**Article:**
Testori, G, Janoschka, M, Mena, AB et al. (1 more author) (2021) Ecuadorian housing resettlements five years after the 2016 earthquake: A critical analysis. Habitat International, 117. 102433. ISSN 0197-3975

https://doi.org/10.1016/j.habitatint.2021.102433

# Ecuadorian housing resettlements five years after the 2016 earthquake: a critical analysis


## Abstract

In the past decades, earthquakes have left millions of people without homes, across the world. Safe housing is crucial for the long-term wellbeing of the affected population. This article analyses the Ecuadorian housing reconstruction developed after the 7.8 magnitude 2016 earthquake, taking as case study the cities of Portoviejo, Manta, Bahía de Caráquez and Pedernales, located in the Manabí province, which jointly accommodate more than 90% of the resettlements built by the central government.

The research aims to understand the implications of the top-down management reconstruction process and its impacts, five years after the earthquake, using as critical lens the inhabitants, the UN-Habitat principles for adequate housing and the "Build Back Better" principles of the Sendai Framework for post-disaster reconstruction. The work combines policy review, risk spatial analysis, semi-structured interviews, and constructive and architectural analysis. The article is the outcome of a transdisciplinary multi-scalar approach that analyses key long-term social implications, the quality and the spatial adaptations of the built environment. It finally offers some crucial recommendations for the long-term wellbeing of post-disaster housing strategies.



Keywords: Post-disaster reconstruction, housing, earthquake, Ecuador, Manabí.

## 1. Introduction

Scientists, urban planners and practitioners commonly agree that post-disaster recovery is an often slow and complex venture, susceptible to disappointments and conflicting results. Therefore, many researchers suggest that sustainable reconstruction strategies should be established in advance of the occurrence of a disaster (Johnson and Olshansky, 2017; Félix et al., 2013; Lizarralde et al., 2009). In this context, investigations have demonstrated that, if community participation and people-centred design of housing strategies were anticipated, they may have crucial positive effects in the case of a disaster (Maly, 2018; Sadiqi et al., 2017; Opdyke et al., 2019; Davidson et al., 2007). While each adversity is unique, the existing literature identifies common characteristics of reconstruction policies. For instance, many governments favour centralised approaches, considering top-down planning as the most 'efficient' strategy in view of the emergency (Daly and Brassard, 2011). Furthermore, quantitative targets of housing reconstruction, as well as the costs and technical requirements for seismic safety (Iuorio, 2007), tend to be emphasised over the accessibility, the design and the liveability of the settlements. Especially in contexts of only precarious governance capacities, this tension corroborates decisions overlooking the local social, political and economic capital, with potential adversities for affected populations (Johnson and Olshansky, 2017; Davidson et al., 2007).

With that in mind, Elliott-Copper et al. (2020) suggest that even if residents receive new -and often 'objectively' better- properties during a relocation process, they cannot be fully compensated for the isolation they feel when their original home was lost. Accordingly, the new places may never feel truly like home, and the resulting processes of 'un-homing' pinpoint to a kind of violence that is operating on individuals anonymously and invisibly through the way society is organised (Atkinson, 2015; Baeten et al., 2017). These distressing experiences are common in post-disaster relocation projects. But they share also many characteristics with resettlement and social housing policies in cities of the Global South (Nikuze et al. 2019; Viratkapan and Perera, 2006; Lyons et al. 2010). For instance, it has been addressed that the realisation of social housing projects tends to leave, especially vulnerable people, in socially and economically fragile positions (Barenstein and Iyengar, 2010; Jain et al., 2017). Indeed, the peripheral geographical location, poor transportation networks and accessibility, the lack of local employment opportunities, social disarticulation and weak sense of community, are correlated with insecurity, abandonment and high vacancy rates, and become crucial factors reinforcing vulnerabilities (Herath et al., 2017; Janoschka and Salinas, 2017). Additionally, the reality of many

housing developments has been addressed as socially and economically monotonous, and lacking sensitivity to local building cultures and livelihoods (Sullivan and Ward, 2012; Lizarralde, 2011; Bredenoord, 2009; Davidson et al., 2007). By triggering severe material and symbolic changes for households, such (unintended) consequences are exposing mainstream social housing policy frameworks, and they encourage our subsequent focus on the affective and emotional links between residents, places and the communities to which they belong.

