



The challenge of low-cost housing for disaster prevention in small municipalities

Gonzalo Lizarralde, Université de Montréal
email: gonzalo.lizarralde@umontreal.ca

Abstract

Small municipalities in developing countries often find that procuring new low cost housing to relocate families living in disaster-prone areas is largely constrained by political, economical and social difficulties. Acquiring safe land, matching public and private resources, encouraging individual savings, selecting, evaluating and approving beneficiaries and choosing minimum standards are some of the major barriers in the process of housing delivery.

A recent initiative in Colombia, in which 103 families were relocated from disaster-prone areas into a 1262-unit project of low-income housing, illustrates a convenient way of planning, procuring and building housing for disaster prevention. In this model, an efficient partnership between the local and national government, private companies that administer social benefits and a residential developer was created. The partnership managed to successfully channel public subsidies and administrative means to use public funds and transform them into core-houses, ultimately transferring them to an ongoing process of progressive construction managed by individual beneficiaries. Some mistakes were made in the urban and architectural designs. However, the strategies used might set up an example for future municipality-based initiatives of disaster prevention in developing countries

Keywords: Reconstruction; Housing; Procurement; Progressive housing; disaster prevention.

Introduction

Low-cost housing markets in developing countries are often distorted (De Soto, 2000; Lizarralde and Root, 2008). In fact, Keivani and Werna (2001) have found that these markets do not always behave efficiently creating housing shortages and reducing the possibility of finding affordable sheltering for the bottom poor. They clarify that this shortage of housing is usually related to the following characteristics:

1. Capital market failures: purchasing a house usually requires financial assistance. This means that purchasing this good is dependent of availability of financial services (an external product) in the form of loans or mortgages.
2. Imperfect information: the adjustments between demand and supply require well informed suppliers and consumers. However, the construction industry and the real estate market are highly fragmented and therefore information is not easily accessible and is expensive to obtain.
3. Inelasticity of supply: Houses are site-dependant and therefore cannot be easily transferred from one area to another in order to meet high demands in a particular area.
4. Houses have to be built in land which is scarce in inner cities; the price of the commodity is highly dependent of the price of land which in turn reflects the most profitable use (which is rarely low cost housing).
5. Uniqueness of products: every site is different (climates, topography, neighbours, vary from site to site) and thus the price of a house is largely affected by externalities from the context in which it is located. Thus, the market price does not necessarily reflect the tension between costs of production and demand.
6. The market does not act freely between interested clients and suppliers. Instead, it is largely affected by centralized and largely controlled agencies: urban planning agencies, deeds registration agencies, banks and financial institutions, property companies, and land owners.
7. Builders and developers in the low-cost housing sector must accept slim profits per unit to maximize affordability. Thus the activity is only profitable if it can be delivered in large numbers to obtain economies of scale. Nevertheless, due to the lack of large pieces of land in desirable locations, this is particularly difficult to achieve.

The housing shortages are then represented in both quantitative and qualitative deficits. Various authors have associated the qualitative deficit of housing with disaster vulnerability (Davis, 1981; UNDRO, 1982; UNCHS-Habitat, 2001; Lizarralde and Boucher, 2004). According to this argument, the lack of affordable housing leads low-income families to live in substandard conditions that usually include over densities, construction in disaster-prone areas, invasion of land, and constructions that do not respect building codes and standards.

This qualitative and quantitative shortage – and the disaster risks associated with it - is a major challenge for small municipalities in developing countries. In most of the cases municipalities do not have the resources, the infrastructure and know-how to deal with housing shortages without external support. The intervention of central governments becomes then necessary. This intervention often takes the form of housing subsidies and different procurement strategies need to be established to direct these resources to the families living in unsafe conditions (Lizarralde and Root, 2008).

In two complementary papers, Lizarralde and Root (2008) and Lizarralde and Massyn (2007) have found that (i) the solutions proposed by governments to alleviate this shortage might distort the market even further, and (ii) the participation of local organizations in subsidized housing does not guarantee appropriate levels of community participation and significant decision making power from local residents. Studying the case of the low-cost housing market in South Africa, Lizarralde and Root (2008) found that subsidized low-cost housing promoted by governments might not necessarily

contribute to create an efficient market where low-income families can find housing products that correspond to different levels of affordability.

