

Regularization of Spontaneous Settlements

by Rodolfo Mercado and Ricardo Uzín



Rodolfo Mercado was born in Bolivia in 1955. He is an architect and was awarded a Masters degree in Urban and Land Use Planning by the University of Cantabria, Spain. He has over ten years of experience in teaching and research on the participatory planning process in the peri-urban areas of Bolivia.

He works as a consultant to GTZ, the German agency for technical cooperation, advising on municipal decentralization and participatory planning.



Ricardo Uzín was born in Bolivia in 1955. He is an architect specializing in urban planning. He has wide experience of university teaching and has worked for over ten years in the Municipality of La Paz, where he has developed urban administration and systems for plot registration.

He is currently a consultant to the United Nations Development Programme on urban legislation and participatory planning.

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Preface

When Swedish Development Aid was reorganized in 1995, a new Urban Development Division was established, acknowledging the importance of cities as centres of both dynamic growth and human hardship. It is responsible for setting policy, conducting programmes in infrastructure and housing, and advising the other sectors of Sida when they work in urban areas.

We are pleased to present four *Building Issues* as a Swedish contribution to the Second United Nations Conference on Human Settlements, Habitat II, Istanbul 1996. They address the themes of the conference: *adequate shelter for all* and *sustainable human settlement development in an urbanizing world*.

Rodolfo Mercado and Ricardo Uzín have written one of these four *Building Issues*.

Göran Tannerfeldt

Head of the Division for
Urban Development and Environment
Sida

1 Introduction

Problem

This report is based on studies done in Bolivia, Chile and Peru during 1995, and is thus specific to parts of Latin America. Spontaneous settlements in these countries are a response to population pressure. Poorly built shelters are scattered without any plan, and there are almost no services or basic urban infrastructure. The main causes are: urban migration, concentration of services and resources to a few large cities and inadequate housing policies for the current rate of urban growth. Each spontaneous settlement is unique, because of diversities in the social conditions of the residents, in the institutions and the infrastructure of each city.

The one characteristic common to all spontaneous areas is that the land is used before there is a plan or any infrastructure. Plots are occupied, and houses are constructed immediately, with temporary materials. The poor quality of the structures is related to the lack of infrastructure and basic services; they deteriorate rapidly through lack of maintenance or overcrowding. The plots are usually located in areas not zoned for construction, or where there is high risk for natural disasters, such as landslides, earthquakes or floods. They are not interesting as commercial real estate, and are thus easily taken over by the low income population.

Most of the residents of these areas, or their parents, migrated from the countryside to seek work and better living conditions. They are generally young – the average family size is six – and have little formal schooling. They maintain the traditional forms of community organization, such as political and family influence or self-help cooperation, to fend off local authorities and ensure their access to plots and basic services. Their goal, rarely obtainable, is a large plot, a house built of permanent materials and a garden.

Until they feel they have secure tenure of their plots, they are not willing to invest. Houses are temporary, in case they must move out quickly. Although some governments tried to solve this problem through social development, the projects often collapsed through inefficiency, and quickly began to resemble spontaneous settlements again. They became unhealthy, with a deteriorated

Spontaneous settlements are often located on marginal land not appropriate for construction.

rating environment, lacking basic services and infrastructure. Once the plots are legally registered, the family has access to forms of cooperation and support and is willing to invest and improve its housing.

Types of Irregularities

Common to all the irregularities is the lack of basic services.

- *The first type of irregularity results from peaceful or violent occupation of sites that may belong to government or private owners.*

In the cases studied, the only legislation that established the conditions for the recognition of these spontaneous settlements was in Peru. It defines the requirements for the occupants' qualification and the process for regularization. Historically this is how spontaneous settlements in many developing countries were formed. The immediate result is the arbitrary division of land and the construction of temporary buildings without municipal control.

- *In the second type the plots were bought from the legal owners.*

This may not have been done through formal legal procedures. The residents have not complied with zoning regulations, mainly because the site is not suitable for construction (rural areas or natural reserves), or because the cost of developing the land is so high. The main result is that the buildings are temporary in character.

Often the residents try to acquire plots through agreements with the owner or his agent, who helps to subdivide the plot. The municipal authorities responsible for control and legalization are aware of the process, which creates dubious legal rights and expectations, "property rights expectancy," not recognized by law.

Current Solutions

There are three common ways to address problems arising from the formation of spontaneous settlements in the countries studied. Together they form a national land development policy: anticipate the formation of settlements, continue the regularization process in existing settlements and/or try to find other solutions.

- *Anticipating and planning settlements, legally appropriating public land and implementing urban designs that consider social aspects.*

Neighbourhoods and even cities have been built this way, and they resemble spontaneous settlements in the lack of services or public investment in infrastructure. This policy provides a framework for urban land development and improvement of living conditions, since it allows control and regularization of spontaneous settlements.

- *Regularization as a long process of restructuring with judicial, physical, administrative and social components.*

The goal is to ensure permanent settlement of the residents with better living and environmental conditions.

- *Resettlement.*

This is a massive programme to find new plots for the people in dense areas. Because of urban growth, land prices have soared, creating a contradiction between these settlements and the urban plan. Resettlement may be a necessary part of regularization, when there are too many families for the available plots.

To resettle households, plots must be available, and these are usually in the outskirts of the city. The successful programmes have had strong political support and the full participation of public institutions. Support was not only for physical restructuring and donation of infrastructure for the plots, but included social work, training, community infrastructure and tree planting. However, the daily living costs for the residents are high, because the settlement is usually far from the urban centre.

The concern of this study is the regularization of spontaneous settlements. It recommends actions to facilitate, at low cost, the implementation of a regularization process. It places priority on: physical planning, the legal registration of the plots, and the creation of mechanisms to facilitate access to credit.

Method

The report is based on case studies from Bolivia, Chile and Peru. A framework for interventions in spontaneous settlements was defined. The case studies were selected to show successful examples of regularization, with respect to legalization of tenure rights and financial and physical restructuring. Other factors used in selecting the cases were the availability of information and institutional support for the study. Questionnaires were prepared, and selective interviews were conducted.

The comparative analysis, a review of the literature and personal experience gave a picture of the physical characteristics of spontaneous settlements, highlighting the key features in the regularization process. Specific suggestions were formulated for each of the stages in the process. Note that these recommendations are offered as suggestions and guidelines, not recipes, because of the diversity of the countries and the differences in legislation, urban regulations and socio-economic conditions.

Organization of the Report

The report consists of two parts.

Part 1, consists of Chapters 1, 2 and 3. Chapters 1 and 2, consider the concepts derived from the experiences observed, noting the most significant lessons learned in the regulating process. Chapter 3 suggests how to deal with the most important stages of implementation in a regularization project.

Part 2, Chapter 4, summarizes the case studies in Bolivia, Chile and Peru.

2 General Considerations

Urban Irregularities

Even though it is clear that current urban building norms are inappropriate for the rate of local population growth and expansion, there is no change in the regulations. In many large cities urban development is characterized by the illegal occupation of plots. This leads to urban chaos and irregularities. In all the cases studied, there are three main characteristics of the irregularities.

- *Illegal occupation of land belonging to the government or a private owner.*

This is the first step in the formation of an irregular settlement. Various types of land are occupied:

- agricultural land meant for pasture or communal use,
- government or municipal land intended for social or technical infrastructure or other non-housing purposes, but not yet developed,
- private plots that are not used, occupied because of land pressure or for political reasons.

An effect of irregular occupation is that the plots are not registered in the Municipal Land Register, and their occupants do not pay taxes.

- *Chaotic growth and land division, without consideration for norms or plans made by local authorities, limit and hinder future development, especially when the process has gone far.*

It has been observed in recent years that there is some organized preparation of urban physical space, either through the activities of the residents or by professionals that have unofficially supported the formation of the settlement. A result is that the plot boundaries are drawn at right angles, but no consideration is taken of slopes or for installing basic services later. Nor is there any allowance for access roads, wide enough for future motor traffic, or for social areas.

The plots are defined individually without any planning or consideration for regulations, so the land between the plots is inadequate and irregular.

- *Lack of basic infrastructure: water, sewerage, rain water drains, electricity and paved walks and roads.*

The first goal of a resident in a spontaneous settlement is to obtain a shelter to provide protection and a basic level of comfort, so the lack of services is not an issue. However, increased crowding, high costs and technical requirements for installing the services later on are a serious limitation that inhibits the integration of the settlement with the rest of the city.

Unpaved streets are a health hazard in high density areas both in dry and wet weather.

Many people live at the edge of survival and consume their few resources for shelter. Existing vegetation is used for construction or removed in preparing the plot. The small amounts of garbage produced are scattered in the streets or empty plots. Massive trash deposits in ravines block drainage and cause floods during rainy seasons.

In established settlements the subdivision of plots leads to smaller structures occupied by more than one family. An arbitrary and disorganized grouping of plots can be found in older settlements. More recent settlements show the influence of urban design criteria, such as a grid pattern. However, subdivision of plots and population growth create irregularities in the grid. Steep slopes and the lack of traffic lead to the formation of small, narrow streets inappropriate for the grid pattern.

No space is left for green areas or infrastructure. It becomes impossible to put in access roads, sewerage or electricity, not only because of the high cost, but because of local policies and restrictions on these settlements and the topographic conditions. There is a great difference between the areas nearest the access roads and those farther away. Those near the road have the advantage of being closer to water, distributed by trucks, and sewer systems. Those farther away have latrines and open sewers. On slopes waste is dumped into ditches causing saturation of the soil and landslides, a threat to the precarious buildings on top.

Informal street commerce in the main access roads, in intersections and at public transport stops cause further chaos, traffic jams and insanitary conditions. The rest of the land is used for housing, with scattered spaces for small family industries and handicrafts.

Houses differ according to how well established the settlement is, and how secure the residents feel about

their tenure rights. Differences in construction include how permanent the structure is, use of local resources and the number of rooms. In new settlements where the main interest is in acquiring space, houses are built of mud, left-over wood and recycled materials on the edge of the site. They have one or two rooms, and if necessary additional rooms are built without plan or functional criteria. After 10 – 20 years, if the residents gain legal tenure, more permanent materials such as bricks, concrete and metal sheets for the roof are added to the original structure. In established settlements, almost all the plots are built over, sometimes leaving space for a very small inner patio. The stone foundations, lighting and ventilation are very poor in most houses.

