retain their status as cooperativa, distinguishing themselves from the lower-status asentamientos humanos. These are the areas with the most consolidated houses. In contrast to the higher areas, where many houses still show their bare concrete or brick walls, the houses here are plastered and painted. The cooperativas were the first to get some of their internal roads paved, as well as their sidewalks. People seem to have a little more to spend on the appearance of their houses, and the few parks in the study area are to be found in the cooperativas. It is striking that in these areas, the children even play with different toys. Whereas in the areas dominated by wooden and straw houses the children play with whatever they find, making their own kites of bamboo and plastic bags and kicking the indispensable football, in the consolidated areas they play with tops, marbles and simple wooden horses. In the cooperativas, they have bikes, roller-skates and even computer games. For the children of both areas, there is no greater joy then playing with water, whether in water fights the few hours a week that water comes out of the hoses, or swimming and bathing in the water tank the day it has to be cleaned. One of the neighbours in a cooperativa even constructed a small swimming pool on his plot, where many of them go swimming in summer.

Strolling through the three old settlements in Pamplona, one experiences a completely different atmosphere. The basic layout is one of rectangular housing blocks. In physical terms this part of Pamplona is more developed. The most striking difference is that there is less activity in the streets. Except for the concrete playgrounds, which are always in use, public space seems to be abandoned. Life has turned more inward, as if people are hiding behind the walls.

It is incongruous to see more shops, bars and restaurants than in Pampas, but fewer people making use of them. In the evening, the atmosphere can even become hostile. Several of the settlements surrounding the ones included in the study are known to be the home bases of drug dealers. People unfamiliar with the area are strongly advised not to go to Pamplona at night. Although actual violence and crime is not as high as the image of Pamplona suggests, the problems of violence and youth gangs are greater in Pamplona than in Pampas.

As has been indicated in the methodological chapter, the settlements were classified into four different types, based on their age (old, intermediate or new), their organisational structure (cooperativa or asentamiento humano) and some indicators of their physical consolidation (see Chapter 2). The following section will describe and discuss the basic population characteristics and the current environmental conditions of the four types of neighbourhoods.
5.2.2 Characterising the four types of neighbourhoods

Pamplona (old)
The three settlements in Pamplona included in this study were formed between 1967 and 1971, so on average are almost 30 years old. They are situated in the flatter parts of Pamplona, close to the economic centre ‘Ciudad de Dios’.

Most of the houses are constructed from durable materials, quite often with a fence or façade that also protects the little garden in front of the house, or even a car park. The vast majority of the families are connected to running water and the sewerage system, many sidewalks are paved and the municipal garbage truck does pass. Public transport passes the main roads and can take people to everywhere else in Lima. There are schools, health centres and churches. The atmosphere in the streets differs considerably from the atmosphere in Pampas. In Pampas, part of family life still takes place on the street and with neighbours, but most people in Pamplona are in their houses behind their façades when they are at home. The three settlements included in this study have the organisational status of asentamientos humanos.

Pampas Cooperativa (intermediate)
The average year of formation of the cooperativas is 1979, so most of them are around 20 years old. As has been indicated, most of the cooperativas and asociaciones in Pampas are found in the flatter parts of Pampas de San Juan, often close to the stabilisation ponds. The flatness of the area makes it easier to open up roads. Indeed, almost all roads are have been levelled in the cooperativas Many are already graded and over the last three years several have been paved.

More than three-quarters of the houses in the cooperativas are built from durable materials. Sometimes efforts are concentrated on the outward appearance. It can happen that a massive wooden door in one of the most beautiful facades, with a plastered white wall and a beautiful wooden window with panels, opens to a room with four walls open to the sky – a marvellous façade, but no roof. Although it is an exception to have a house with almost no roof, it is quite normal that only the bedrooms and living room are covered, while the kitchen, bathroom and toilet are not. In the cooperativas, quite a lot of effort seems to be put into taking care of the intimate outdoor environment. The few parks in Pampas are to be found in the cooperativas. In other cooperativas, there is no park yet, but several neighbours have small private gardens in the areas reserved for future parks. These small gardens also can be found in the asentamientos humanos, but there are more in the cooperativas.

There are several additional differences. Most important is that the cooperativa residents, as was indicated earlier, do not yet possess the individual land titles to their plots. As a consequence, it is in theory impossible, but in practice essentially more difficult, to get access to credit schemes for neighbourhood improvement, both for building the houses and for public works. The fact that, despite these difficulties, many houses are built from durable materials suggests that in the cooperativas the people have higher incomes than in the asentamientos humanos. The fact that the majority of the cooperativa population refused to accept a change in their status (by rejecting Barrantes’ offer to change to asentamiento humano) shows that they saw other possibilities to achieve their goals without losing their status.
Gradual occupation: arriving with your family and ...

Putting up five straw mats
Chapter 5

Photo 5.5  Overview: recent settlements at both sides of the electric pylons

Photo 5.6  A community-built and community-run day care centre in Las Dos Cruces, Pampas Unconsolidated
The natural and support system in Pampas de San Juan and Pamplona

Photo 5.7  Street with an inviting appearance in Pampas Consolidated

Photo 5.8  Houses under construction in Pampas Consolidated
**Photo 5.9** Striking details: a house, a garden and a water tank in Pampas Consolidated

**Photo 5.10** Children playing with water at the public tap point in Patrón de Santiago, Pampas unconsolidated
The natural and support system in Pampas de San Juan and Pamplona

Photo 5.11  Pampas Cooperativa: The children even play with different toys

Photo 5.12  Paved Roads and well-constructed dwellings (Pamplona)

Photo 5.13  Street Scenes in Pamplona: 'closed' houses and empty streets
Many more cooperativas than the asentamientos humanos in Pampas have a community hall built from durable materials. These are also considerably larger and better equipped than the ones in the asentamientos humanos.