However, subsidized housing keeps being one of the most important strategies used in developing countries to alleviate low-cost housing shortages (Ferguson and Navarrete, 2003; Ferguson and Navarrete, 2003b; Gilbert, 2004). In both South Africa and Colombia, central governments manage the subsidies while municipalities and regional governments must procure the housing projects (Gilbert, 2004; Department of Housing, 2006) (In some cases in Bogotá, organisations of the national government have contributed to procure projects, particularly in the Metro vivienda initiative). The problem is, that municipalities rarely have the resources required to administer the projects and require financial assistance and know how from external sources: international loans, participation of central governments, private capital, etc. (Zanetta, 2001). In fact, small municipalities in developing countries often find that procuring new low cost housing to relocate families living in disaster-prone areas is largely constrained by political, economical and social difficulties. Acquiring safe land, matching public and private resources, encouraging individual savings, selecting, evaluating and approving beneficiaries and choosing minimum standards are some of the major barriers in this process.

Private capital and know how are also necessary to compensate for the lack of resources at the level of municipalities. Johnson, Lizarralde and Davidson (2005) have found that post-disaster reconstruction often requires then two levels of procurement: one called “macro procurement” at the national level, coupled with “micro procurement” at the private level.

The lack of administrative means and resources at the level of municipalities to develop housing projects is also a major barrier for disaster mitigation during reconstruction activities. Lizarralde (2004) had previously identified the challenges faced by the municipalities of Choluteca and San Salvador in the aftermath of two major disasters.

In the case of Choluteca, a small city located in the south of Honduras, the local administration did not find the means to solve the housing crises caused by Hurricane Mitch in 1998. The administration resorted to external aid and the reconstruction project (materialized in a settlement called Nueva Choluteca) included more than 16 international organizations working with little input from the municipality. A visit to Choluteca in 2002 demonstrated that the municipality had little involvement in the management of Nueva Choluteca and that the settlement had high levels of unemployment, crime and major public health problems (Lizarralde, 2004).

In the case of San Salvador, the capital city of El Salvador, the same study demonstrated that after the double earthquakes of 2001, the municipality was not capable of dealing with the major housing deficit. Even though the municipality launched an ambitious program of housing reconstruction, no permanent houses were actually built. The program was dismantled few months after the creation of the reconstruction committee due to lack of funds. In this case, the study conducted by Lizarralde (2004) showed that the municipality did not have the management skills and resources to capture funding and loans from external sources.

Research methods

Previous studies have demonstrated that small municipalities in developing countries find it very difficult to procure low-cost housing projects to reduce disaster risk. This study hypothesises that partnering strategies might contribute to initiate, plan, procure and administer those projects. A case study will be used to test this hypothesis and the patterns found in this case will be compared with patterns found in previous studies.

Research hypothesis:

- Small municipalities in developing countries often do not have the administrative and financial mechanisms to procure low-cost housing projects targeted to reduce disaster risks. However, partnering strategies between municipalities, the national government and private organizations can reduce the common barriers for housing delivery, alleviating the pressure of disaster prevention.

First, an extensive review of procurement strategies for low-cost housing in developing countries was conducted. The case study research, conducted between November 2006 and November 2007, implied direct participation of the researcher in the object of study (as proposed by Marshall and Rossman, 1999 and Robson, 2002). This method offers the researcher some advantages, particularly “the opportunity to learn directly from his own experience of the setting” (Marshall and Rossman, 1999, pp. 106).

The fieldwork commenced with a review of low-cost housing projects in Colombia, after which it concentrated in the region of Cundinamarca (central Colombia) and particularly in a recent project called Juan Pablo II in the municipality of Facatativá. The author got directly involved in the low-cost housing project under study. Official reports were collected and analyzed, including: publications made by the municipality, the catalogues aimed at beneficiaries, the websites of the institutions involved (including private companies) and articles and press releases related to the project. Additional information included: partial budgets, project schedules, plans of the houses and the settlement, aerial photos, pictures and all the law bills and legal documents used for procuring the project.