Because there are no recreational spaces, children have nowhere to meet except in the streets. This is a result of irrational use of space and little public investment, particularly in education and health. Space left for social infrastructure is rapidly occupied by other buildings, unless the services are established and used frequently. That creates dependence on other better equipped urban centres, and the need to travel raises costs for people living in the area.

The Regularization Process

The expression *regularization* is used to mean legalization together with any necessary physical restructuring of land use. The main concerns are:

- To improve safety for the residents by reducing the risks for fires, flooding and natural disasters.
- To improve the road network for better accessibility and public transportation: such as ambulances, fire trucks and commuter buses.
- To reserve land for community services such as schools and clinics.
- To improve infrastructure.

Direct intervention in spontaneous settlements must guarantee rights to land, a land use plan to set the minimum standards for construction and traffic, provision of technical and social infrastructure, basic services, and financial and technical support for implementation.

In the cases studied, the following were achieved.

- Delivery of title deeds to the households.
- Re-design of the layout, blocks and plots, paving of at least sidewalks.
- Installation of household water, sewerage, electricity and sometimes gas.
- Introduction of financing for construction and/or housing improvement.
- Community education on the use and maintenance of buildings.

Not all settlements are suitable for regularization. Some considerations include soil stability, potential natural risks, prohibitions on land use, and whether the site was privately owned before occupation. A feasibility study is essential to decide how much and what can be done.

Resettlement of squatters is not recommended except in the following situations:

- There are physical risks or restrictions with the site.
- There are too many families for the number of plots.

Moving people generates serious social conflicts, creating discontent and problems in the new settlement. The problems tend to be related to the distance to work, access to markets, education and health services. A spontaneous settlement should not be removed to free land for the commercial real estate market. This causes resentment, and if it is implemented, can discredit the entire intervention.

Legal and Institutional Framework

New spaces for human settlements are usually created by land development in areas of urban expansion. This process should be in accordance with a general plan for regularization, clearly defining plot subdivisions, areas for technical and social infrastructure, roads, neighbourhoods and basic service grids. The legal owner must transfer the plot through a sales contract.

Spontaneous settlements are not covered by urban legislation or public housing policies, showing government indifference to one of the main forms of urban development and growth in developing countries. This leads to the deterioration of living conditions and causes social conflict. Recognition of this reality in policy, to control and regulate growth of such settlements, is the first step in resolving the problem.

It is necessary to improve the legal regulations for ownership of urban land, to allow development and planning of the sites. This will address the temporary nature of established settlements and regulate the formation of new ones, without violating rights of private ownership. Improvements in the legal system should be complemented by public investment in the regularization and improvement of neighbourhoods.

Legal settlements should be regulated according to the following process:

- Collect qualitative data on the social, geographic and health status of the settlement to establish whether it has potential for improvement. Assess the legal ownership of the plots, social profile of the residents, geographic location and its physical characteristics.
- Develop a flexible plan for the physical reorganization of the settlement: road layout, technical and social infrastructure, minimum plots size, basic services (water, sewerage, electricity, paving, etc.).
- Negotiate with the authorities to grant tenure for each plot. The deeds should specify the requirements for occupation, such as the amount of monthly fees for regularization costs, mortgage and legal registration with the land authorities.

Even if there are legal procedures for the regularization of established settlements, they must be revised and complemented. They must be more flexible, especially concerning urban construction.

Although it is necessary to regulate settlements, the case studies show that the programmes mainly help in upgrading neighbourhoods, and sometimes address only

Table 1 Factors Governing the Type of Intervention

		RESETTLEMENT	OBSERVATIONS	CAN BE REGULARIZED	OBSERVATIONS
GEOGRAPHIC CONDITIONS	<i>High risk land</i> Steep slopes, rugged hillsides (+40%). Unstable ground, risk for land slides (geological faults). Sink-holes, cavities in the ground.	Total resettlement must be considered	It is impossible to intervene. Urban regulations define these areas as not possible to develop.		
	<i>Rugged land</i> Medium or steep slopes (15–40%). Rugged hillsides with brooks or rapid streams. Rocky river beds. Areas with wind or water erosion.	Partial resettlement. Complete resettlement if water is absent, distant or too deep.	Some areas might not be developable. Analyse the cost of land stabilization. If there is inadequate water pressure for the height of the settlement, it might not be possible to regularize. Lack of land for resettlement, could prevent regularization.	Regularization might be expensive and time consuming.	Possible works required: land stabilization and anti-erosion protection such as afforestation, platforms on ejection cones, water drainage, support walls or embankments along slopes. Works on slopes over 30%, and construction of protective walls at river basins are very expensive.
	<i>Favourable land</i> Medium or soft slopes (7–15%). Adequate holding capacity for construction. Sandy plains or arable land with soft slopes.		Flooding or lack of water can prevent regularization.	Favourable.	
SETTLEMENT QUALITY	<i>Undergoing Densification</i> High degree of plot subdivision, irregular sizes and proportions. Intensive construction, permanent well-established population, institutional tolerance.	Resettlement appropriate where there is great overcrowding.	Limited options for physical restructuring. In the oldest settlements, the high degree of consolidation hampers regularization. The people often resist regularization. It is almost impossible to take occupied plots for community facilities.	Physical restructuring is not advisable.	Consider existing roads when planning for vehicular traffic.
	<i>Illegal Subdivision of Private Land</i> Dwellers have proof of transaction, but often no tenancy rights. Population has “expected rights” on basis of the transaction. Social conflicts caused by selling plots twice, selling more plots than available, fraud by intermediaries. Land zoned for social and technical infrastructure retained by the subdivider, so it can be sold later.			Legalization possible within the existing laws.	Protect the interests of the people through laws that force the subdivider to meet urban development norms, including expropriation in extreme cases.
	<i>Urban Irregularity</i> Subdivision outside urban norms. Urban development plans ignored in designing roads, infrastructure and services.			Can be regularized.	Useful if urban legislation allows exceptions to norms for these settlements. Programmes should be appropriate for the country; use the planning recommendations as guidelines only.

the settlement layout, basic infrastructure and legal aspects of plot ownership. The effect on individual houses is not always positive. There may be excellent civil works related to urban development, but the houses are still very temporary, with no basic services such as water or sewer connections. This may be because the households do not have resources, education or knowledge. This is why this sort of project must be integrated to facilitate access to better material living conditions.

Actors

Among the actors in the regularization process are the institutional: specialized central government offices, municipalities and NGOs; social: neighbourhood groups such as neighbourhood associations; and private social development institutions or private construction firms. There are also individuals who act in their own interests and may either help or hinder the regularization process.

The size of the problem has forced many governments to create special units or to assign specific functions to sectoral institutions responsible for national and local urban development. The government's task is to design policies, establish the norms for the implementation process, stimulate and supervise activities, distribute resources by setting priorities for projects presented to the municipalities, and provide technical assistance to less developed municipalities.

The local authority is a central actor. It identifies and surveys settlements where intervention is feasible, evaluates the social conditions of residents and defines new plots if resettlement is necessary, develops the project, supervises implementation and provides social assistance.

Central government institutions and local authorities are often hampered by political interests that conflict with their assessment of priorities and fair allocation of resources. They do not always have skilled or motivated staff, and often follow complicated administrative procedures that increase operational costs.

NGOs work directly with residents in a spontaneous settlement, often acting as technical advisors, mobilizers and providing help with legal claims. They often conduct, perhaps with the help of local authorities, reconstruction and upgrading in the settlement. They are important because they have experience of both mobilization and implementation, although they might have limited operating capacity and/or cannot meet the legal qualifications to tender for public works.

Among the social actors, local groups are very important. They act as negotiators and exert pressure on different organizations to obtain legal tenure and improvements in technical and social infrastructure. They mobilize and mediate in conflicts during implementation.

Regularization must be coupled to the processes of mobilization and popular participation. It has been proved that under normal conditions it is impossible to achieve the project goals without the involvement of the local population. For this reason it is imperative that the different institutional and social actors work together. Mechanisms for financing and allocation of resources must be agreed between the public and private institutions, since there is a trend toward rationalizing public

expenditures and decentralization from central to local government.

The main individual actors are land owners, land speculators, community leaders and professionals. The land owner might discover his land cannot be developed commercially, or that it will not be serviced. He then sells plots anyway, trying to get the biggest profit from the land. The selling of unsuitable land is thus the cause of the problem. There are two types of intermediaries: those who like land owners act for their own interests and those who work with the residents, advising them and dealing with illegal occupations. Some speculate in land subdivision or try to sell the same plot to different people. Leaders of local organizations can be effective mediators in the regularization process to improve agreements between the parties, but once they assume this role, there should be coordination between them and the urban development authorities.

Obstacles in the Regularization Process

It might be impossible to change urban regulations and give tenants legal tenure, if the area is zoned for non-residential uses such as technical and social infrastructure, or if construction is forbidden for environmental reasons. Cooperation is needed among the agencies responsible for urban design policy and those implementing the regularization programme, which should include land development and funds for improving housing in densely populated settlements. In extreme cases, partial or total resettlement might be considered.