**Pampas Asentamientos Humanos (intermediate)**

The average year of formation of the asentamientos humanos is 1983, the year of the massive invasions in Pampas. The average size of the settlements is 300 plots. Although the settlements are on average over 15 years old, about 25% of the houses are still made of wood or even straw. Most of these settlements in Pampas are either on the relatively flat areas, or on the more gently sloping hillsides.

It is only in recent years that the major through roads and some of the internal roads were paved. During the fieldwork, it was observed that many more shops, and especially small restaurants, opened their doors.

Life in the streets of Pampas asentamientos humanos is more animated than in the cooperativas. During the day, women work in the comedores, or just sit and chat. In the early evening hours, people play volleyball. Quite often at night someone will call their neighbours to come to an activity organised to support a family in need. In several of the settlements, the recently graded streets can be blocked with rows of big stones to prevent a car from passing and damaging the street. The inhabitants are waiting for the internal roads to be paved.

Some of the more successful settlements boast a church, a health centre, a market and a school. Furthermore, there was a remarkable amount of building activity observed. Many internal roads could hardly be passed by car because piles of bricks and other construction materials obstructed traffic.

**Pampas unconsolidated (new)**

The most recent settlements are all on steep hills, and characterised by straw-mat or wooden huts, frequently on Andean-style terraces, interconnected by the previously mentioned goat trails and the illegal electricity connections. Their average year of formation is 1991, so they had only existed for 5 years when this research started. The process of consolidation could be followed during the fieldwork period. The average size of the settlements is 65 plots. The largest numbers 175 plots, whereas the smallest houses only 20 families. On Sunday mornings, you can find the people busy levelling the roads, constructing staircases or digging the ditches for the waterworks. During the fieldwork period, several settlements managed to get a public tap point installed. It is remarkable that even under these circumstances, where people obtain their water from public tap points, the SEDAPAL water tank or water vendors, several made small gardens on their terraces.

The newest settlements do not yet have any additional services such as markets, churches, schools or health centres. In two settlements, a small childcare centre is run in the wooden building that during the night serves as the community hall, the local communal. Half of the settlements have a local communal, but that is for the time being made of wood. The other settlements have their meetings in the open air.
5.3 The natural system

Pamplona and Pampas de San Juan are two of the six sub-sectors of the district of San Juan de Miraflores. This district is one of three that are often collectively referred to as ‘The Cono Sur’, the Southern Cone.7 (Map 5.1). The three districts together – besides San Juan de Miraflores also Villa María de Triunfo and Villa El Salvador – had over 800,000 inhabitants in 1993 (INEI 1993). All three districts are situated in rather bleak desert areas shaped by the foothills of the Andean Mountains. San Juan de Miraflores lies outside the confluence of the beds of the Rimac and the Lurín Rivers; the soils were formed by eolic processes on a rocky base. As a result, much of the soil consists of loose salty sand interspersed with rocks. Like the rest of Lima, annual rainfall is almost zero, but the relative humidity can reach 96%. During the winter, the air can be rather damp and the winds are chilly. When the winds blow inland from the ocean the wind-chill factor can make one feel unpleasantly cold, especially at the top of the hills.

Map 5.1 Location Cono Sur

The district is defined by the landscape, a flat plain which extends towards the ocean in the West, and towards steep hills to the East. The centre of the district, where the first invasions took place, is relatively flat with an average elevation of about 40 metres above sea level. At the boundaries of the district, especially in the North, the hilltops can reach 450 metres. Although San Juan de Miraflores as a whole covers 2,030 hectares, not all of it is even marginally inhabitable due to its topographic conditions. In 1989, 1,440 hectares were urbanised, and installations by Lima Metro-

7. Sometimes the neighbouring district of Chorrillos is also considered to be part of the Cono Sur. In other publications, the more rural districts of Lurín and Pachacamac and the beach districts further South are considered part of the Cono Sur as well. However, the three districts of San Juan de Miraflores, Villa María de Triunfo and Villa El Salvador have many characteristics in common, whereas Pachacamac, Lurín and the beach districts represent completely different realities.
politana (an electric plant, municipal tree nursery, a park and wastewater treatment ponds) took up another 450 hectares.

Although the remaining hectares were officially considered uninhabitable due to the steep hills and rocks, which made access difficult and infrastructure provision too expensive to invest in, invasions on these slopes continued.

In this inhospitable desert area there are very few natural resources. In the past, there were two natural wells that supplied drinking water. As a consequence of falling ground water levels these wells have gone dry. Studies have found no other possibilities for new wells (Ipadel 1989:24). The only water resource in the district is man-made: a complex of stabilisation ponds where wastewater is treated. The treated water is used to irrigate a 15-hectare eucalyptus forest and 20 hectares of farmland. This green reserve is one of the largest in Lima and is considered by many to be the city’s only ‘green lung’ (see Section 5.4.5 for a detailed description).

