Pre-crisis market analysis for disaster risk reduction in urban informal settlements
A pilot study on housing market system in Polvorines, Peru

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Today, the majority of the global population lives in urban areas and this rapid urbanization is a root cause of increasing disaster risk (UNISDR, 2012; 2013). As more people settle in unregulated high-risk areas, the greater the probability of casualties and economic losses is, as a result of climatic events such as floods. This makes it critical to focus on disaster risk reduction in urban areas (UNISDR, 2012). This shift has contributed to one of the biggest challenges in developing countries: the formation of unplanned informal settlements in high risk areas. In the Latin America and Caribbean region, informal settlements are a significant feature of urban growth. According to UN-Habitat (2016), 104 million people live in irregular settlements in the region, equivalent to 21% of its urban population as of 2014. In Peru alone, 8.2 million people live in such peri-urban areas, which correspond to 34% of the urban population.

People living in informal settlements are particularly vulnerable to floods (GFDRR/World Bank, 2012). Most informal settlements carry physical vulnerabilities because of their inappropriate location or poor construction practices. These settlements are often located in highly risk areas and built with low quality design and construction materials, on plots with no secure land tenure. This also leads households to be left out of the basic service provision such as potable water and electricity. They therefore rely on illegal connections to electricity poles, to water points and do not currently have access to improved sanitation. The drivers for this urbanisation are economic opportunity pulling people to the cities for jobs, compounded by lack of planning enforcement, allowing illegal settlements to establish and grow. As a result local livelihoods, strongly depend on market systems, be it for food, access to water and sanitation, adequate housing and employment. In the face of catastrophic events market systems in these areas are often severely disrupted and collapse, thus affecting the coping capacity of the population to survive and recover.

Market oriented approaches for emergency response, such as the Emergency Market Mapping Analysis (EMMA) toolkit1, have proved to be effective in rapid analyses of market systems in post-disaster context. In recent years it has been recognised that incorporating market development approaches in risk reduction will facilitate transition from dependence on external relief to building local resilience.
Key messages

1. Markets can make a significant contribution to people’s livelihoods by providing access to food and basic services, adequate housing and employment. Therefore, it is important to identify who the main players are and analyse how complex relationships and various incentives function in a pre-crisis context in order to reduce potential impacts.

2. Carrying out a systemic and multi-stakeholder analysis of the housing market in informal settlements allows to gain a broad understanding of the key barriers to sustainable solutions in a crisis context, such as promoting access to risk and vulnerability information and transparency for effective decision-making before and during a predicted crisis.

3. Market systems’ interventions play a critical role in building community resilience, i.e. a well-functioning market that operates in improved ways can remain functional when a disaster strikes, so that a humanitarian crisis can be avoided. Therefore, reducing the vulnerability of these market systems to floods has the potential to reduce vulnerability and increase the resilience of marginalized communities that are embedded in them, and thus avoid major damages and losses to their assets and livelihoods.

4. Market interventions are challenging to undertake as long as structural problems such as regulations, governance, political tensions, informality and mafias are still representing rooted impediments. That is why recommendations for efficient market interventions need to be focused in priority on components that can be improved or changed. Actions on such structural problems need to inform further and longer-term country programme strategies.
Rationale for considering a market approach to disaster risk reduction

Market analysis approaches initially designed for long term development programmes have primarily been used in humanitarian contexts to respond to emergencies following a crisis. There has been a clear recognition in the disaster risk reduction community that markets could be analysed and strengthened prior to recurrent or expected crisis to reduce the impact on the most vulnerable people. Hence, by focusing on reducing the vulnerability of these market systems, market-focused interventions have the potential to reduce the vulnerability and enhance the resilience of involved marginalised communities.

This study on informal housing market system was undertaken as part of the Zurich Flood Resilience Programme in Peru. The central objective was to explore the role that functioning markets can play in reducing the vulnerability and strengthen flood resilience of urban and peri-urban communities. With this experience we have strengthened our learning about the pre-crisis market approach and informed future activities in flood risk reduction.

Critical market system and scenario

The critical market chosen for this study is the urban informal housing market. The study highlighted that the housing system was intrinsically composed of three interrelated sub-markets: construction materials, land tenure and construction labour. It was also vital for the market analysis to consider access to basic services; water and electricity, as this has an influence on house and land prices.