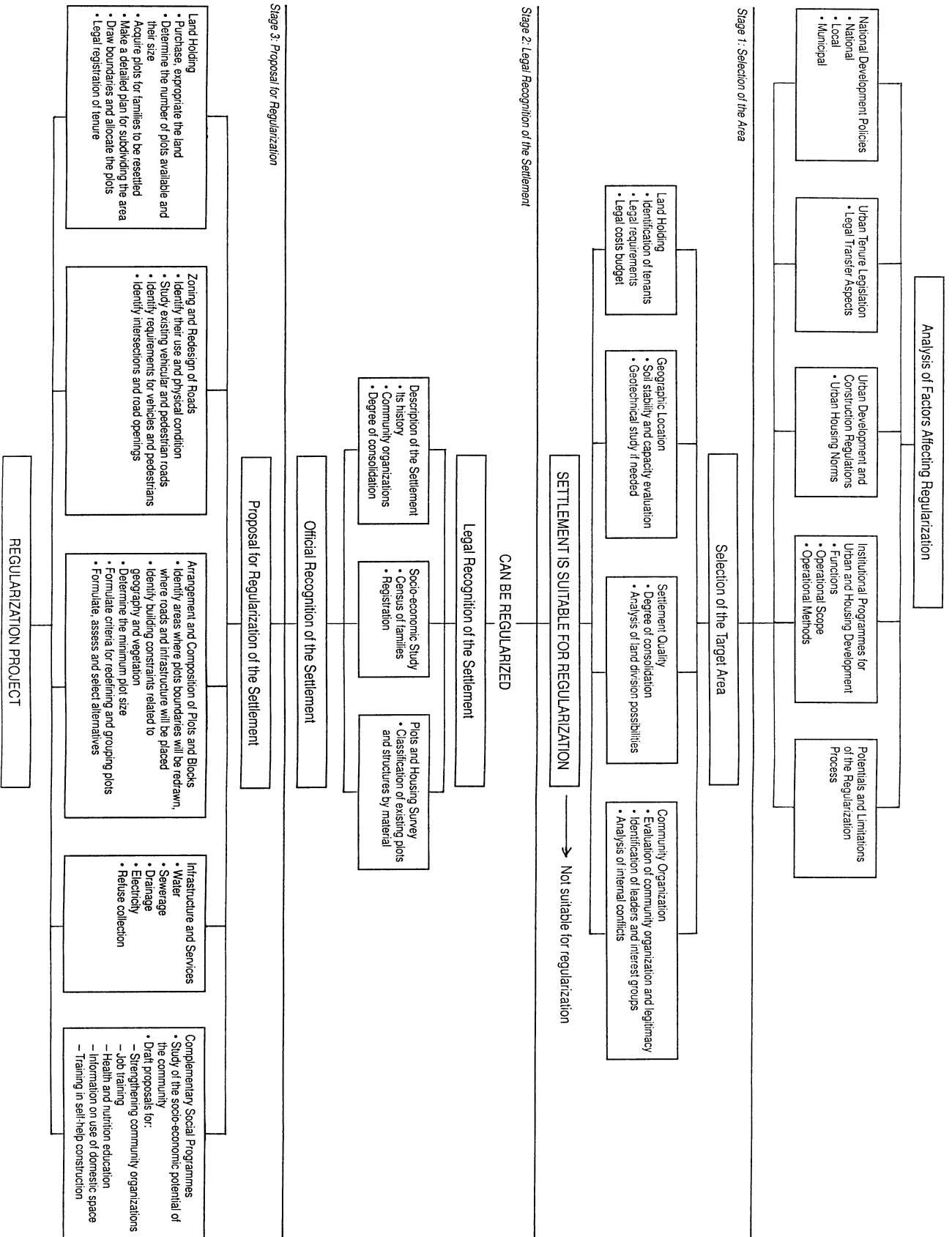
Poor soil and topographic conditions are a threat to the residents and the houses. Natural risks negate the possibilities offered by liberal urban development policies and legal arrangements. It might be possible to stabilize the land with drainage systems in hillsides or with dams, but it is very expensive and raises prices, and could promote segregation of the households by raising land values.

The only solution might be to redesign the settlement by redrawing the plots if: the settlement is extremely dense, the plots arbitrarily drawn, the houses unhealthy or present fire risks, there is no space left for community services, or the layout makes the installation of basic services too expensive or impossible. All the neighbours must be organized and committed, and the process must be completed quickly. It is important to consider that in these cases some of the occupants must move. The process must be done very carefully, and the new plots for people who must move should be prepared in advance.

Conflicts of interest could postpone implementation of a solution for many years. Promoters try to gain recognition for their work by specifying their conditions and supporting the residents. It is important that the authorities enforce sanctions against those land speculators who have not observed the laws and regulations during the process of plot demarcation. At the same time plot prices should be set according to criteria agreed by all the actors.

Most of the time local leaders, because of their local knowledge and their contacts inside and outside the community, become intermediaries between the settlement and the authorities. This gives them power and resources.

Stages and Components of a Regularization Project



They are not always interested in completing the process quickly since their position depends on their continued engagement. This is a reason communities lose interest and contact with their local organization once their needs are satisfied. Elected community representatives have clear objectives assigned by their neighbours in negotiations with local authorities and land owners. Their participation is short, until they get results. Political leaders seek electoral support; therefore, their public commitments are sometimes pure propaganda. They assume a paternalistic manner, establishing temporary alliances with other leaders, negotiating support in exchange for the resolution of local problems. The relationship established between these two sorts of leaders may be rivalry or alliance. It is important, however, to consider the effect on the regularization process. The best way to solve these conflicts is to educate the residents in the neighbourhood and to inform everyone in the settlement about the procedures and mechanisms of physical and legal regularization.

If the staff members of the organizations running the programme are not aware of the goals, they might lack commitment, which leads to poor coordination with units responsible for complementary work and support activities. The staff's lack of expertise makes it difficult to reach the project goals. The most critical element for the implementing institution is its relationship to the community, because it must establish priorities to handle conflicting interests among the actors. They have to select the families to benefit. They must define the charges for services and recover the costs incurred.

Factors Favouring Regularization

A long-term policy for physical and legal regularization of spontaneous settlements, and the continued will among public authorities, provide the institutional framework for implementation. These are the main elements contributing to success. The following should be considered in the process.

- Local organizations, recognized as legitimate by the whole community, with the capacity to negotiate and with awareness of the social actors and leaders. This will facilitate popular participation, involving the beneficiaries in diagnosis, programme design and implementation, on the basis of shared responsibilities. It is necessary to strengthen the organization's capacities through training and information on the mechanisms of intervention and the expected results at different stages.
- Financing systems appropriate for the economic and legal capacities of the families in the settlement.
- An integrated approach to the programmes to be implemented.
- A good technical framework at the design and implementation level. The design should be flexible enough to allow for different intervention techniques, appropriate for the requirements, priorities and technical possibilities of the beneficiaries.
- The participation of intermediary and independent institutions in implementation, such as NGOs, with cred-

ibility and skilled personnel committed to the objectives and with understanding of the process.

Stages and Components of a Regularization Project

Urban development policies and the legal statutes differ between countries. They offer specific possibilities and restrictions in addressing basic issues of legal tenure rights, redesigning site layouts and introducing infrastructure and basic services. Each spontaneous settlement is unique, with its own physical and social profile. This is important in designing the project since the possible solutions must be assessed according to the potentials and limitations identified in each case. However one should not avoid designing a general project methodology appropriate to the legal framework of the country and the needs of the settlement. The following guidelines are proposed in developing a regularization project, following basic principles of project planning and urban design. It is important to remember that each stage should involve the participation of the beneficiaries.

There are three basic stages in a project: selection of the area, definition and legal recognition of the settlement, development of a restructuring proposal.

- **Intervention areas are selected** to identify settlements with irregular characteristics. This is done by comparison with similar cases, and through a feasibility study to be certain that the local urban development plan, the political, legal and statutory frameworks, allows for regularization.

As a first step, national urban development policies relevant to the physical and legal adjustments of the irregular settlement are analyzed, to identify the promotion and development strategies established by local authorities and existing programmes of technical, social and financial assistance. It is important to analyze the possibilities and restrictions in the regulatory framework. The main legal instruments to consider are those dealing with the purchase of occupied plots, housing and service financing systems, social subsidies, rehabilitation regulations, forms of land development, facilities and roads.

Spontaneous settlements are identified by municipal authorities or through independent studies, possibly conducted by NGOs. Before selecting the settlement to begin working with, compare the different areas, considering the following determining factors: tenure rights (originally public or private land) which affect the legal feasibility for regularization according to established legal instruments; soil conditions and topography to determine the technical feasibility; organizational aspects of the community to determine the social feasibility. The findings will help identify areas that are not appropriate for regularization, and those with favourable conditions that are suitable for a regularization project.

- The **legal or official recognition of the settlement** is necessary to allow initial security of tenure. From this stage on the area exists as an object for regularization, permitting or guaranteeing the occupation of the residents and their rights, although it does not determine possession of the land. This requires defining the exact

boundaries of the area, the number and the social and economic characteristics of the families.

The boundaries of the settlement are determined on the basis of its historic location, the extent of community organizations and the density of its layout. These are expressed as geographic limits, forests, ravines, etc. and through physical and urban limits (roads, outlet canals, etc.).

The socio-economic analysis identifies the number of households in the settlement and their qualifications for the programme. A census of families should include the number of children, household income, length of residence in the area, contribution to community work, etc. If these requirements are met, the area can be legally recognized. Some countries have legislation to regulate this procedure, but where there is none, it is important to define an entity with sufficient authority to protect the families involved.

- Two principal criteria should be considered in the **restructuring proposal**: on one hand, a basic approach addressing fundamental problems generated by the spontaneous settlement, such as tenure of the plots and urban restructuring (redefinition of plots, zoning, facilities and service infrastructure); on the other hand, an integrated approach that provides complementary social programmes to support the residents and make the areas sustainable. Government participation is limited to the fundamentals, due to lack of funding or because there are other complementary programmes. Private NGOs for social development use an integrated approach, which offers many advantages, but also makes the programme more complicated, demanding larger resources and more efficient control and follow-up systems. In this way the participation of public and private social institutions in the development of complementary programmes contributes to better selection of the areas, because it requires coordination, that facilitates designing the project and developing the regularization operation.

The integrated approach considers the following components:

- legalization of land tenure
- land use planning including social and technical infrastructure
- re-drawing the plot boundaries
- provision of infrastructure
- basic services
- social programmes
- housing improvement.

Legalization of land tenure begins in the previous stage and continues with a survey of plots, census and registration of the beneficiaries, and acquisition of additional land if resettlement is necessary. Then, based either on the topographical survey of the settlement or plot and block regularization plans, tenure rights are registered in property records. Provision of infrastructure and service networks follows normal design procedures. The planning criteria in chapter 3 could be used as guidelines.

The regularization process should provide a detailed proposal for the civil works to be done later, preferably divided into stages, since the process usually lasts several years.

3 Recommendations

Determining the Type of Intervention

It is necessary to define what type of intervention is appropriate, from the most general alternatives such as re-settlement or regularization to specific variations. This is done after analyzing the site: topography, land holding capacity, water resources, geographical faults. Any solution must also be affordable for the target families, so an analysis of their monthly paying capacity is required.

Another factor is the legal situation concerning tenure, the possibility of arranging legal transfer of the land from the original owner to the residents and any stipulations on land use established by urban regulations and municipal land use plans.

The third factor to consider is the quality of the settlement, which is closely related to how the land is divided, existing roads and provision of services and infrastructure.

The Table 1 offers recommendations for each of these factors, according to the complexity of the situations that can be found in peripheral urban areas. Each case should be analysed for the three factors, to identify an alternative, or a combination of them, for the type of intervention decided.