The author visited the construction site in December 2006 and in June 2007 in order to follow project progress. The second visit was conducted when the houses of five out of six phases had been completed and handed over to residents. Subsequent modifications made by the residents to the basic units were photographed and compared with those taken during construction. The contacts established with the municipality and the local church proved to be extremely useful to guarantee that the researchers had good access to information on the projects.

Two officers of the municipality were interviewed using semi-structured interviews: the Mayor and the General Secretary of Public Administration. The bishop of the region was consulted in two occasions about his perception of the project and his perceptions of insight information gathered from the interviews.

Eight residents were informally interviewed during or after the construction. Photographs and videos of their housing units were taken and they were interviewed about their expectations and their involvement in the process. All the information gathered from the project participants was triangulated with official reports and printed documents. In some cases there were differences in the information obtained, requiring further analysis through comparison with additional sources.

According to Robert Yin (1984) the aim of a case study is not to derive the findings from statistical generalization, but to generate patterns and relations of theoretical importance, called “analytical generalizations”. Thus, the hypotheses were first tested through the analysis of published information and comparison of quantitative data (from previous research) and then they were tested with qualitative data from detailed case studies. This included the following activities:

1. Collection of information about procurement choices for low-cost housing, identification of patterns in design, management, modes of transaction, forms of tenure, etc.
2. Analysis of low-cost housing projects developed through public subsidies.
3. Analysis of patterns found in the case study.
4. Comparison of patterns found in activity 3 with previous research results and patterns.
5. Definition of analytical generalizations following the case study approach (Yin, 1984).

Research Objectives:

- To identify the barriers that small municipalities have to face to reduce disaster risks related to low-cost housing.
- To identify mechanisms for low-cost housing procurement at the municipal level.
- To highlight alternatives for low-cost housing procurement targeted to reduce disaster risks.

Research results

Facatativá is a municipality of just over 100,000 inhabitants located in the west valley of the capital district of Colombia. The municipality is located at 42 km of the capital Bogotá, in an agricultural area well known for the production of export flowers and dairy products. The proximity of the municipality to Bogotá – a city of over 7 million, favours frequent commuting towards and from Facatativá. The municipality is located in the jurisdiction of the department of Cundinamarca (a regional government that includes the capital district). The local government includes two complementary sections: the Mayor and the City Council.

In 2004, the administration identified two major challenges: an important housing shortage of about 5,800 units and 1012 families living in disaster-prone areas in the periphery of the city (most of them close to rivers and in sloped areas). The common difficulty to face these challenges is to find a way of relocating the families living in unsafe locations. Forcing the families to leave the areas is a politically risky and socially

counterproductive measure. The municipality then planned a two-fold strategy: to buy the land and constructions occupied by the families living in unsafe conditions and to buy a safe piece of land for a major housing project. The strategy envisaged that the compensation for the unsafe locations would correspond to tenure rights in a new location in a safe area.

By May 2004, a piece of land of 18 Hectares was identified besides a neighbourhood called “Arboleda” in the periphery of the municipality and adjacent to a road that leads to the neighbouring village of El Rosal. The land was bought by the city for 1.2 million USD¹

The city also identified about 50 locations prone to landslides or flooding. An estimation of the commercial price of the land plus the house was then established for each of the families located in three of those locations in order to compensate them with a subsidy represented in tenure over a piece of land in the new location called Juan Pablo II (JP II).

In March 2005, the municipality authorized the Urban Development Plan of the area for residential use and approved a mixed use combining housing, commerce and community services. Few days later, the Municipality authorized the delivery of subsidies in the form of land tenure for families that accepted to follow a “Programmed Savings Plan”. The total subsidy included 6.027.456.948 Colombian pesos (2,99 million USD), broken down like this: (i) land: 1.2 million USD, (ii) infrastructure: 1.7 million USD, and (iii) plans and designs: 44.600 USD. Each family received then a subsidy of 4.776.115 Colombian pesos (2,371 USD).