The scenario selected was the predicted El Niño event in February - March 2016 and entailed some unknowns with regards to level of severity of flooding, number of potentially affected people and infrastructure.

The study was structured around key analytical questions that focused on the following four main aspects:

- Understand the factors that influence the level of functionality of the urban informal housing market.
- The level at which the functionality of the market affect the vulnerability of urban and peri-urban communities in a flood context.
- The performance of the urban informal housing market in the current situation and how it will respond in a context of a flood.
- Identify and promote recommendations to support and make the market systems more inclusive, by strengthening market literacy, risk awareness and the participation of marginalised vulnerable communities as critical components of their pathway to resilience.
Methodology for pre-crisis market analysis

The study used a hybrid methodology, using key principles, data collection tools and facilitation methods extracted from the Participatory Market System Development (PMSD) approach and the Pre-Crisis Market Analysis (PCMA) approach. The department of Piura is located in the northern part of Peru, with a population of 1,844,129 inhabitants and is one of the regions most affected by floods in Peru, especially during El Niño phenomenon (INIE, 2015). Studies estimate that more than 28,561 houses were impacted during El Niño event of 1997-1998 and peri-urban settlements suffered the highest impacts (Galanza and Kamiche, 2012).

The presence of urban planning in Piura has led the most vulnerable fringe of the population to build houses in high flood risk areas where they do not have access to secure land tenure. One of these settlements located in the southwest area is the district of “Veintiséis de Octubre”. This district was created in 2013 and has 41 settlements and 5 urbanizations that cover 110 km² and has a population of about 130 thousand inhabitants. The status of property titles in the district is complex, some areas have property titles and others do not, or are in the process of receiving them.

Situation analysis in Piura: target area and population
Polvorines is one of the informal settlements in this area and has a population of 3,500 families. The area is classified as an area of very high risk of flooding as it is built on low-lying land next to a dry lagoon which fills with water during the rainy season (December - April). According to the map of hazards of the city of Piura, it is a zone of “difficult and very slow drainage in which the depth of the flood reaches 0.60 to 2.0 m2 (INDECI, 2012). In this settlement most of the houses are the product of informal self-construction with low quality materials and limited compliance with building codes.

The informal housing market system involves diverse actors who interact in different ways and have specific roles in the market. The target population of this study is composed of the vulnerable settlers in Polvorines, who comprise of various socio-economic states. Within them, three target groups were identified:

(I) **Formal property owners, who are households that have property titles and built stores**, businesses and construct their houses of bricks and cement, in the least vulnerable areas of Polvorines;

(II) **Informal property owners**, who are known as Popular Neighbourhoods of Social Interest (UPIS) who use lower quality materials for construction as plywood, but have invested in the development of their housing thus they are seeking formalization of property titles and

(III) **New land occupants**, who have recently settled illegally and have their houses built at highest risk areas next to the lagoon, as well using low quality materials as plywood, but sometimes local materials as Guayaquil bamboo (Guadua angustifolia) and a design that does not comply with building standards. The last two groups (II and III) do not have access to adequate basic urban services as water, drainage and electricity and rely on illegal and precarious connections from the formal sources.
### Key factors influencing functionality of informal housing market in Polvorines

The informal housing market in Polvorines is complex associated with access to land, high demand for construction material and labour in an informal context. The study identified key factors that define the functionality of the informal housing market in Polvorines and hence contribute to increasing the vulnerability of the population.

#### Table 1. Influencing factors and key vulnerabilities influencing the functionality of informal housing market in Polvorines.