Planning Regularization

The age and density of the settlement determines the possibilities and constraints in restructuring the area. Table 2 summarizes the main recommendations for planning interventions in three types of spontaneous settlements, classified by their age and density.

Well established settlements (15 – 20 years or more) are those with the highest densities. They generally occupy stable terrain with a soft or moderate slope on sandy sites, or land that is somewhat favourable for agriculture. There is a high degree of plot subdivision, and some plots are well below the minimum size or irregular in size and shape. There can be blocks with “blind” plots, with no direct access to a public pathway. There is intense building activity covering up to 100% of the usable surface. More than half the houses are built with permanent materials and are in the process of growing upwards. The area is usually provided with infrastructure, and about a half of the houses are connected. There is no order or standard for primary and service roads, that vary in width and terminate in dead ends. Commerce is concentrated along the main roads leading out of the settlement.

Established settlements are 10 – 15 years old and occupy land that is unstable or prone to natural disaster with both soft and steep slopes. They may be extensions of an older settlement. Usually these areas have had some kind of technical support, which gives some regularity in layout, although there is no uniformity in the size of the plots. The buildings do not cover the whole plot, and there are some unused spaces. About 1/3 of the buildings are single storey and built with permanent ma-

terials. There are empty lots with foundations and/or walls. There is some traffic planning, although paths do not follow the fixed plot boundaries, and pedestrian walkways are very narrow. Nothing has been done about roads, and there is no street lighting. There may be potable water lines with a few residential connections in some areas, but this does not satisfy the demand; in most of the settlement people obtain water from public taps. Electricity is restricted to domestic use.

Incipient settlements have been recently occupied. They are mainly found on hillsides, on steep slopes or on plots not suitable for construction. The land is in the first stages of plot division. All the plots are occupied temporarily, because of the risk of eviction, and tend to be small and grouped in squares. Housing is very temporary, made of impermanent or recycled materials. There are no water or sewerage systems. Electricity is taken from neighbouring settlements. There is poor access, roads are usually along the edges of the plots, and there are no sidewalks or pavements.

In the first type of settlement there are few possibilities for intervention, other than developing roads. There are fewer restrictions in the other two types, and it is possible to intervene using land development tools, such as recomposition of parcels.

In parcel recomposition the existing plots are redefined. Irregular plots are modified, keeping the same area or modifying it so that all plots are equal and proportional, and the resulting plan reflects as much uniformity in size and frontage as possible.

Legalization of Tenure Rights

There are normally three ways to regularize occupation of plots: transfer or allocation of public property, expropriation of private property, or negotiation and land purchase.

Of these three, the first two have an impact on the regularization process.

In the first case, public property is transferred to local government, which acts as the sponsor of the project. The land is then transferred or sold to the families. This normally occurs at a national level and requires legislation, so the paperwork tends to be complicated and it takes a long time.

The second case, land expropriation, might take years to complete. Existing legislation might prevent expropriation for residential purposes. Where it is legally possible, the municipality must demonstrate the need and benefits for the public, set a fair price and pay it on time. The process can take long and is subject to contingencies such as: lack of money, lack of resources among the beneficiaries to meet their obligations, which could interrupt the process and lead to annulment of the expropriation and the reversion of tenure rights to the original owner. In this case one automatically loses all possibility to expropriate the same plot again.

To overcome these limits, and assure the success of the regularization process, the following are suggested.

Globally

- Involve national governments, judicial and legislative institutions in the solution of the problem to modify legislation on the legal improvement of spontaneous settlements and to ensure that the regularization activities of local government are met with the priority, continuity and promptness they require.
- Coordinate universities, technical institutes, NGOs and other social development agencies to involve technical personnel, promoters and students in implementation. This can reduce the planning and operating costs of municipal interventions.
- Incorporate simplified norms and procedures to facilitate the following processes: transfer of public land, expropriation of private property to enable upgrading of spontaneous settlements in relation to need and public usefulness, and land measurement and assessment to provide guarantees for legal tenure before the transaction is completed.
- Promote revision of urban land development norms for residential plots, to make them appropriate for the occupancy and use of space according to the social, economic and cultural characteristics of each country.

Operationally

- Through a municipal ordinance delimit technically and legally the area occupied by the spontaneous settlement; define the perimeter of the site, mark the boundaries of adjacent sites and declare the settlement subject to regularization.
- Where there is a partial overlap of tenure rights, it is convenient to isolate the conflict areas legally, to avoid a temporary or permanent delay in the improvement of the rest of the settlement.
- The boundaries of the settlement must be legally approved by a legal instrument to avoid future extensions that fall outside the relevant ordinance.
- All legal provisions must be taken to avoid annulment or reversion of the families' registration and qualification. No registration of absent people may be done by third parties.
- It is convenient to accept any official document that links the occupant to the plots (electoral record, paid utility bills, etc.) as proof of permanent occupancy.
- To prevent clandestine subdivision of areas expropriated for social and technical infrastructure or roads, the value of the property must be deposited with the courts, and the decision announced in the media and on the site itself. This prevents the owners or presumed owners from later claiming their rights and leaving the settlement without common areas.
- Regulations must be incorporated to allow legal sanctions on land speculators or owners who promote irregular settlements, forcing them to accept responsibility for developing the site according to the applicable urban norms.
- Recognition of the right of tenure should be conditional on the satisfactory completion of the entire regularization process.

- Issuing the title to the property should be conditional on the payment of all outstanding debts for regularization charges
- Keep records of the beneficiaries to avoid duplicate applications and prevent repetition of irregular subdivisions.
- Issue the tenure rights to the mother in the household to be sure the family group benefits, since couple relations are often informal.

Costs of Regularization

The costs depend on factors such as: site conditions, physical characteristics of the settlement, norms for the quantity and quality of civil works required, design of the physical restructuring, work required by the design, technical conditions for installation of services; scope of the operations including legalization of tenure rights, re-drawing plot boundaries, complementary programmes for neighbourhood organization, community development and financing.

When classifying costs, considering the diversity of the cases, the main categories are the following:

- costs related to the physical conditions of the site
- costs independent of the project design
- costs related to project design.

The **costs related to the physical conditions of the site** concern the geographic and technical characteristics, and topography. One must first determine the cost for ground stabilization works (drainage, support walls, etc.) required to ensure the ground's holding capacity and resistance to harsh weather conditions. Then calculate the costs to provide basic services (connections to existing networks, reservoirs, power plants, roads, etc.) to the edge of the site. Normally there is no connection to services in this kind of settlement.

Costs independent of the project design include first paperwork related to legalization of tenure: land acquisition (expropriation or purchase) and official registration of the plots. Costs also include project related studies and activities such as defining the boundaries of the settlement, topographical survey, site and building survey, mapping, design of services, etc. The third type of costs are related to project financing and its administration. And finally there are costs for community development, if included in the programme. The professional service costs of the implementing agency must also be considered.

Costs related to project design include the physical restructuring operations or restoring the land use plan (demolition and moving), provision of basic service networks with residential connections, vehicular and pedestrian ways, potable water, sewerage, drainage, public lighting, and other measures such as fire prevention.

In the first group of factors, related to the physical aspects of the site, it is important to do a technical analysis of the land holding capacity and to avoid the effects of potential natural risks. These factors can often determine if the project is economically feasible, or if for technical

reasons the cost for civil works is too great a burden for the sponsors and beneficiaries.

It is very doubtful if there are any benefits in reducing civil works, (postponing construction of pavements, for example), which is a tendency in spontaneous settlements. To put in less works than stipulated by urban regulations means only a lower initial investment, not lower long-term costs. Temporary solutions can be crucial for the project and may result in higher overall costs due to the loss of the investment. Examples are the additional costs incurred by latrines and public water taps that are inadequate for connection to permanent networks, low quality poles, electric lines with insufficient capacity, and temporary pavements that must be moved later to match municipal levels and plot boundaries because the plots were not redefined at the beginning.

A very costly item in regularization projects is pavements and roads, which might be up to 40% of the design related cost. The total length of roads in the settlement, related to the total area, is a good indicator of cost rationalization. That is, a greater ratio of land assigned to housing over land allocated to roads shows a more efficient use of space in the regularization design (see *Building Issue 8:3* by Acioly and Davidson).

In this sense the cost relationship depends on the design criteria used: on one hand the existing pattern of plots, or a rearrangement through a parcel recomposition procedure, and on the other hand the plan of roads and pathways. It is clear that a conventional block pattern with an average frontage equal or less than the depth of two plots, that is a block formed of two parallel rows of rectangular plots, offers the greatest possibility for cost reduction. According to this criteria, using the maximum block length allowed by urban regulations, topography and travelling distance, and the design of the block layout with open or dead-end pedestrian ways, will increase rationalization of costs. As for plot shapes, squares are not cost efficient because they give long travel stretches in relation to the amount of land available for housing. Rectangular plots give more efficient travel lengths (roads and paths along the short front) and a greater percentage of the plot for housing.

Recommendations for urban design are thus:

- Maximize the length of the block, according to limits set by the physical characteristics of the settlement.
- Minimize vehicle access by building main collector roads and promoting pedestrian pathways.
- Integrate recreation areas into the pedestrian ways through good design.

Pavements are expensive because of the materials used. Solutions include finding alternative local materials and cheaper finishes, and reducing the width of paved roads that are not heavily used.

Sanitary infrastructure (water, drainage and sewerage systems and residential connection) is the next most costly aspect.

Studies in Chile show that in potable water systems, the switching valves with access or inspection chambers account for 8 – 15% of the total cost of distribution networks, while in sewerage systems the inspection cham-

If water reservoirs are located high above the settlement, water distribution is more likely to function.

bers represent 15 – 25% of the total cost. Significant cost reductions can be achieved through rational distribution of the systems, better placement and reduction in the number of valves installed. In the case of sewerage systems, cost reduction could be achieved by constructing inspection chambers of adequate size and distributing them better, or by introducing non-conventional systems.

The same study shows that costs for water and sewerage decreased with greater residential density, which is related to the configuration and clustering of plots. Service costs tend to increase as the plot dimensions approach a square, or when the front is greater than the depth. Similarly the cost for the service network is significantly lower with clusters or blocks of 10 – 30 plots.