However, this subsidy would not be applicable to most of the residents living in dangerous places because they did not have permanent jobs. Therefore, in November 2005 the Municipality created the Valor Unico de Reconocimiento (VUR), a formula to compensate the families that were living in disaster-prone areas. The units were estimated between \$1 million and \$12 million pesos, an additional value was given to match the required resources for applying to the project JP II, which was \$15 million pesos. In July 2006 The Fondo Nacional de Vivienda (Fonvivienda) approved the VURs for families living in disaster-prone areas.

Figure 1 illustrates the contractual strategies used for the project. The diagram shows that two different alternatives existed for the beneficiaries that were part of workers’ funds and for the ones that were living in disaster-prone locations and did not have formal jobs. The first group benefited of the National program of subsidies upon authorization from the organization Findeter. The second group benefited from the subsidies given by the Municipality after arrangements with the Ministry of the environment, housing and development and the authorization of Fonvivienda.

The figure also shows that a special partnership was created between the municipality and the General contractor, which acted – in reality – as a residential developer of the project. This partnership was bound by a Fiduciary duty in which the general contractor engaged to administer the land and the resources and to commercialize the houses and transfer them to the beneficiaries with full-tenure rights.

¹ Current exchange rate= 2014 Colombian pesos for one US dollar

Other participants also worked in construction activities: a general contractor of infrastructure was responsible for the roads. The municipal unit of water and sanitation worked also with a private contractor of infrastructure; electricity and gaz infrastructure were also delivered. The telephone company, a consultant in urban planning and an external audit also joined the team managed by the municipality. The consultant in urban planning prepared the designs and was hired directly by the municipality. The external audit also had a contract directly established with the municipality.