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<tr>
<th>Influencing factors</th>
<th>Key vulnerabilities</th>
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| **Flood risk factors** | • Location in high risk areas, such as in riparian areas and dry lagoons, which flood during the rainy season.  
• House construction with inadequate materials and non-compliance with building codes.  
• Lack of access to qualified technical capacity to support the design and construction of adequate flood resilient housing. |
| **Social factors** | • Low perception of risk among settlers and absence of a culture of disaster risk management among local authorities.  
• Limited access to key information for households (climate information, land tenure, urban planning, basic services rights, market literacy, networking and price setting) |
| **Economic factors** | • Limited options for accessing bank loans or other financial mechanisms for improvement and reconstruction of houses.  
• Price speculation and market inequalities regarding land tenure, construction materials and construction labour. |
| **Legal factors** | • Inadequate public policy to respond to specific needs and possibilities of most vulnerable populations.  
• Insecure land tenure  
• Presence of “Informal power dynamics”, which acts as impediment to enforcing regulations. |
How the market will function in the period “during and after flood”

The informal housing market systems in Polvorines is already extremely fragile and should a flood occur the market will have very limited response and recovery capacity and the impacts will add to the current constraints.
In a scenario of flood, the demand for construction materials is expected to increase due to the need to repair damage to houses. One of the key factors affecting this sub-market system is around physical access, as the settlement becomes isolated due to collapse of the road network. This results in shortage of supply of construction materials as Guayaquil bamboo (Guadua angustifolia) and increase in price of cement. It is most likely that the demand for construction labor will also increase. The demand would motivate new workers to arrive in Polvorines and increase prices. Yet, much of the workers starting jobs in this period are informal and with low qualification thus leading to inadequate construction of houses especially for the new land occupants.

There is a very weak articulation between vulnerable population with low income and no land titles, and their access to social housing programs and credits for reconstruction of houses. This is a central vulnerability of the market system, and an aspect that defines its resilience. The municipality, in this case, functions as an evaluator of the eligibility of applicants to receive the payment. To be eligible, beneficiaries must have a registered property title. Therefore, only a few households have access to such loans.

It is expected that informal land traders will see an opportunity to purchase a high number of land plots, affected by the flood at a low price, but suitable to be sold at higher price once the flood recedes and people forget about the flood, this affects the low income population and their access to land.
Although in the current context there were no limitations on access to potable water through formal or informal networks, in a situation of flood, the access to drinking water will be affected. It is assumed that permanent water pipes where water quality is good, will withstand flooding. However, it is very likely that informal water connections will be impacted, so the demand for drinking water would increase in the informal settlements.

**Recommendations**

Key ingredients for achieving change and upgrading the housing market in informal settlements (Figure 5).

The study recommends the following market interventions to improve its functions and respond to the needs of the most vulnerable in flood context:

1. **Improve access to market information and flood risk for all actors.** Improve literacy regarding basic services, housing and construction materials, in particular regarding the legal framework, land tenure regulations and rights. Improve understanding of flood risk, risk mapping and appropriate risk reduction strategies.

2. **Improve the quality of construction services available for low income populations** – through various options to support the construction codes and regulation, the establishment of small businesses between the artisans and/or independent certifications, and the use of alternative technologies.

3. **Promote and facilitate collaboration between housing market actors as community, government and private sector, to create a common agenda** – Form alliances and seek collaboration among all stakeholders to strengthen the exchange of information and facilitate inclusive decision-making processes that can lead to greater collaboration for safer housing location and construction.
4. **Promote the development and use of innovative financial instruments** – such as vouchers, insurance and adequate credit, adapted to the specific living and livelihood conditions of low income settlers, to increase their quick recovering capacities while not undermining local markets with handouts.

5. **Support and encourage the formation of local labour for construction.** Training on new construction technologies and materials especially simple flood resilience measures to increase the quality and supply of skilled and semi-skilled local labour to cope with the market demand.

6. **Combine flood risk analysis and urban planning** – Need formal flood risk assessment developed in collaboration with the local population to inform urban planning decisions.

7. **Public policies that take a preventive approach to informal settlements and actively promote access to land and housing in secure areas before slums are formed.** Improve and apply existing requirements to ensure the longevity, safety and quality of buildings and housing to improve disaster preparedness.

Building communities’ knowledge of their rights, facilitating participatory risk assessment appeared to be a central leverage points. Understanding the role of institutions and communities in decision-making processes, and assessing gaps and opportunities in the current legal framework, as well as the dynamics in linkages between actors and business models was at the core of this study. In the following table (Table 2) we analyse the feasibility of the intervention alternatives proposed above by identifying the facilitating and limiting factors for their implementation.