As said, San Juan de Miraflores is divided into six sub-sectors, with Pampas de San Juan roughly in the south-east of the district, as can be seen on map 5.1. The oldest one, Ciudad de Dios, is the flattest, and it is where invasions started in 1954. It is easily accessible and relatively well connected to the rest of Lima, which has enhanced its economic growth. This centre of the district Ciudad de Dios has grown into a major economic centre for the Cono Sur as whole, housing both an impressive number of retail as well as wholesale markets and many shops. Two other sub-districts of San Juan de Miraflores are in the surrounding flat areas: Urbanización de San Juan and Pamplona Baja. Both house the relatively better-off in the district. Maria Auxiliadora, situated on one of the steepest hills in the district, was created by several families. The sub-sector Panamericana Sur, the most recent and least developed sector of the district, is at the boundary with the Chorrillos district, west of the stabilisation ponds and the Panamericana Sur highway, formed by invasions which started in the early 1990s. The district had 283,349 inhabitants according to the latest census (INEI 1993), and an estimated 311,000 inhabitants in 1997 (IMP 1998).

The two sub-sectors included in this research, Pamplona Alta and Pampas de San Juan, are similar in site characteristics and size and have similar histories (see Section 5.1). Both contain a relatively flat central area where their first invaders settled and are delineated by steep hills. Both are built on a sandy or rocky underground. Both have some high rocks appearing in the middle of a flat area, and both have a crater left after large-scale sand quarrying.

There are also important differences. Despite the two sub-sectors’ similar surface areas, Pamplona has many more inhabitants. Although there are no recent data available, Pamplona had 89,000 inhabitants in 1989, making it the largest sub-sector in the district. Pampas had 40,000 inhabitants in the same year. Although the number of inhabitants has increased in Pampas and the population is now estimated to be over 50,000, there is no reason to believe that the ratio between the two sub-sectors has changed much. Population densities and the number of members per plot are considerably higher in Pamplona.
Map 5.2  Income distribution in Pampas de San Juan

Map 5.1 INCOME LEVELS IN SAN JUAN DE MIRAFLORES 1993

LEGEND

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 380°</td>
<td>Light Gray</td>
</tr>
<tr>
<td>230° - 380°</td>
<td>Gray</td>
</tr>
<tr>
<td>200° - 230°</td>
<td>Dark Gray</td>
</tr>
<tr>
<td>&lt; 200°</td>
<td>Black</td>
</tr>
</tbody>
</table>

There also is an important difference in relative location. Pamplona is a real ‘poverty bag’: a flat basin almost completely enclosed by hills, with only a small ‘opening’ to the rest of the district. It is as if there is only a single gate from which to enter and leave Pamplona, as there are no major roads connecting it to the other districts. One only goes to Pamplona out of necessity, and entering Pamplona is like entering ‘a dead end street’.

Pampas, on the other hand, has grown along a major traffic axis connecting San Juan de Miraflores with the neighbouring Villa El Salvador district. Where mountains surround Pamplona on three sides, Pampas has only one enclosed side. The other sides are open, which has resulted in a great deal of traffic between Pampas and Villa El Salvador. This more favourable relative location may have contributed to a more favourable development process in Pampas.

It should be noted that only three of the over 100 settlements in Pamplona have been included in this study, as a control group to see what happened to the neighbourhood organisations and popular participation when the settlements grew older. These three settlements are situated close to Ciudad de Dios and the ‘entrance gate’ of the district. Data on Pamplona should be taken as being representative for these three old settlements, but definitely not for Pamplona as a whole.

5.4 The support system in Pampas and Pamplona

The four types of neighbourhoods included in this study (Section 5.2.2) are classified according to their date of invasion, the organisational form and the level of infrastructural services realised. In this section, those elements of the infrastructure that are relevant for this study – water and sewerage, roads, waste collection and green areas – will be described.

5.4.1 Drinking water provision

For many years, the Cono Sur was the area where the provision of drinking water was the most restricted. To ensure proper supply in the high-income areas of the city, water was rationed in the low-income areas. The same pattern was and still is found within the districts: higher-income areas are serviced more often than low-income areas. Rationing is done by providing water only for a restricted time during the week. In San Juan, service for those with a domestic connection ranged from 24 hours a day seven days a week to 4-6 hours once a week.

The struggle to obtain the domestic water connection was the most arduous struggle in Pampas, as will be elaborated upon in Chapter 6. This is reflected by the fact that in 1990, only five settlements had domestic connections: the two oldest cooperativas (Fortaleza and 27 de Julio), Republica Demócrata Alemana (thanks to its special connections to the political party APRA (see Box 6.4), the asentamiento humano Cedros del Sur, which opted for a self-financed construction and the asentamiento humano 13 de Octubre. From 1990 on, intensive investments in the construction of water and sewerage were made.
Five other cooperativas obtained their domestic connection between 1990 and 1993, and the cooperativa Ricardo Palma was connected in 1996. Most of the settlements in Pampas asentamientos humanos (intermediate) got their waterworks implemented between 1991 and 1995. For some of them, such as the small settlement of Vista al Mar, this meant that they got their water after waiting for 20 years. On average, both the cooperativas and Pampas asentamientos humanos waited 11 years.

None of the 15 newest settlements had the water works installed when this research started. Three of these settlements completed their works in 1997: the two 'oldest' new settlements (Indoamerica and Union y Paz) and Los Pinos II. The other 12 new settlements still have no domestic connection. Five of these settlements obtained public tap points in 1998-1999.

Once a settlement has a domestic connection, most houses get connected, but not those who cannot afford the connection. Even in Pamplona and the cooperativas, some people did not have a domestic connection in 1997 (Table 5.1). Although there is, of course, a strong association between the consolidation level of the house and the source of drinking water, there are some households that managed to build their houses from durable materials, but do not have a domestic water connection. This is especially so in Pampas asentamientos humanos, where 60% of the households that have to do without a full connection are living in houses made from durable materials.