These findings underline the importance of the plot layout in regularization, specifically that plots should be rectangular with a proportion 1:2 to 1:3 (front:depth) and they should be in clusters of no more than 30 plots. This emphasizes the need for parcel recomposition if social conditions allow physical restructuring.

Among the costs for infrastructure, materials and labour stand out. Self-help construction reduces costs, and can be used for digging and filling ditches, perhaps water pipe installation which requires some skill. Electricity is third in this group, about 16% of the total cost, but there is little possibility for cost reduction.

In the case studies there was only one programme with subsidized credits to finance regularization. Subsidies were given for regularization of spontaneous settlements in Chile, as part of a broader programme known as housing with services. Subsidies were granted according to the economic and social needs of the families and the assessed value of the plot, once the regularization was complete: land purchase, redrawing of plots, provision of services and construction of latrines. Of the total costs, 75% was financed by state subsidy and 25% was contributed by the beneficiary in fixed monthly payments. There were penalties for late payments but no

interest. The guarantee was the land, a mortgage on the building at the public property registry, and a clause prohibiting transfer, rental or change in use of the plot for five years after the credit was repaid.

The system was accepted by the beneficiaries because of the obvious benefits and the chance to participate in other subsidized housing improvement programmes after the credit was repaid. The main criticism of the system is that it is not self-sustaining, since it requires heavy financial contributions, which are almost impossible for poor countries. Even though no interest was charged on the credit, it was difficult to pay, and in some cases the debt was officially written off, since social conditions make it impossible to evict legally. The practice adopted of offering new payment agreements to help people fulfil their commitment created dependency in the population, contrary to the objectives of the programme.

There are other examples of credits for housing improvement which are complementary to the regularization of spontaneous settlements. Several studies note that the specific characteristics of a subsidized credit programme depend not only on the social, economic and political situation of the community receiving help, but also on the kind of investment needed by the community.

Community Participation

The participation of the beneficiary population in regularization requires encouragement, guidance and support to achieve its goals. Participation is necessary during registration of the families, design the proposal, inspection and approval of the work.

Communities with structured, legitimate and representative neighbourhood organizations have their own mechanisms for decision making and conflict resolution, which helps them participate in regularization. In contrast, a community with conflicts of interests, rivalry, lack of leadership, political differences that reinforce group interests, and lack of motivation hinder the process. In this latter case one should improve social cohesion and strengthen neighbourhood organization first.

Therefore, one must evaluate the neighbourhood organization and conditions for social participation in the spontaneous settlement before identifying the area of intervention. The following aspects must be considered.

- Identify natural leaders, key persons that represent the community. Once they are convinced of the value of the project, they will promote it and encourage the community. They can act as intermediaries between the implementing agency and the neighbourhood.
- Keep the community informed of the plans, requirements and expected results of each stage of the project. Make commitments of mutual responsibility, especially in defining the area of intervention, registration and assessment of beneficiaries, building survey, design of physical restructuring, cost of financing and terms of execution.
- Coordinate the demands of the different sectors and groups, creating mechanisms to solve conflicts of interest.

- Involve the community in the design for physical restructuring, considering cultural patterns of allocation and use of space, technical limitations from the perspectives of the city and the settlement, and financial limitations.
- Ensure that the community has permanent authority to control and inspect the project.

Table 2 Planning Criteria for Regularization

HOW WELL ESTABLISHED IS THE SETTLEMENT?	ROAD STRUCTURE	PLOT SIZE	INFRASTRUCTURE	SOCIAL AND TECHNICAL INFRA-STRUCTURE
WELL ESTABLISHED SETTLEMENTS IN THE PROCESS OF DENSIFICATION	<p>Physical restructuring is very difficult.</p> <p>Identify areas not suitable for regularization.</p> <p>Identify areas for recreation and services (e.g. along rivers).</p> <p>Possible only to improve and align existing roads.</p> <p>Use a hierarchy (primary, secondary, tertiary, etc.) of roads to link commercial and industrial areas to the main access to the settlement.</p> <p>Depending on the size of the settlement, develop the peripheral roads according to a hierarchy.</p> <p>In blocks with shut in plots, build alleys so all plots have a public access.</p> <p>Minimum width of pedestrian ways crossing gradient curves: 3 meters.</p> <p>Minimum width of pedestrian ways along a gradient curve: 2 meters.</p> <p>Avoid demolition and resettlement if possible.</p>	<p>Plot size: 90 m² minimum, frontage 6 m minimum.</p> <p>Redrawing of plots is possible only where new alleys are built.</p> <p>Reforming blocks is very expensive in this kind of settlement and might not be completed.</p>	<p>SEWERAGE</p> <p>In very dense areas with an irregular parcel structure, see that there is a regulation that imposes a right of way to install this service.</p> <p>In areas with relatively uniform parcel structure, an alley for infrastructure can be arranged, with each plot giving up 0.8 m along the back for this shared alley.</p> <p>Complete the system following the regularized plotting of pedestrian ways.</p> <p>In all cases, the system's should have as few inspection chambers as possible.</p> <p>For rain water drainage in areas with steep slopes, build open canals with break-pressure points to reduce water velocity.</p>	<p>Recover residual spaces: flood protection areas, river banks, appropriately protected and treated eroded land.</p> <p>Resettle some households, after acquiring suitable land nearby.</p> <p>Expropriation of unimproved or unused land.</p>
ESTABLISHED SETTLEMENTS	<p>Identify unused areas for social and technical infrastructure, recreation, parks.</p> <p>Use a hierarchy (primary, secondary, tertiary, etc.) of roads to link commercial and industrial areas to the main access to the settlement.</p> <p>Put priority on the design of the road network, reducing the total for vehicle access and increasing pedestrian ways.</p> <p>The roads must follow the gradient curves.</p> <p>In areas with steep and moderate slopes, use pedestrian ways, to which vehicles have access, to the blocks.</p>	<p>Plot size: 90 m² minimum, frontage 6 m minimum.</p> <p>Parcel recomposition is possible by sectors, in blocks with enclosed plots or blocks with a large area.</p>	<p>DRINKING WATER</p> <p>Where there is none, reservoirs can be built at high points, to be supplied by water trucks, distribution systems and permanent residential connections, following the regularized plotting of pedestrian ways or infrastructure alleys, until permanent installation of the service.</p>	<p>Space for health services, schools and sports is important for the population. It is possible to recover plots through compensation or resettlement.</p>
INCIPIENT, UNDER FORMATION	<p>It is possible to implement physical restructuring.</p> <p>Identify neighbourhood units of medium density (about 60 families per hectare) and areas for social and technical infrastructure, recreation and parks.</p> <p>Plot primary and other roads to link neighbourhood units with the main social and technical infrastructure.</p> <p>Put priority on the design of the road network, reducing the total available for vehicle access and increasing pedestrian ways.</p> <p>Roads should be long enough to avoid steep slopes.</p> <p>Design roads to follow the gradient curve.</p> <p>Minimum width of roads running counter to the gradient curve: 3 m.</p> <p>Minimum width of roads running along a gradient curve: 2 m.</p>	<p>Where slopes are steep, build pedestrian ways counter to the gradient curve.</p> <p>Plot size: 90 m² minimum, frontage 6 m minimum.</p> <p>Implement block redesign or parcel recomposition.</p> <p>Rectangular plots with ratios 1:2 and 1:3 are more efficient.</p> <p>Clusters of 30 plots are the most efficient.</p> <p>In steep areas, blocks can be organized in rows with pedestrian alleys between.</p> <p>On slopes, plot distribution must consider that houses will be built on platforms, and pedestrian ways should consider people's travel patterns.</p>	<p>Progressive development of water and sewerage systems offer flexibility and adaptability to the settlement needs.</p> <p>Public lighting and residential connections must be overhead.</p>	<p>Recover plots through parcel recomposition, resettlement to (better) plots nearby.</p>

4 Case Studies

Bolivia

The city of La Paz lies 3,652 m above sea level, and has a population of 713,400 and an area of 7,720 hectares.

The city has grown along a wide canyon running north to south, with steep slopes broken by deep and rough ravines. Because of their instability, the slopes are not zoned for construction, but spontaneous settlements have created a long belt almost 4,000 m above sea level. In some areas the slope averages 3.5%.

Despite the topography and after many years without legal and technical controls, these are the only areas available for expansion. They may not be suitable as residential areas, but they have certain attractions: rapid and easy access to the main business centres, low cost, availability of land and strong neighbourhood relations.

The climate is cold, averaging 11°C; relative humidity is 56%; rainfall is less than 200 mm during the rainy season from December to February. One side of the canyon receives sunlight during the morning, and a chilly shade during the afternoon, while the other is bathed in sun during the afternoon and shaded in the morning. Because of the climate vegetation is scanty, and the situation is made worse by residential development.

The phenomenon of spontaneous settlements on land not suitable for development began in the mid-1960s. In 1980 the municipal government was forced to react. Its primary goal was to incorporate the spontaneous areas into the urban development process. It was thought that once the basic irregularities were removed, and a rational physical structure imposed, all future needs could be channelled through existing technical and administrative authorities. It initiated the Urban Development Programme.

- *Redefining the use of land*

The programme was developed with the participation of the different neighbourhoods, represented by their community councils. It permitted the partial resolution of land tenure conflicts and the initiation of technical studies for the provision of basic infrastructure such as toilets and social service areas. During 1980 – 1990 priority was given to construction of primary health facilities and buildings for extension services (that would serve as administrative offices later). The areas that were redefined during this period were incorporated into the formal system, allowing for the issue of building permits, and were provided the following complementary programmes and projects.

- *Legalization*

The aim was to complement redefinition of the plots with the improvement of the buildings. Architectural students surveyed all existing buildings and recorded any deficiencies in construction to help the residents who could not afford to hire professionals. A survey map was later approved by the municipal authorities and the School of Architecture, giving it a legal status equivalent to the maps of the plots in the

previous step. This allowed the legal registration of the tenants.

- *Training for housing improvement*

The goal was to provide free technical assistance to the neighbourhoods in La Paz that were redefined and had their buildings surveyed.

- *Credits for housing improvement*

Credits were provided to solve the health and safety deficiencies in the houses. The credit was given according to the building materials required and the need of the household. Credits were given to families who did not qualify on the formal financial market, to help them improve their housing themselves.

After 15 years of implementation, the Urban Development Programme had not met its objectives, due to failures in one or more of the technical, legal and financial mechanisms.