**Table 2.** Analysis of recommendations for the market of informal housing system in Polvorines.

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<th>Facilitating factors</th>
<th>Limiting factors</th>
<th>Actors</th>
<th>Timeline</th>
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<tbody>
<tr>
<td>It is an easy-to-execute alternative that could benefit the entire market system.</td>
<td>Willingness of market players and local governments to support activities with provision of relevant information.</td>
<td>Civil society organisations</td>
<td>Immediately</td>
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<tr>
<td>1. Improve access to market information and flood risk for all actors.</td>
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<td></td>
<td>The adoption of new or improved choices of materials and construction techniques would depend on the will of the population and the workers as well as supporting policies.</td>
<td>National / regional / local government, private sector and civil organizations</td>
<td>Short to medium term</td>
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<td>2. Improve the quality of construction services available for low income populations.</td>
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<td>Several platforms already exist to strengthen collaboration and facilitate dialogue among key actors.</td>
<td>There are conflicts between the actors, which can limit activities that strengthen collaboration.</td>
<td>National / regional / local government, private sector, civil organizations and local population</td>
<td>Immediately</td>
</tr>
<tr>
<td>3. Promote and facilitate collaboration between housing market actors as community, government and private sector, to create a common agenda.</td>
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4. Promote the development and use of innovative financial instruments.

| The population in Polvorines thinks of their houses as a means to capitalize and thus there is demand for financial instruments tailored to their needs. | Difficulty in developing financial services and products which are adequate for the specific needs and limited possibilities of the most vulnerable population. | National / regional / local government and private sector | Short to medium term |

5. Support and encourage the formation of local labour for construction.

| There is interest to strengthen local skills and focus on special groups such as young workers to create new job opportunities. | It may involve high costs and it would be a question of sustainability. Certification must be recognized by the government and this can take time to be achieved. | National / regional / local government | Medium term |

6. Combine flood risk analysis and urban planning.

| There are studies of risk analysis in the region that can serve as a basis for the process. | Willingness and capacity of the Government as well as limited funding to execute this process. | Gobierno nacional / regional / local | Immediately |

7. Public policies that take a preventive approach to informal settlements and actively promote access to land and housing in secure areas before slums are formed.

| There are existing processes and legislation for access to land and tenure, and construction rules that will serve as a foundation for the process. | It requires a change of behavior in public institutions to apply norms and adopt preventive approach. | Gobierno nacional / regional / local | Medium to long term |

A year after the study was realised, the following actions were taken as part of the Zurich Flood Resilience project in Piura:

Following the participatory informal housing market system mapping facilitated by Practical Action in Piura in January 2016, the results the study were presented in Piura in July 2016 and at the Public Forum on Relocation (May, organised with CENEPRED). Further to these events, the local authorities met to update their Urban Development Plan (last revised in 2002), a key document to improve the territorial planning and prevent the occupation of high flood risk areas. The recruitment of specialised consultants to support this process is ongoing.

In December 2016, Practical Action contracted an architect to investigate the “construction of adapted housing to the climate and urban conditions of the human settlements in Los Polvorines, District of Veintiseis de Octubre, Piura Region”. This study reviewed the existing housing models in the area, assessed the main physical and territorial hazards and risks in the area, as well as the legal framework. This study’s main conclusion was to propose a modular house design for a 5 people household, with construction materials sourced locally (Guayaquil bamboo). Practical Action is planning to implement this model design as a pilot for an individual house, which is also playing a community centre role.
Notes

1 PMSD Roadmap: http://www.pmsdroadmap.org


References


For more information:

Lili Ilieva
Thematic leader on adaptation to climate change and sustainable livelihoods – Practical Action Consulting – Latin America
Correo: Lili.ilieva@solucionespracticas.org.pe

Noémie de La Brosse
Inclusive Markets Consultant, Practical Action Consulting UK
Correo: Noemie.DeLaBrosse@practicalaction.org.uk

Alicia Quezada
Manager, Practical Action Consulting – Latin America
Correo: Alicia.Quezada@solucionespracticas.org.pe

Visita nuestra web: www.infoinundaciones.com

Soluciones Prácticas
Av. Arequipa 4499 – Miraflores, Lima, Perú
E-mail: info@solucionespracticas.org.pe
www.solucionespracticas.org