The table also shows that some people depend on water vendors, and others make use of the SEDAPAL tanks. For those living near the water tank, this is a reasonable opportunity as they can fetch water free of charge for two hours per day. The high number of people making use of the SEDAPAL tanks is surprising, because for many of them the tanks are far away. Given, however, that many of the newer settlements cannot be reached by truck, it is probably their only option to get water. It may be that people also make use of the SEDAPAL water trucks that pass through the settlements on their way to the tanks.

Table 5.1 Main source of drinking water of the households in the different types of neighbourhoods (1997)

<table>
<thead>
<tr>
<th>Source of water</th>
<th>Pamplona (old)</th>
<th>Pampas Cooperativa (intermediate)</th>
<th>Pampas asentamientos humanos (intermediate)</th>
<th>Pampas Unconsolidated (new)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water vendors</td>
<td>2%</td>
<td>5%</td>
<td>1%</td>
<td>52%</td>
</tr>
<tr>
<td>SEDAPAL water tank</td>
<td>1%</td>
<td>25%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>Public tap point</td>
<td>98%</td>
<td>94%</td>
<td>74%</td>
<td>35%</td>
</tr>
<tr>
<td>Domestic connection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=98</td>
<td>n=122</td>
<td>n=182</td>
<td>n=90</td>
</tr>
</tbody>
</table>

Gamma = -.8 p = 0.000

Source: First household survey 1997.
Chapter 5

Map 5.3 Year that the domestic water and sewerage connection was installed

MAP 5.3 YEAR THAT THE DOMESTIC WATER AND SEWERAGE CONNECTION WAS INSTALLED

LEGEND
- Not installed
- 1996 to 1998
- 1993 to 1996
- 1990 to 1993
- 1980 to 1990

Source: Second neighbourhood leader survey 1998
In 1998, there were considerably more households in the newest settlements making use of public tap points. Several of them got the tap points installed in the years after the household survey was completed.

As stated earlier, having a domestic connection in Lima does not necessarily mean 24-hour access to water. In Pamplona, it runs only once a week for several hours, according to 76% of the respondents. The remainder indicate that they have water twice a week. This means that the majority of households have to store water in their household tank for a week. In Pampas, this is somewhat better. In the *cooperativas*, most of the respondents indicate they have water twice a week (75%) or even more often (21%). These figures are almost the same in Pampas *asentamientos humanos* (78% and 22% respectively). The 30% of the households in the newest settlements that do have a domestic connection are serviced at a similar level as in Pampas *asentamientos humanos*.

It is difficult to prove a clear causal relationship between the kind of water provision and the prevalence of water-borne diseases. Two important indicators of water quality are the presence of chlorine and of faecal coliform bacteria.

There are no adequate data available on the quality of drinking water in San Juan de Miraflores. We can infer, however, from a small (but not necessarily representative) sample in the Cono Sur, that water from the domestic connections has a higher chlorine level – and is therefore considered safer – than water in the tanks or water from the water vendors. The fact that SEDAPAL puts an average 1 mg/l chlorine in the water seems to have its effect when it goes from the hose into the tank. Due to improper management of the tanks (insufficient cleaning), this level of chlorine is rapidly reduced. In fact, most samples of water in the water tanks showed no chloride at all. No faecal coliforms were detected in tap water, but there were some in the water in the tanks and from the public tap point (IMP 1998).

In other words, water from the domestic connection is ‘safe’, but once stored its quality rapidly decreases. A study found a clear correlation between the prevalence of diarrhoea in the children in Pampas and the kind of water supply in the household. In the households with a domestic connection, 11% of the children suffered from diarrhoea. For the households using a public tap point this figure was 25%, and for those at the water tank 17%. (Fovida 1994). It seems that at least the children (and probably others) in Pampas suffer from the lower water quality when there is no adequate connection and/or the tanks are not cleaned.

5.4.2 Sewerage

Since the water and sewer connections are usually constructed simultaneously, the numbers of the sewerage connections are only a little lower than those of domestic water connections. In the district as a whole, 48% of the households had a domestic sewerage connection in 1993. In 1994 this had risen to 63%. Most important, however, was that the number of households that had to make use of the open field dropped from 9% in 1991 to 4% in 1994. The other households without a domestic connection used latrines (POVIDA, 1994).

That there are many differences within the district becomes clear when we look at the sanitation situation in the study area (Table 5.2). In Pamplona, almost all house-
holds have a private toilet, whereas in the newest settlements 20% of the households have no sanitary facilities whatsoever, meaning that they have to use the open field. These households use the strips of land around the water tanks at the top of the hill, or the open areas under the electrical pylons. The table furthermore shows that very few people use public latrines or shared toilets. Each household makes its own latrine if there is no connection to the sewerage system.

Table 5.2 Kind of toilet of the households in the four different types of neighbourhoods, (1997)

<table>
<thead>
<tr>
<th></th>
<th>Pamplona (old)</th>
<th>Pampas Cooperativa (intermediate)</th>
<th>Pampas asentamientos humanos (intermediate)</th>
<th>Pampas Unconsolidated (new)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No toilet</td>
<td></td>
<td></td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Public Latrines</td>
<td></td>
<td>1%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Private Latrines</td>
<td>3%</td>
<td>15%</td>
<td>27%</td>
<td>60%</td>
</tr>
<tr>
<td>Shared Toilet</td>
<td>3%</td>
<td>2%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Private Toilet</td>
<td>94%</td>
<td>82%</td>
<td>68%</td>
<td>12%</td>
</tr>
<tr>
<td></td>
<td>n=100</td>
<td>n=124</td>
<td>n=182</td>
<td>n=90</td>
</tr>
</tbody>
</table>

Gamma = -.76, p = .000

Source: First household survey 1997.