Experience in Planning and Urban Design

The Los Andes area is west of La Paz, part of the district known as Max Paredes, and has an area of 25 hectares. It is completely urbanized with 17,000 residents and a population density of 680 persons per hectare.

Construction began in 1970 and redefinition of the plots was approved in 1980. About 90% has been legally and technically upgraded, including basic services.

The land is steep slope, 3,766 m above sea level, crossed by river beds and close to four fairly large canyons. The soil is good.

The land was originally forest, and was purchased from the legal owner by rural migrants. It is now residential with houses on the slopes. It is close to the main liquid fuel storage plant owned by the national petroleum company, and the city cemetery. These constitute potential risks for fire and contamination.

The plan of the area shows different sized plots, each with different fronts, shapes or placements. Some are located within blocks without direct access to a public road, so the residents must use the neighbour's access. In some cases the only entrance to the inner plots is a narrow passage, no more than 1.5 meters.

Lack of street lighting and pavements, and the steep slopes, create conditions for accidents and vandalism.

Stage 1: Feasibility Study

The first part was a technical feasibility study that included the physical definition of the settlement, the registration of plots in the land registry and a topographic survey. It also included a study of the natural risks and their potential impact on the area.

Later a legal study was developed to determine if judicial intervention was feasible. It was implemented through the verification of tenure and ownership for each plot in the area.

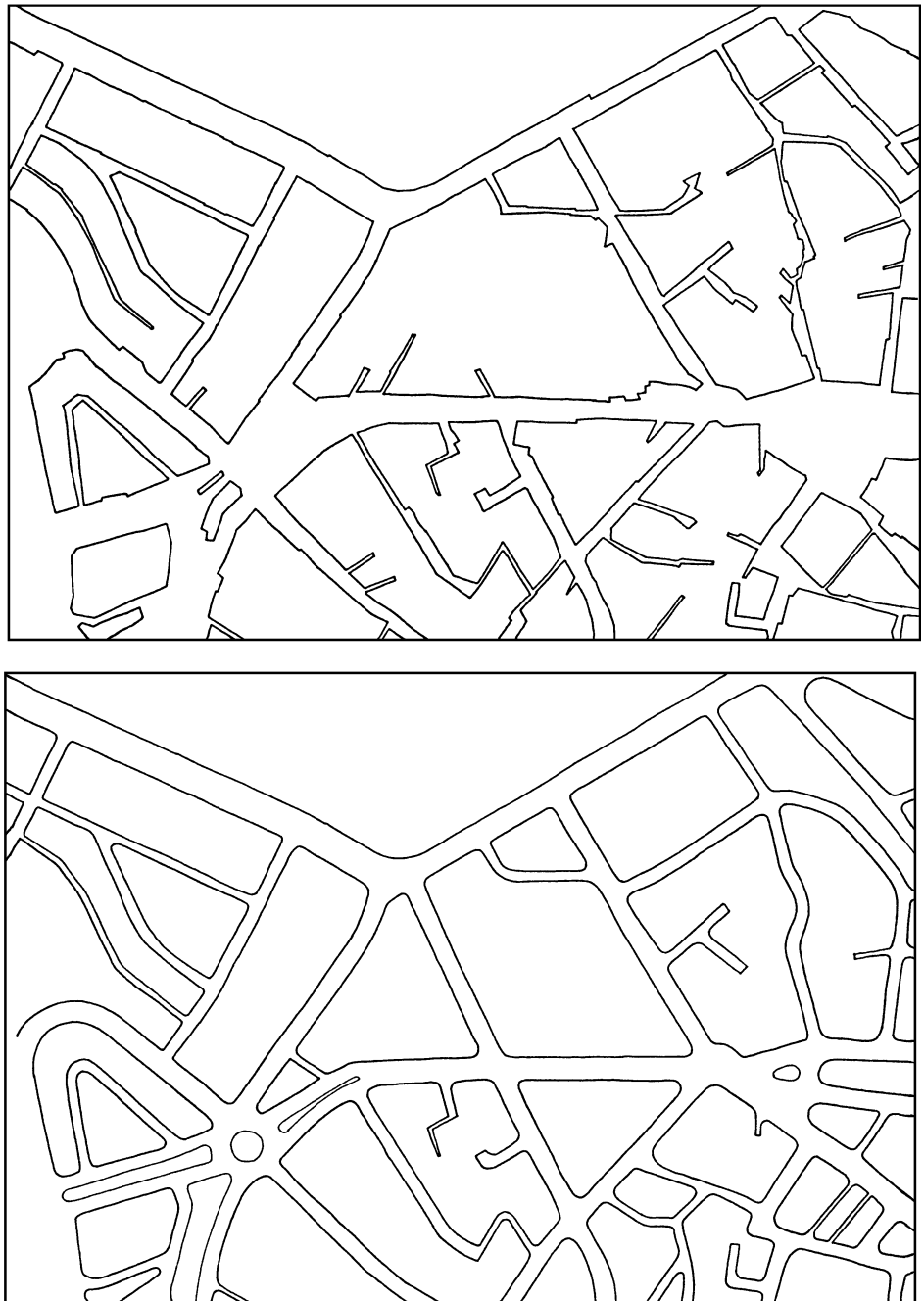
A socio-economic study completed the development phase of the Urban Document, as the feasibility study was called.

Stage 2: Development Plan

The plan was designed with the participation of the residents.

Site layout of the Los Andes neighbourhood in La Paz before (above) and after (below) regularization.

Source Municipality of La Paz.



- Definition of roads, keeping them to spaces chosen by the neighbourhoods, trying to keep them from impinging on other spaces, and trying to assure as much accessibility as needed.
- Blocks were defined according to the shape and size of the plots.
- More community infrastructure and recreational areas were defined. The few spaces previously reserved were usually in the wrong place and inadequate for the needs of the population.

Stage 3: Official Approval

The plan was approved by the municipal council, allowing the settlement to use all the services of the municipality.

In the map to redefine the plots in the Los Andes area, there were two clear settlement patterns.

- Progressive and spontaneous occupation without any technical assistance, giving plots of different sizes, shapes and dimensions.
- Occupation of sites with technical assistance, giving a more regular but rigid structure that does not allow for errors related to topography. The roads designed against the slope were a serious problem, making traffic movement difficult. This was worse during the rainy season, since these roads became channels for surface drainage.

The major problem concerning infrastructure was the steep slopes and the consequent block configuration. There was some consideration given to constructing two meter channels to link the sewerage network to the middle of the blocks, but the idea was not widely welcome by the community.

Chile

The city of Santiago lies above the Mapocho River Basin in an intermediate depression between the Coastal and Andean Mountain ranges. The good climate, water and soil conditions support productive fruit and vegetable plantations. Santiago is the biggest city in the country with 39% of the nation's population, and attracts migrants from rural areas and the provinces.

During the 1960s, a series of spontaneous settlements, called camps, were formed. At first they occupied public land, and later private property on the hillsides around urban centres, on banks of rivers that cross the city, and in the peri-urban areas along the main communication routes into town. Illegal occupations took a political tone during 1970 and 1973, which also shaped later interventions for regularization. The process of appropriation and development of urban land was done in three main stages. At the beginning, tents and minimum services were installed. Then houses were improved, mainly single room, wooden structures with a single pitched roof, and there were attempts to obtain electricity and drinking water. In the last stage, services and infrastructure were negotiated with the local authorities. This development lasted an average of 15 years before regularization.

Although the data is not complete, authorities and researchers agree that the problem of spontaneous settlements is solved, and the country's main housing problem is *allegamiento*: the incorporation of married children, relatives or unrelated families into the home. This generates overcrowding in the building.

The Programme for Quarter Improvement from the 1980s defined a national intervention strategy for the regularization of spontaneous settlements. The aim was to improve the camps and other settlements that had serious deficiencies and lacked basic infrastructural services, through government programmes, such as Site Operations.¹

The General Law of City Planning and Construction gives municipalities authority to regularize spontaneous settlements, according to specially established norms. Existing subdivisions of plots are recognized, even if sewerage, water, electricity and pavements are not already installed. All cases should strictly follow the plot definitions and norms of the master plan, whether they have already been built on or not.

In general, there are criteria for improvement, freezing the existing situation and establishing a policy for renovation through studies, design, and approval of a plan specifying length and width of streets, detailed zoning, mandatory construction areas, areas to be renovated, neighbourhood clusters, land to be expropriated, etc. The plan also requires a feasibility study for piped water, domestic and rain water drainage for the existing and anticipated population.

Planning and Urban Design Experience

Conchalí is a commune north of Santiago, within the city boundaries. It has a completely developed area of 10.6

km². A survey in 1992 found 153,809 residents in 90,240 households and 31,142 buildings, giving a density of 14,500 persons per km². In 1990 a survey classified 32% of the population as poor, 7.7% extremely poor. About 6.5% of the work force was unemployed.

The population settled on former orchards and convents dating to the beginning of Santiago. The original long rural roads provide the structure to the settlement. Since the 1970s, the fields between the extensions of the existing city were rapidly occupied, resulting in huge villages of similar plots, generally with a rectangular layout. Buildings are homogenous, mainly single storey, one family houses and medium height buildings along the main avenues leading to the city centre.

The commune had several spontaneous settlements, unimproved camps or site operations. Between 1983 and 1992, 4,746 housing solutions were implemented by the household sanitation programme. The settlement in Northern Panamericana began in 1972, when poor families occupied plots illegally. After the 1982 floods along the Mapocho River, the municipality moved other families in. There were 77 plots occupied by about 120 households and 450 residents. There was more than one household on several of the plots. A significant percentage (58.3%) of the plots also accommodated relatives that formed a new household or rented out rooms. In this way *allegamiento*, one of the most important contemporary housing problems, developed.

The household sanitation programme was implemented by the Municipality of Conchalí in 1985. It built public water and sewerage systems, paved sidewalks, put in public lighting, built 77 sanitation units of 7.16 m², one on each plot and, issued legal titles to the land.

Redesigning the layout of the plots largely ignored the existing boundaries and imposed the norms established in the regulations. A typical plot was 8 × 13 m, about 100 m², and plots were grouped in rectangular blocks.

Water, sewerage and electricity were installed according to established standards and norms. Roads inside the settlement are at least 6 m wide for pedestrians and the occasional car, and footpaths on slopes are at least 4 m wide. The central pavement is 3 m wide. Because of the fire risk caused by the existing wooden structures, stone masonry fire walls are used in all partition walls that are part of the buildings. They are 15 cm thick and extend over the roof ridge.