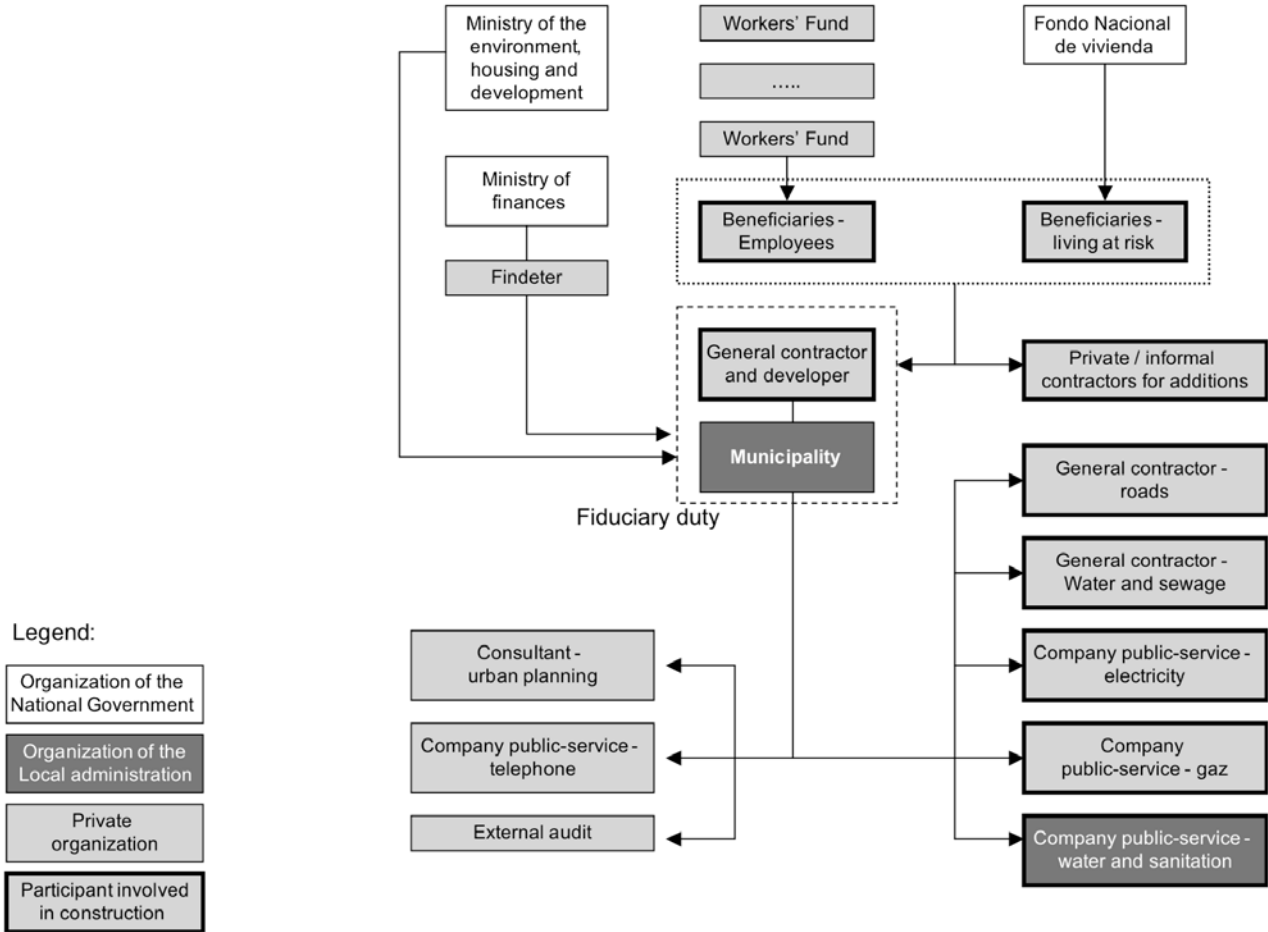


Figure 1. Organisational diagram of the project Juan Pablo II. The municipality organized a close partnership with the general contractor, with workers' funds and with organizations of the national government.

Urban general layout

The urban layout of the project is both efficient and sustainable. The layout includes minimum roads for vehicles and an optimization of pedestrian paths. Parking spaces are located only along the main road that goes across the project. However, each of the housing units is located at less than 100 meters from a parking space. Unfortunately, only two perpendicular roads connect the settlement with the adjacent neighbourhood of La Arboleda. This follows certain constraints in the topography of the land; however, it limits the integration of the project with the existing urban fabric (see Fig 2).

Spaces for recreation and sports have been considered in the project. In fact, one of the main features of the project is the park that has been left in the hill (see Fig. 3). Commercial activities and a centre of technical education were proposed adjacent to the main road (in the north side of the plot). However, this centre has not been built yet.

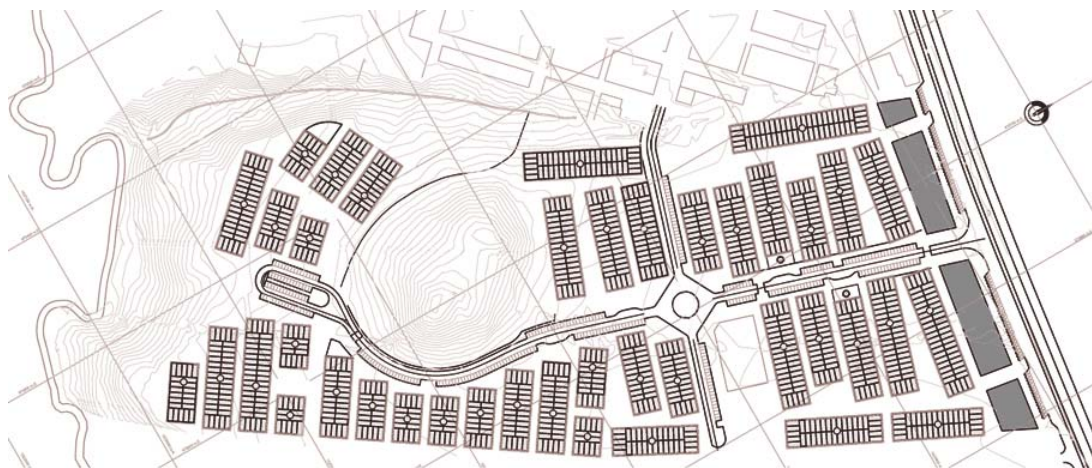


Fig. 2. Urban layout (in grey the commercial facilities located close to the main road)



Fig. 3. Image of the north side of the project taken from the hill. The units in this photo do not include yet later additions and alterations made by the residents.