5.4.3 The complex of wastewater treatment ponds
The wastewater treatment ponds were designed in 1961, when the only population in the area was to be found in Ciudad de Dios. In that era, Ciudad de Dios was still expected to become a satellite city that would grow from its population of 30,000 at the time to a maximum of 60,000 (it was estimated that the desert area simply could not support more than that). The engineer responsible for the project planned the complex at an acceptable distance from the urban centre, and from the anticipated 60,000 users. Wastewater would be treated using the newest technologies from the United States, and the treated water would be used to create a green belt that could compensate for the loss of green areas in the city (already a subject of concern in the 1950s). The forest was designed in such a way that it would block some of the winds coming from Lima, and form a curtain against dust and air pollution. Furthermore, it was planned on a sanitary landfill, an area that, in theory, permitted no other use than converting it into a green area for recreational use.8

In theory, the ponds have several important benefits:
1 Environmental damage due to discharge of untreated wastewater is avoided.
2 Scarce water resources are conserved.
3 Greater crop and fish production close to the city is made possible (Bartone et al. 1987).9

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8. Interview with the engineer Alejandro Vinces, responsible for the project, 15 July 1995.
4 A ‘green lung’ compensates for the lack of green spaces and ‘absorbs’ some of the polluted air.

The eucalyptus forest surrounding the stabilisation ponds and a recreational park named ‘Parque Zonal Huayna Capac’ are indeed irrigated areas as planned, but reality caught up with and even surpassed the projections. The population grew to almost 300,000, advanced to the boundaries of the complex, and by the beginning of the 1990s had even started to cut down the eucalyptus forest to clear land for new invasions. The Lagunas de San Juan nowadays cover 20 hectares and have 21 ponds. What could have been a solution to an environmental problem – and a very advanced and innovative one for its time – unfortunately turned into an environmental problem itself due to undercapacity and bad management.

No recent data exist on the water quality after treatment. Based on a compilation of data available from the early 1980s, Wierda concludes:

‘The complex is malfunctioning. The treatment performance is such that the WHO guidelines for unrestricted irrigation are not met. This is in the first place a consequence of overloading of the primary ponds’ (Wierda 1995:24).

As a consequence, Wierda concludes that only 18.4% of the treated wastewater is of an acceptable quality, 30% is conditionally acceptable, and 52% is unacceptable (Wierda 1995:30). The water quality is so bad that it does not even meet WHO standards for irrigation of the recreational park Parque Zonal Huayna. But when the treatment ponds are not functioning, for whatever reason (and there are many), farmers use raw sewage, although it damages their crops.

The treated wastewater is used to irrigate approximately 20 hectares of farmland and to feed 3 hectares of fish ponds. Only 33% of the 50 hectares reserved as forest is actually in use. In theory, this eucalyptus forest should be irrigated with treated water. In practice, it is irrigated with raw sewage. Often it is a simple practice of creating an overflow from the open channels with raw wastewater. As a result, the soil has turned into an unpleasant-smelling swamp, where it is unsafe to walk without boots.

One alarming conclusion from the few studies carried out was that 91% of the agricultural products irrigated with raw wastewater from the ponds showed the presence of parasites. Although this figure was lower for the products cultivated with treated water, it was still high enough to be a problem. The same holds true for the presence of the salmonella bacteria. It must be added that neither the Ministry of Health nor the municipalities of the Cono Sur have implemented a programme of wastewater quality control, nor to control the quality of the agricultural products. The products grown with treated wastewater failed to meet quality standards’ (IMP 9).

9. It must be noted that in the original plan, the wastewater never was meant to be used for agricultural purposes (Matos Mar cited in Wierda 1995:14).
10. Thus, people are living on a sanitary landfill. The case of this settlement ‘Susana Higuchi’ has caught national attention. The invaders were extensively informed by both government officials and NGO workers of the health risks, but refused to leave the area. For political reasons they were allowed to stay.
11. The entity primarily responsible for water quality controls.
1998: 5.4.2.1:12). Also, the treatment process in the wastewater treatment plants is not monitored. There are no specific standards for the use of wastewater in the Cono Sur. Neither is there any control on the kind of products cultivated with this water as is specified in the General Water Law (IMP 1998: 5.4.2.6.d:25).

5.4.4 **Solid waste management**

The 311,000 inhabitants in San Juan de Miraflores produce an estimated 132 tons of solid waste per day. An additional 27 tons is produced daily at the markets. The amount of waste produced is related to household income. Since poverty is not equally distributed over San Juan, waste production differs per zone as well. No reliable data on the production of household waste in the district existed, so a study was carried out to determine this. As can be concluded from Table 5.3, the amount of waste produced per inhabitant per day is indeed related to income: the wealthier the household, the more waste produced. The table illustrates the importance of more detailed measuring of household waste production. In the general statistics on household waste production in Lima, it is assumed that waste production in San Juan de Miraflores is 0.375 kg per inhabitant per day, which results in a total daily production of 116 tons according to these estimates (IPES 1995:17). These statistics do not take into account the income differences within the district.