Regularization began with a baseline study of the community by the municipality to identify the most urgent needs concerning physical restructuring and sanitary services. It provided data for selecting the settlements to upgrade. A card system was introduced to record information about the family: condition of the buildings, length of residence and economic status. A land use study and a feasibility study for installation of water and sewerage systems were also done. With this data, the municipality and external consultants developed the regularization project to redefine the plots and to install services. The project was presented to the Ministry of Do-

1 The Site Operations Programme was implemented between 1965 and 1970 to provide housing to the poorest sectors and to address the problem of camps. It involved allocating 160 m² plots with latrines, streets for refuse collection, provision of water taps and electricity. Although the programme had a positive effect on making the settlements more permanent, an evaluation concluded that 47.6% of the activities carried out did not contribute to basic urban development.

*The Panamerica Norte
neighbourhood after
regularization.*

mestic Affairs' Social and Community Development Division, an institution responsible for evaluating and authorizing the project's public tendering. The municipality was responsible for negotiating and signing the construction contract. Before execution of civil works, training was held for the beneficiaries on the maintenance of the sanitation units, economical use of water and electricity, etc.

The execution of civil works was a painful process for the benefitting families. To put in the new streets and paths and to redefine the plot boundaries, families had to remove some existing rooms and, in some cases, they had to take down the whole construction and move it. In Northern Panamericana, plots were reassigned, moving neighbours to different places, mixing them and introducing new families. Then "during the installation of infrastructure and construction of sanitation facilities, the occupants of the site were frequently required to move their houses to the back, where they would not interfere with the contractor's work ... Finally the majority of the dwellers placed their houses together with the sanitation unit," a step that was voluntary and permanent for the affected families.

The last stage, handing over the plots and property deeds, was done with the dweller signing over the property to the municipality as a mortgage guarantee for 25% of the regularization costs (plot, urban planning work and construction of the sanitation unit). The remaining 75% was financed through a state subsidy. The public record established that the plot and construction were officially mortgaged and could not be sold, rented and used for another purpose for a period of five years.

The recovery of mortgages was very low; 50 – 60% of the beneficiaries were late in paying, and the municipality was forced to make adjustments to the payment plan and to cancel debts. The poor rate of payments was due to the "extreme poverty of the beneficiary families, and the little flexibility shown by the system before 1990. Another reason was that political and social leaders promoted the idea that no interest should be paid. People also were not informed that the funds would be reinvested in the same site, in works to improve residential quality." (Sepúlveda, R. et al., 1992.)

Even though the Northern Panamericana experience did not involve large numbers, it is a typical example of the programme. It is worth noting, however, that the re-

sults of the programme are difficult to understand without reference to the political context at the beginning of its implementation.²

Peru

Lima lies on a vast alluvial plan of the Rimac River at the base of the Andes Mountains. Before it was urbanized, the fertile soil supported agriculture. The empty plains toward the north and south contrast with the outcrops of the Andes in the east. Spontaneous settlements have developed on the softly sloping sandy plains. The climate is good, but the settlements are far from the city centre, and there is no land speculation.

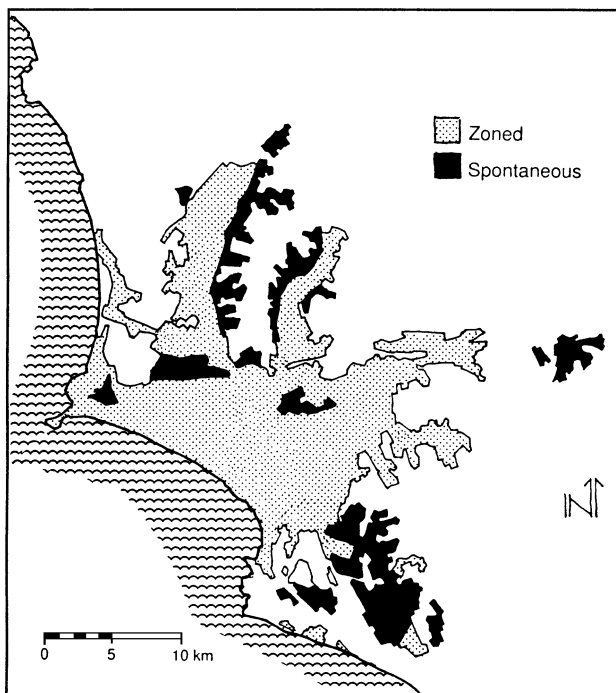
During the 1960s – 1970s many groups of migrants settled on private and public land that was meant for planned urban expansion. In 1978 there were 415 of these settlements in Lima Province, about 219,000 plots on an area of about 8000 hectares. Between 1978 and 1986, 284 new settlements were built, with about 77,500 plots on about 2000 hectares. These settlements were and are still the main form of urban housing for the poor.

During the 1980s, the plots occupied were in the less attractive areas not previously taken, in areas reserved for social and technical infrastructure, hillsides, industrial land, small agricultural plots, or larger areas far from the city and main roads. Most of the new settlements are small, compared to the older areas, less than five hectares, with steep slopes and other geophysical conditions making them unsuitable for development. They are farther from existing service grids. There is a total lack of infrastructure and the buildings are very temporary at the beginning. The situation is made worse by the high cost of land development due to the physical characteristics of the site.

A survey in 1981 showed that 22.4% of the population of Lima lived in spontaneous settlements. They had a population growth rate of 3.8% and a housing growth rate of 3.5%, with an average of 5.6 people per house. About 67.5% of the houses were connected to water and 84% to electricity.

Illegal occupation of land in Lima dates back to the 1940s. Since then policies have been formulated and translated into legal and urban planning provisions to allow the incorporation of the settlements into the urban

² The country was ruled by a military dictatorship until 1989.



Lima, 1986.

Source Instituto Geográfico Nacional, Perú.

expansion process. However, there is not yet any formal control over the formation of illegal settlements.

Legal Provisions for Land Tenure

The law states that any land that is not economically exploited, primarily agriculture or mining, or zoned for urban development, is the property of the state. When illegal land occupation led to social and political conflict, the Government issued the Law of Squatter Areas³, establishing the conditions for legal recognition of spontaneous settlements and defining them as “land zones of fiscal, municipal, community or private (...) property on which – due to invasion and disregard of legal provisions on property, with or without municipal authorization, on plots distributed without official approval of subdivision plans – groups of buildings of any structure have been built.” Under this law, the dwellers were assured of their titles to their plots through a procedure called “physical and legal guarantee” under the state authority.

In 1979 a law abandoned the policy of regularization and upgrading spontaneous settlements by establishing that any area with a subdivision plan, and that registered the plots in the property records, was automatically subject to the regulations that applied to conventional urban zones; the only condition for granting property titles was the existence of plot plans. For this, it sufficed that an area was divided into regular plots. Although the aim was to ease the issue of property titles, it also reflects the political tone of the time, which also led to abandoning the policy of regularization and state support in the creation of new settlements.

In the areas known as “pirate urban developments”⁴ a law was issued to force the owner or developer to install the civil works demanded by urban development regulations. In case of failure to comply, all the outstanding debts of the plot buyers would be transferred to the Ministry of Housing and used for regularization. The Ministry could expropriate the plots, and could also approve a technical project and establish a fee that the plot holders paid for costs such as land development. This removed any possible profit for the “pirate subdivider” since the residents could stop paying him and request that the settlement be declared a marginal quarter.

In 1984 a new law gave the municipalities the power to assist residents in squatter areas to improve the physical and legal structure, to issue property titles and to plan new settlements.

This legal and policy framework allowed Lima Municipality to carry out demonstration projects regularizing existing settlements and promoting new ones. Finally in 1988, new legislative decrees regulated popular mortgages, property registration of squatter areas and credit insurance guaranteed by the popular mortgages. The aim of these decrees was to recognize legally, in all transactions, the value of the investments by the dweller in their own areas and to modify the legal tenure system for both plots and the buildings. The system grew out of the lack of documentation that would allow a resident to register his tenure rights in a conventional property record.

Regulations for Urban Improvement

The main laws and norms refer to the type of urban development and housing construction in “squatter areas.” They are complemented by the National Construction Regulations, in the sections related to spontaneous settlements.

Normally “squatter areas” are accepted if they occupy unimproved peripheral land. If they occupy private property, expropriation is authorized on payment of a fee that takes into account the value of the land before the settlement formed.

There are two steps in regularization. The first is a set of collective transactions that permit the identification and qualification of the “squatter area” and its physical and legal improvement: registration of residents, qualification of families, a topographical survey to draw a perimeter plan, and a plot or land division plan. The second step is to obtain the titles, which depends on the successful completion of the first step (recognition of the “squatter area”).

Population density is limited to 300 residents per gross hectare (800 per net hectare). The maximum area of a plot is 250 m² and the minimum is what is “necessary to give enough room to meet the essential living conditions,” based on the needs of the family. Subdivision of plots is not permitted, except with official authorization, when part of a plot is rented and both resulting plots meet local norms for size. In “squatter areas” land

3 Law of February 10, 1961: “Restructuring, guarantee and legalization law of marginal quarters” also called “law of squatter areas.”

4 Developments promoted by the owner or his representative, disregarding legal provisions and regulations. Or they could be legally formed organizations such as cooperatives and housing associations who occupy land before it is completely developed according to the regulations. This creates settlements that resemble a squatter area.

may be used only for residence and compatible handicraft or commerce.

Planning and Urban Design Experiences

El Agustino District – Third Zone

This municipal district is in eastern Lima. The population in 1990 was 245,000 (4.5% of the Lima total). There are about 36,400 houses on 1,500 hectares including both spontaneous and planned settlements; 53.4% of the plots do not have property titles. There is a lack of services and technical and social infrastructure. El Agustino is the third poorest district in Metropolitan Lima. Only 4% of the economically active population have stable jobs; 80% are under-employed and do not earn enough to meet their basic needs; the remaining 16% are unemployed.

Third Zone is at the bottom of Agustino Hill rising in the middle of the district. It was formed at the end of the 1940s through land invasion of the hillsides by small traders and new immigrants. They worked in the wholesale and retail markets of the city in this area. This was also where transport from the central mountain range arrived. Later when El Agustino Ranch sold parcels of land to a real estate developer, the farm workers stopped farming the land and built adobe barracks along narrow alleys as low price rental units for new immigrants. This generated more occupation and consolidation of the settlement. The zone rapidly became a slum because of the pressure for housing caused by migration.