Design of the basic unit

The 37 m² basic house (the core unit) offered to residents includes a piece of land of 4 by 10 mts. The layout includes a kitchen, a living area, two bedrooms and one bathroom distributed in two levels (see Fig. 4). The unit was designed to be extended by the beneficiaries over time (see Fig. 5). For this, a construction guide was prepared and given to the beneficiaries with the delivery of the house. The guide explained in detail the main characteristics of the house, the construction methods, the technical information about pipelines and installations, the structural requirements for changes and additions and the conditions for guaranties. According to the guide, only pre-established modifications and

additions can secure that the contractor will grant the construction guaranties in case of imperfections.

Lizarralde (2002) and Lizarralde and Davidson (2006) have found that multiplicity of choice pays a fundamental role in the performance of low-cost housing projects, allowing families to adapt their solutions to individual needs and priorities. However, in the case of Juan Pablo II, all the housing units are identical, leaving very few space for adaptation to different types of families and different needs. Units located in the main road are identical to those accessible by pedestrian roads. The units with vehicular access do not include a design adaptable to commercial activities (that are highly profitable, having easy access from the road). Unfortunately, this limits the possibility of families to develop additional sources of income, a possibility that has often been associated with the positive performance of low-cost housing projects in developing countries (Lizarralde and Massyn, 2007; Kellett and Tipple, 2000). Despite of this, by the time of the evaluation in December 2007, 12% of the units had a mixed use (domestic and commercial). These include user-made adaptations like: various convenience stores, a childcare place, a movie rental sore, various cafeterias, a store for shoe repairs, etc.



Fig. 4. Plans of first level (left) and second level (right) of the 37 m2 basic unit.

Later additions and modifications to the basic unit were developed and organized directly by individual beneficiaries. Various beneficiaries had construction skills and worked directly in the construction. Others opted for hiring informal contractors to develop the additions according to the plans provided in the Construction Guide. Another group opted for a mixed approach in which they bought and supplied the materials and hired only labour force for the construction. Each family followed its own pace according to the resources available.

The patterns found demonstrate that later additions follow an evolutionary process in which the construction is developed in a progressive manner. Extensions usually start with improvised materials such as plastics and sticks (see Fig. 7). In a second step the

foundations and floor are built. Walls and roof for the first floor follow the sequence and the second floor appears later, only when resources are available.

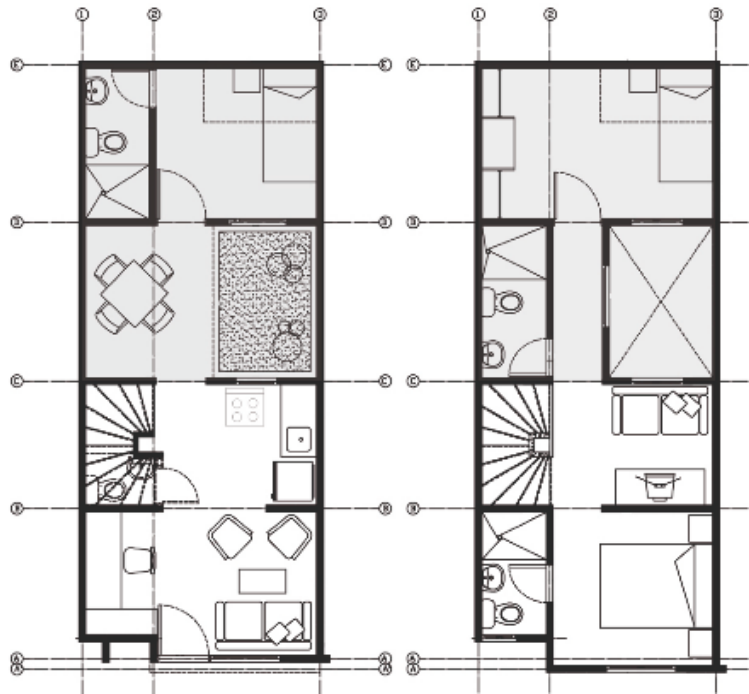


Fig. 5. Plans of first level (left) and second level (right) of the extended unit as proposed by the developers.