**Table 5.3** Household waste production per income class in San Juan de Miraflores in 1998

<table>
<thead>
<tr>
<th>Income level</th>
<th>Sample area</th>
<th>Kg/inhab/day</th>
<th>Total production per class – tons/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 High</td>
<td>Urbanización San Juan</td>
<td>0.47</td>
<td>58</td>
</tr>
<tr>
<td>2. Medium high</td>
<td>Alfonso Ugarte (Pamplona)</td>
<td>0.42</td>
<td>28</td>
</tr>
<tr>
<td>3. Medium</td>
<td>San Miguel de Apurí (Pampas Cooperativa)</td>
<td>0.33</td>
<td>14</td>
</tr>
<tr>
<td>4. Low</td>
<td>20 de Mayo/Paraiso–Pampas asentamientos humanos</td>
<td>0.33</td>
<td>17</td>
</tr>
<tr>
<td>5. Extreme poverty</td>
<td>Manuel Scorza – Pampas unconsolidated</td>
<td>0.35</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Total waste production in the district</td>
<td>132</td>
<td></td>
</tr>
</tbody>
</table>


The difference between the 0.47-kg per inhabitant per day for the higher-income households and the 0.33 kg a day for the lower-income households can be called considerable if we think about what this means in terms of daily production. Sixty percent of the total population of San Juan produces more than 0.4 kilo per inhabit-

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12. This does not include waste from the biggest market, Ciudad de Dios. No data are available for the market, which furthermore organised its own waste collection through private contractors.
13. See for the methodology of this study methodological Annex 2.
The natural and support system in Pampas de San Juan and Pamplona

ant per day, making the total production in San Juan not the 116 tons generally estimated, but 132 tons a day. That the poorest households in Pampas de San Juan produce slightly more waste per day then the households in class 3 and 4 has to be attributed to the characteristics of their plots: they have a higher proportion of sand in their waste. This is clearly shown in Table 5.4.

Table 5.4 Composition of household waste for the different income levels and daily production in tons (1998)

<table>
<thead>
<tr>
<th>Material</th>
<th>Income level (high)</th>
<th>Income level 2 (medium)</th>
<th>Income level 3 (medium)</th>
<th>Income level 4 (low)</th>
<th>Income level 5 (extreme poverty)</th>
<th>Total daily production in tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic</td>
<td>52.5%</td>
<td>51.9%</td>
<td>61.1%</td>
<td>52.6%</td>
<td>46.3%</td>
<td>69.4</td>
</tr>
<tr>
<td>Inert (sand)</td>
<td>8.7%</td>
<td>10.1%</td>
<td>7.9%</td>
<td>10.8%</td>
<td>12.7%</td>
<td>12.7</td>
</tr>
<tr>
<td>Glass</td>
<td>2.4%</td>
<td>1.5%</td>
<td>2.4%</td>
<td>1.6%</td>
<td>2.4%</td>
<td>2.7</td>
</tr>
<tr>
<td>Paper</td>
<td>5.7%</td>
<td>6.5%</td>
<td>4.6%</td>
<td>7.3%</td>
<td>6.1%</td>
<td>7.9</td>
</tr>
<tr>
<td>Plastics</td>
<td>6.9%</td>
<td>7.7%</td>
<td>8.4%</td>
<td>8.5%</td>
<td>11.5%</td>
<td>10.4</td>
</tr>
<tr>
<td>Tins/cans</td>
<td>2.4%</td>
<td>2.2%</td>
<td>2.6%</td>
<td>2.6%</td>
<td>2%</td>
<td>3.1</td>
</tr>
<tr>
<td>Cardboard</td>
<td>2.1%</td>
<td>2.1%</td>
<td>2.0%</td>
<td>2.1%</td>
<td>2.4%</td>
<td>2.8</td>
</tr>
<tr>
<td>Textile</td>
<td>2.7%</td>
<td>3.5%</td>
<td>1.9%</td>
<td>4.2%</td>
<td>3.7%</td>
<td>4.1</td>
</tr>
<tr>
<td>Metal</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0.2%</td>
<td>0.2%</td>
<td>0.1</td>
</tr>
<tr>
<td>Wood</td>
<td>0.5%</td>
<td>1.3%</td>
<td>0.5%</td>
<td>0.9%</td>
<td>2%</td>
<td>1.2</td>
</tr>
<tr>
<td>Toilet paper</td>
<td>12.6%</td>
<td>10.3%</td>
<td>4.4%</td>
<td>4.4%</td>
<td>5.2%</td>
<td>12.3</td>
</tr>
<tr>
<td>Construction waste</td>
<td>1.1%</td>
<td>0.7%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0.8</td>
</tr>
<tr>
<td>Shoes</td>
<td>0.5%</td>
<td>0.9%</td>
<td>1.3%</td>
<td>1.3%</td>
<td>0.6%</td>
<td>1.1</td>
</tr>
<tr>
<td>Other</td>
<td>2.1%</td>
<td>1.2%</td>
<td>3.3%</td>
<td>3.5%</td>
<td>4.9%</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>132</td>
</tr>
</tbody>
</table>

Source: Own study in co-operation with IPES, 1998

Organic waste is by far the largest component of waste, which is normal. The percentages are a little higher than for Lima as a whole (46%, IPES 1995:19), which is logical given the general correlation that 'the poorer the households, the higher the share of organic materials in their waste'. The high share of toilet paper has to be attributed to the general habit in Lima of disposing of toilet paper in a special bin to avoid blocking the toilet. Since it is also moist, it has a relatively higher weight.

It is most important to look at the percentages of those materials that have a recycling potential: organic waste on the one hand, and items such as paper, cans, glass, textiles and metal on the other. San Juan de Miraflores produces around 70 tons of organic waste per day, which has a high recycling potential. Of the inorganic waste, around 30 tons a day could be recycled. There are many itinerant buyers and even several wholesalers in the Cono Sur that take an interest in the waste produced. No data are available on the amount of inorganic materials that are collected on a daily basis by the tricicleros that pass through Pampas. We only know that there are very few inhabitants who separate their waste (see Section 6.2).
Map 5.4 Parks and waste in Pampas de San Juan

Legend:
- Park (according to urban development plan)
- Park (actual)
- Trees
- Waste accumulation (large and small)
As in the rest of Lima, the waste in San Juan de Miraflores is not adequately collected, but the frequency of the collection improves once the settlement consolidates. Even though in Pamplona waste is collected from all households – albeit on an irregular basis – this happens in only 58% of the unconsolidated settlements in Pampas (Table 5.5). The respondents who indicated that they could count on a regular service are all concentrated in a few settlements on the main roads.