At the beginning of the process to redesign of the site layout, the Third Zone had about 1,600 housing units with 5.92 persons per unit, a total of 9,472 residents. Most of the immigrants from the central mountain range settled on 1,200 plots of varying size and shape on an area of 179,330 m². 1,084 families were qualified for regularization. There were two sectors distinguished by density: the southern part remained a slum, while the northern sector had larger plots and a relatively ordered layout of blocks.

The El Agustino spontaneous settlement.

Regularization was hindered by the high degree of consolidation. The owner of the small white building refused to participate in the regularization process.

The population was the main actor in the redesign of the site layout, under the organization of the Promotion and Development Committee, whose function was to look after urban development in the zone with support from CIPUR a non-governmental organization. For a long time the settlement was recognized as a “squatter area” which provided tenure rights and allowed them to try to expropriate an adjoining area to resettle some families after redrawing the plots. Unfortunately legal problems led to a state of litigation.

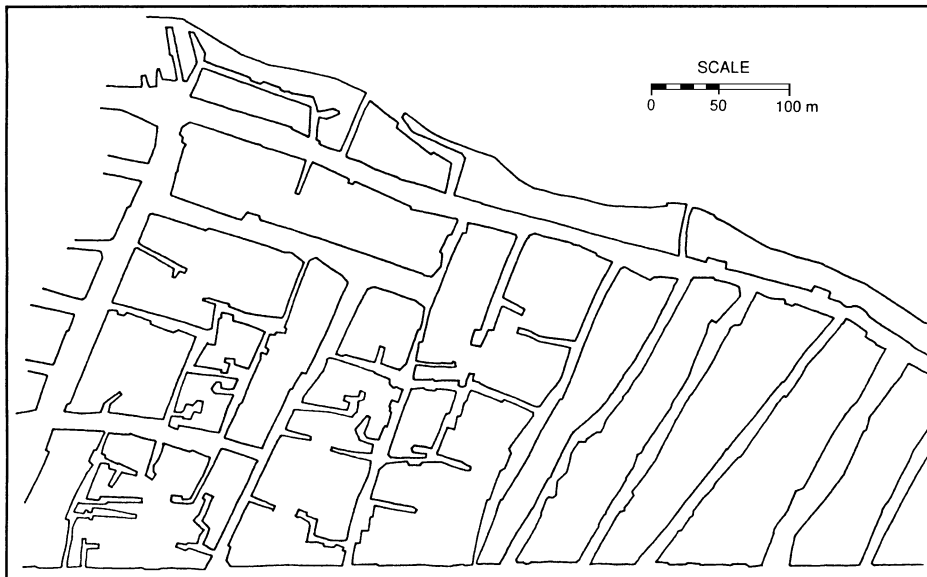
Planning, urban design and construction was participatory; the residents met and discussed project developments in detail. The redesign of the layout was based on a topographical survey that identified the boundaries of the area, the plots and existing buildings. Hired technicians worked with the residents to record complaints about the condition of the buildings and the connection of homes to services such as water and electricity. Location of social and technical infrastructure was based on a land use analysis, considering areas with most vacant space at the back of the plots, the lesser degree of physical consolidation, lower density and spatial coverage of commercial, educational, community and recreational infrastructure, in that order.

Road design was based on the following criteria: existing main roads, volume of vehicular traffic, pedestrian and paved highway requirements. For secondary roads consideration was given to the location and openings of all new distribution roads, accessibility to all plots and preferential pedestrian traffic.

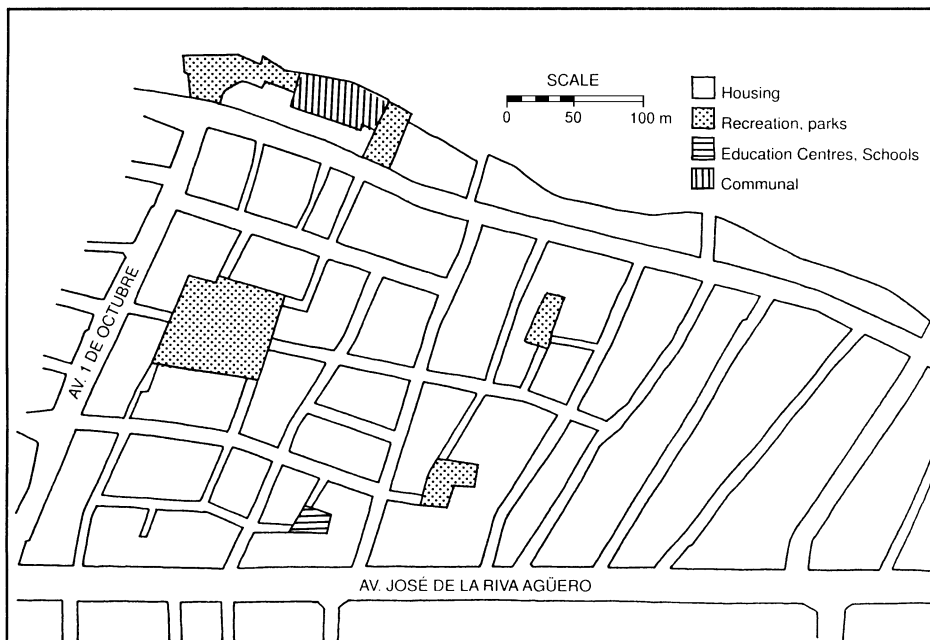
Plots were redrawn respecting, if possible, buildings made of permanent materials (adobe, brick, etc.). The 884 plots varied in size from 90 – 140 m². This meant that 200 families had to be resettled on land specially acquired by the dwellers.

Water and electricity nets were consolidated over the existing grid. Sewerage connections were designed by conventional systems to connect with the existing main matrix.

The organized residents of the Third Zone were the real force behind the redesign. They financed the project and the construction. They hired professionals to work with a group of residents’ representatives to re-design the layout of the plots and determine the number of workers needed for necessary clearing. However, some modifica-



Existing site layout of the third area in the El Agustino spontaneous settlement. Note the organic structure, high plot density, lack of space for community services and irregular street pattern. (Riofrío, 1986.)



Final proposal for regularization (alternative three) of the El Agustino developed after discussion of two earlier proposals. The area was regularized according to this proposal. (Riofrío, 1986.)

tions were introduced by the director of civil works without consultation, and the way the new land for resettlement was acquired led some families to refuse to cooperate with the project. This prevented the completion of the work, mainly the opening of parks and some secondary roads, since they refused to leave the area or build with permanent materials.

Huaycán

This urban land development programme was created in 1984 by Lima Municipality to generate progressive development of a self-financed and self-constructed settlement for over 20,000 low-income families.

Huaycán is in a ravine of rolling and rocky unimproved land, about 438 hectares. It is on the south side of the Rimac Valley, 17 km east of Lima. Service connections are feasible because of the closeness of water, electricity and the central highway, about 1.5 km away.

The land was obtained by the municipality from the original owner through expropriation, when it could be shown the land was unimproved. A law suit is pending,

however. Teachers, public clerks and people evicted from other “squatter areas” who had already requested land for development joined the programme. Among the original residents, 48% were from other squatter or over-crowded areas in Lima. It was a young population with few resources. In less than a month at the beginning of the programme 4,000 families had moved in, and this number grew steadily. The Huaycán project proposed a system that combined individual tenure of a house plot with collective tenure of common areas and neighbourhood social services.

The plan of the settlement was designed by a group of independent professionals hired by the municipality. It started with a large scale topographical survey. The structure of the settlement was based on a network of main roads crossing each other, following the course of the ravine. Social and technical infrastructure were dimensioned according to existing regulations and a hierarchical organization of the settlement. There was a central nucleus with secondary nuclei spread within areas of about one hectare, the neighbourhood community units.

Land reserved for future community buildings such as schools and health clinics.

Each unit had about 60 plots, with their own neighbourhood social and technical infrastructure and service centres.

The plots facing the main roads were zoned for commercial use. They had an area of 120 m², and 800 were planned. The plots inside each Housing Community Unit HCU accommodated 60 families, which was considered a good number to maintain neighbourhood identity. The proposal had residential plots of 90 m² with two sides facing a street, meeting at an open inner space. The HCU service centre and the street were meeting places rather than circulation points. HCU covered 10,000 m² with a net density of 420 – 550 residents per hectare. Buildings occupied about 90% of the total plot area, and could be up to three stories high.

Some technical innovations were proposed for services. The water supply began by rehabilitating an existing irrigation canal, which could be connected to a treatment plant by filtration terraces and lead to a central reservoir. The reservoir could also be supplied from filtration wells. It would distribute water to smaller reservoirs in each HCU, community water taps and community houses. The distribution network was designed in a radial system to allow later extension to each plot. Until the system was complete, the HCU reservoirs would be filled by water trucks.

Each HCU would have four latrines with six stalls each. Sanitary centres were also designed in each housing unit, emptying towards septic tanks in front of the plots. It was planned to connect these later to a conventional sewerage system. Terraced sanitary micro-landfills were planned for waste disposal.

A central transformer was planned from which electricity would be distributed to public substations, HCUs and service centres. To lower costs, each HCU would have an electricity metre and use overhead distribution lines on wood, rather than concrete, poles. Public lighting was provided with fluorescent lamps.

Residents participated in self-construction and interior design of the HCUs. The management committee, made up of representatives of the municipality, district and residents, approved the overall town plan. The qualified residents (other than owners of other property) occupied plots at the perimeter of each HCU and began self-construction (roads, posts, schools, etc.), beginning by clean-

ing up the plot with technical support and equipment from the municipality. At the same time the residents discussed the subdivision plan with teams of independent architects until all the residents in the HCU gave their approval at a meeting. Later the distribution of plots would be done according to drawings and the qualification of families (degree of participation, seniority, contributions, etc.).

Currently Huaycán has far more than the 20,000 residents planned. The quality is very poor. Although the physical structure proposed has been strictly observed, there is still lack of potable water in several HCUs; the roads are not paved and contribute to environmental pollution because of the dust; and garbage treatment has not yet been implemented. There are new spontaneous settlements in the peripheral area, in the roughest areas and those with risk for flooding. Nevertheless, the experience has given many lessons.

In the Housing Community Unit, HCU, (neighbourhood cluster), land between the houses is reserved for multipurpose use by the people in the neighbourhood.

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