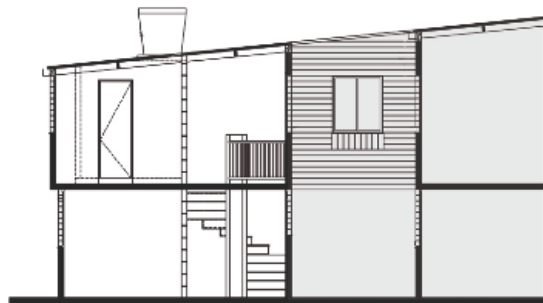


Fig. 6. Section of the unit (the extended portion in grey as proposed by the developers)

The visit to the project in June 2007 demonstrated that various families have opted for additions and alterations to the original dwelling that differ from the ones proposed by the Construction Guide. Some changes to the original design include:

1. Modifications to the location of the kitchen. Many families have opted for moving the kitchen to the patio, changing the water, electrical and sewage installations.
2. Modifications to the patio. Various families have opted for building a transparent roof over the patio and use this area for domestic interior activities. This change reduces the ventilation of the house and limits the possibility of ventilating the additional bedrooms of the addition.
3. Modifications to the distribution of bedrooms and the openings towards the “patio”.
4. Plastering and painting of interior walls.
5. Changes in the installation of the elevated water tank.
6. Not building the bathroom in the first floor.
7. Changes in the distribution of electric switches and plugs.



Fig. 7. The space left for the enlargement of the units. Left: the units just after being completed by the contractor. Right: 6 months later, additions and alteration made to the units.



Fig. 8. Despite that they were not planned in advance, commercial activities, such as this convenience store, have been developed by the residents in the living area of the units.

Discussion and conclusions

Previous examples have shown the multiple difficulties faced by municipalities while implementing and managing projects aimed at disaster risk reduction. Common challenges include: acquiring safe land, matching public and private resources, obtaining financing, encouraging individual savings, selecting, evaluating and approving beneficiaries and choosing minimum standards.

A recent example of relocation in Facatativá, Colombia demonstrates that most of these challenges can be managed by procurement arrangements that include partnership between the local administration, the central governments and private organisations. The project Juan Pablo II illustrates that this organizational arrangement can produce positive results. The project succeeded in creating affordable units for low-income families living in disaster-prone areas. The project relocated 103 families within a functional and ambitious low-cost housing initiative. The new settlement has a functional and efficient urban

design. The units are safe, functional and allow progressive construction. However, two main deficiencies were found in the project: (i) the design of the units does not facilitate the development of activities leading to additional sources of income, and (ii) the units present little flexibility to accommodate different needs and priorities. Despite of this, the project Juan Pablo II represents a positive example of administrative efficiency to reduce disaster risks in developing countries.

Key Lessons Learned:

- Procuring low-cost housing projects at the municipality level requires innovative administrative mechanisms capable of matching national and local resources with private capital and know how.
- Disaster prevention requires administrative solutions capable of transferring to municipalities the know-how and experience required for low-cost housing delivery.
- Small municipalities in developing countries require assistance from central governments to develop the administrative and legal means to be able to alleviate low-cost housing pressures.

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Author's Biography



Dr. Gonzalo Lizarralde is a specialist in management, implementation and evaluation of architectural projects. He has long experience of research and consulting for architecture and construction projects particularly in the field of low-cost housing. Dr. Lizarralde has taught at the University of Cape Town, McGill University, Université de Montréal and Universidad Javeriana and has lectured in universities in Europe, USA and Latin America. He has a PhD from the Université de Montréal and a post doctorate from the Department of Construction Economics and Management of the University of Cape Town. He is the director of the grif – The IF Research Group of Université de Montréal.