Most inhabitants indicate that waste is collected, but on an irregular basis. This means that the trucks can never be counted on to come, and sometimes they do not come for a week or longer. In a hot and humid climate such as Pampas, this can cause a serious stench and attract pests.

Table 5.5 Frequency of solid waste collection in the four different types of neighbourhoods (1997)

<table>
<thead>
<tr>
<th>Waste collection</th>
<th>Pamplona (old)</th>
<th>Pampas Cooperativa (intermediate)</th>
<th>Pampas Asentamientos humanos (intermediate)</th>
<th>Pampas Unconsolidated (new)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>42%</td>
</tr>
<tr>
<td>Regular</td>
<td>98%</td>
<td>2%</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Irregular</td>
<td></td>
<td>95%</td>
<td>87%</td>
<td>51%</td>
</tr>
</tbody>
</table>

n=100 n=124 n=181 n=90

Gamma = -.46, p=.000

Source: First household survey 1997.

In the study area, waste from many neighbourhoods is heaped under the electrical pylons. This area was identified as the biggest accumulation point in the district (IMP 1998:11-17). People also dump their waste on abandoned plots in the neighbourhood, or on land for which no one feels responsible. The concentration areas of waste are indicated on Map 5.4. This map shows the accumulation of waste under the electrical pylons, and also in those areas that are reserved as green areas but have not yet been put to use. Another remarkable fact is that the streets in the cooperativas in general are cleaner than those in the asentamientos humanos.

5.4.5 Roads

In 1996 there were only a very few paved roads in Pampas de San Juan. The main through road (Avenida Miguel Iglesias) leading from the Maria Auxiliadora hospital to Villa El Salvador had been paved a few years before. One lane was still under construction. Two other major roads coming from the Panamericana and passing through the well-consolidated Urbanización de San Juan were paved too, one of them becoming a dirt road at the point its importance declined. One housing block organised the paving work in front of their houses (see map 5.6). One of the consequences of the lack of paved roads is that the inhabitants suffer from dust contamination. Everything in Pampas is covered with dust, which even gives the plants a dispirited appearance, and new dust clouds surge from each car that passes by..
In the *asedamientos humanos* there are no proper parks at all. In some cases, neighbours brought some plants and trees together, ‘greening’ a part of the area reserved for a park. In other cases, people planted small gardens in front of their houses, where they grow vegetables, maize and flowers. In the *cooperativa* 27 de Julio, there are even several empty plots converted into vegetable gardens. In the *cooperativas* 14% of the respondents had a park in their neighbourhood, in the other three zones the respondents all answered that they had none.
By 1997, this picture had already changed considerably. Many of the other important interconnecting roads were paved. Even some of the access roads to the most recent settlements had been paved. This brought a new phenomenon to Pampas: the area can now be crossed by motorised rickshaw. In 1998, 37% of the respondents in Pamplona had a paved road in front of their house. In Pampas cooperativas this was 29%, in Pampas asentamientos humanos 86%, in the newest settlements 2%. This means that the vast majority of the inhabitants still had to do without paved roads.
However, during the two election campaigns – the autumn 1998 local elections and the April-May 2000 presidential elections – there was a steep increase in investments in roads. For Pampas, one of the areas where many roads had yet to be paved, this made a considerable difference. Within two years, an impressive number of roads were paved, some by the local government, some by the army, some in a joint effort between the two. The results of this effort can be seen on Map 5.6. As of April 2000, all major interconnecting roads were paved. Even the highest settlements are now more or less accessible by car. Several cooperativas and three asentamientos humanos have had all their roads paved, and many others have some paved roads. Efforts so far have been concentrated on the lower parts of Pampas. In the southern part of Pampas, many of the roads still have not had any improvement at all.

5.4.6 Parks and green areas

On paper, in the urban development plans, there is ample space reserved for green areas. A field inspection of the areas which according to municipal plans were designated as ‘green areas’ found that only 35% of the reserved areas had an actual use as a park in the neighbourhoods (IMP 1998: III.5.4.1). San Juan de Miraflores, whose current mayor puts great emphasis on greening his district\(^\text{14}\), has 60% of its designated areas (159 parks at neighbourhood level) actually functioning as parks. The vast majority of these parks are to be found in the consolidated higher-income parts of the district.

There are very few parks in Pampas (Map 5.4). There is not a single official park: that is to say there is not one park built, planted, or recognised as a park and therefore taken care of by the municipality. Nevertheless, the inhabitants are taxed for ‘Parks and green areas’, which leads to many bitter comments. The parks that do exist are a result of initiatives of the inhabitants. A few of them are indeed gradually taking the shape of a park, one in the cooperativa 27 de Julio and two in the cooperativa Santa Ursula. In 27 de Julio, some pathways in the park are even paved, and there are three concrete benches donated by the municipality. The trees in this park have just been planted and still have to grow. The soil between the trees is still bare. The parks in Santa Ursula do not have benches or pathways, but they are somewhat better endowed with plants and trees. In one of them there is even some shade. But the same park is only partially filled; a third of the area is still empty.

In 1999, the municipality planted trees on the median strip of the two main roads. Residents also planted several small gardens in the areas in front of their houses. Shortly after the main road in Republica Democratica Alemana was paved, trees were planted there as well. But Pampas receives considerably less attention when it comes to the forestation programme of the municipality than do other parts of San Juan de Miraflores. By far the most plants and trees in the area were planted by the residents themselves. As indicated earlier, it is impressive to see what people sacrifice to create some green in the desert. Those streets that have a lot of green have a far more inviting character than the streets without it.

\(^{14}\) Personal communication from the Director of Green Areas, April 1996.
5.4.7 The houses
The majority of the houses in the study area are built of durable materials. In 2% of cases, people had managed to build more than a second floor. Whereas in the oldest settlements (Pamplona) only 3% of the houses still are made of wood, in the newest settlements this is more than two thirds. Another 11% in the newer settlements still live in straw shacks. Table 5.6 shows a clear picture: the older the settlement, the more consolidated the house. But even in Pamplona, over 40% of the houses do not yet have a proper (concrete) roof. Putting up four brick walls is different than managing to construct a concrete roof. People often have to apply for a separate loan to build their roof. It is also clear that, despite the fact that in the cooperativas it is more difficult to obtain credit, more people had managed to improve their houses than in the asentamientos humanos. There are fewer precarious houses in the cooperativas, and more people have a roof or even a second floor. In Pamplona, almost everybody has already passed the stage of precarious housing. In the cooperativas, 87% had reached this stage. In Pampas asentamientos humanos, 76% have four brick walls, but fewer people have a roof or second floor than in the cooperativas and Pamplona. In the youngest settlements, only 26% reached the stage of durable materials.

Table 5.6 Consolidation level of the houses in the four different types of neighbourhoods (1997)

<table>
<thead>
<tr>
<th>Consolidation of the house</th>
<th>Pamplona (old)</th>
<th>Pampas cooperativa (intermediate)</th>
<th>Pampas consolidated asentamientos humanos (intermediate)</th>
<th>Pampas unconsolidated (new)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straw</td>
<td></td>
<td>4%</td>
<td>8%</td>
<td>11%</td>
</tr>
<tr>
<td>Wood</td>
<td>3%</td>
<td>9%</td>
<td>16%</td>
<td>63%</td>
</tr>
<tr>
<td>Brick/1 floor/ no concrete roof</td>
<td>44%</td>
<td>41%</td>
<td>43%</td>
<td>16%</td>
</tr>
<tr>
<td>Brick/ 1 floor/ concrete roof</td>
<td>35%</td>
<td>33%</td>
<td>25%</td>
<td>6%</td>
</tr>
<tr>
<td>Brick/2 floors/ no concrete roof</td>
<td>12%</td>
<td>12%</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Brick/2 floors concrete roof or more</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Gamma} = -.49, \ p = .000
\]

Source: First household survey, April 1997.

5.5 In conclusion
The peripheral areas of Lima offer very little in terms of natural resources to build a city. The only ‘natural resource’ available is a desert area, where the sand alternates with steep rocky hills. The fact that the wells have fallen dry is an indication of the deterioration of the very few natural resources the district had.
The environmental conditions in Pampas and Pamplona reflect the environmental problems for Lima as a whole: lack of sufficient and safe drinking water, a lack of sanitary services and a lack of adequate waste collection and of green areas. The combined lack of paved roads and of green areas leads to dust pollution. The complex of stabilisation ponds is a location-specific feature of the district that can be considered both a ‘man-made’ natural resource as well as an environmental problem. Other environmental conditions improve over time: the older the settlement, the more advanced in the process of environmental improvement. The older the settlement, the more consolidated the houses, the more roads are paved, the more waste is collected and the more houses are connected to the water and sewage system. The only exception is that in Pamplona people receive water from the tap less often than in some parts of Pampas. The more recent the settlement, the more people have to face environmental problems: lack of drinking water (and/or contaminated water), and a lack of proper sanitation, adequate housing, paved roads, green areas and solid waste collection.

First of all, we can conclude that the majority of these problems indeed belong to the ‘brown agenda’, and pose a direct threat to the health of the inhabitants.

Secondly, there are several ‘transfer mechanisms’ that can be identified. This is most notable with respect to the issue of solid waste, which is literally found everywhere in the district, but particularly is accumulated on ‘no man’s land’ where it is dumped by the inhabitants. These masses of waste pose health risks, especially for the children playing in them.

A similar process of contamination and deterioration results from the lack of sanitary services. The spots of ‘no man’s land’ used by those who do not have their own latrine can likewise form a serious health risk.

We can also conclude that consequences of environmental problems at higher levels of scale are transferred to Pampas. This is most conspicuous on the issue of over-exploitation of the local water bodies. The poor, whose water supply is rationed, bear the consequences of water scarcity. They receive less water than in richer parts of the city. Furthermore they receive it only a few days a week, and thus need to store their water in tanks for several days, during which the water quality deteriorates rapidly.

Seen from the perspective of the household and the settlement, the problem of wastewater is transferred to a higher level of scale: that of the district. But San Juan de Miraflores is the only district where almost all wastewater is treated within the district boundaries instead of being dumped untreated into the ocean. The fact that the stabilisation ponds turned from a solution into a problem has to be attributed to failures in the human system, not in the support system as such.

The other environmental problems in Pampas and Pamplona also show a strong influence from failures in the human system. They obviously have a component of access and distribution. Even within the district, the wealthier areas are better served than the poorer parts. In the wealthier areas drinking water supply is better and more stable, waste is more often and more adequately collected and more roads are paved. How this human system functions in Pampas and Pamplona will be discussed in the next chapter.