Against this background, this article analyses the resettlement policies applied in the Manabí province in Ecuador after the 7.8 magnitude earthquake of April 2016, taking as case study the cities of Portoviejo, Manta, Bahía de Caráquez and Pedernales, which jointly accommodate more than 90% of the resettlements built by the central government. More than five years after the earthquake, the research aims to understand the long-term social and spatial impacts and implications of the top-down management reconstruction process. By combining policy review, risk spatial analysis, interpretation of semi-structured interviews, and constructive and architectural analysis, the article is the outcome of a transdisciplinary multi-scalar approach, bridging effectively the existing divides between the Global North and South in academic collaboration. Using as critical lens the views of the inhabitants, the UN-Habitat principles for adequate housing and the "Build Back Better" principles of the Sendai Framework for post-disaster reconstruction, it finally offers some crucial recommendations for the long-term well-being of post-disaster housing strategies.

The argumentation is articulated in five parts. After this introduction, section two illustrates the applied research methodology. Subsequently, part three sheds light on the case studies and reconstructs the post-disaster policies applied in Ecuador. The following section provides an in-depth analysis of the changing living and habitat conditions five years after the earthquake, discussing the households' efforts to improve and adapt the built environment over time. On these grounds, the conclusions critically assess the Ecuadorian resettlement strategy, suggesting more adequate post-disaster housing recovery policies.

## 2. Research methodology and description of case studies

This article adopts a comparative case-study approach to analyse the materialisation and impacts of resettlement policies in four cities of the Manabí province in Ecuador, which were strongly affected by the 2016 earthquake (Fig. 1). It is informed by a mixed-methods approach

that combines Critical Policy Analysis (CPA) with spatial data analysis; and it builds on qualitative empirical research to appreciate the implications of resettlement policies. Research was conducted in four places in Manabí: Manta, Pedernales, Bahía de Caráquez and Portoviejo, all strongly affected by the 2016 earthquake, with damages reported in up to one third of the buildings. Manta and Portoviejo are two medium-sized cities, with approximately 255,000 and 225,000 inhabitants. Contrary to this, Bahía de Caráquez and Pedernales are much smaller, with respectively 21,000 and 28,000 inhabitants.

Regarding the methodological approach, CPA provides understandings of risk management and social housing frameworks elaborated before and after the 2016 earthquake. By addressing social and political interests, values and normative assumptions, as well as discourse and practice, CPA comprehends politics as more than the sum of specific inputs and outputs. This may facilitate nuanced perspectives on how knowledge, power and resources are unevenly distributed in specific policy processes (Diem et al., 2014; Fischer et al., 2015; Martin, 2001). For this research, 58 policy documents were reviewed and classified according to three main categories: scale (international, national, and local), temporality (pre- and post-disaster), and topic (housing, land use, planning codes, and housing construction standards). CPA allowed comprehending the significance of emergency decrees and ministerial agreements for the reconstruction process, shaping the interpretation of post-disaster support and reconstruction management across scale, temporality and theme.

The phase of qualitative empirical research consisted of 37 semi-structured interviews with stakeholders such as national and local government representatives, builders and housing experts, neighbourhood leaders, and inhabitants of resettlements. Interviewees were selected by combining a positional approach (i.e., individuals with a position of authority in the reconstruction process and the local, provincial, and national administration), and a reputational approach (i.e., influential persons in their respective associative communities and fields of action). We selected 10 representatives from national, provincial and local governments, 3 builders, 7 risk management experts and consultants, as well as 17 neighbours and neighbourhood leaders/associational representatives. The interviews with governmental representatives, builders, and experts chiefly focused on workflows between different government scales during the emergency phase, on current policies and guidelines for social housing, and future prospects for post-disaster housing policies. More specifically, the builders shared their view of social housing as a space inhabited by households of a certain cultural and economic background, and the

rationale for choosing specific building typologies. Local and national policy maker and experts informed on the challenges, success and limitations of pre-and post-disaster risk management. By contrasting the information of the CPA, interview data consolidated our interpretations of the resettlement policy process. In contrast, the interviews with inhabitants and neighbourhood leaders aimed at discussing more personal perspectives; for instance, capturing perceptions, use and appropriation of habitat, sources of (dis-)comfort, social participation, housing adaptation, and broader challenges in the resettlements. Given the travel restrictions imposed by the Covid-19 pandemic, all interviews undertaken in 2020 and 2021 took place remotely, using video conference tools. On average, each interview lasted for 50 minutes. Full transcription was carried out, and transcripts were subsequently coded and analysed with the support of NVivo software for qualitative research.

Risk analysis was carried out using Geographic Information System (GIS) to support considerations about resettlement locations, potential hazard risks and urban connectivity. Following formal requests to each local government, data was delivered in shape file format under the premise of non-commercial use. The shape files were represented by polygons (areas); and provided information about local infrastructure and the city's exposure to different natural hazards, which were scored on a scale ranging from 0-4 (with 0 for low risk, and 4 for high risk). ArcGIS 10.3 was used for the file data analysis and classical overlapping cartography was used for data representation.

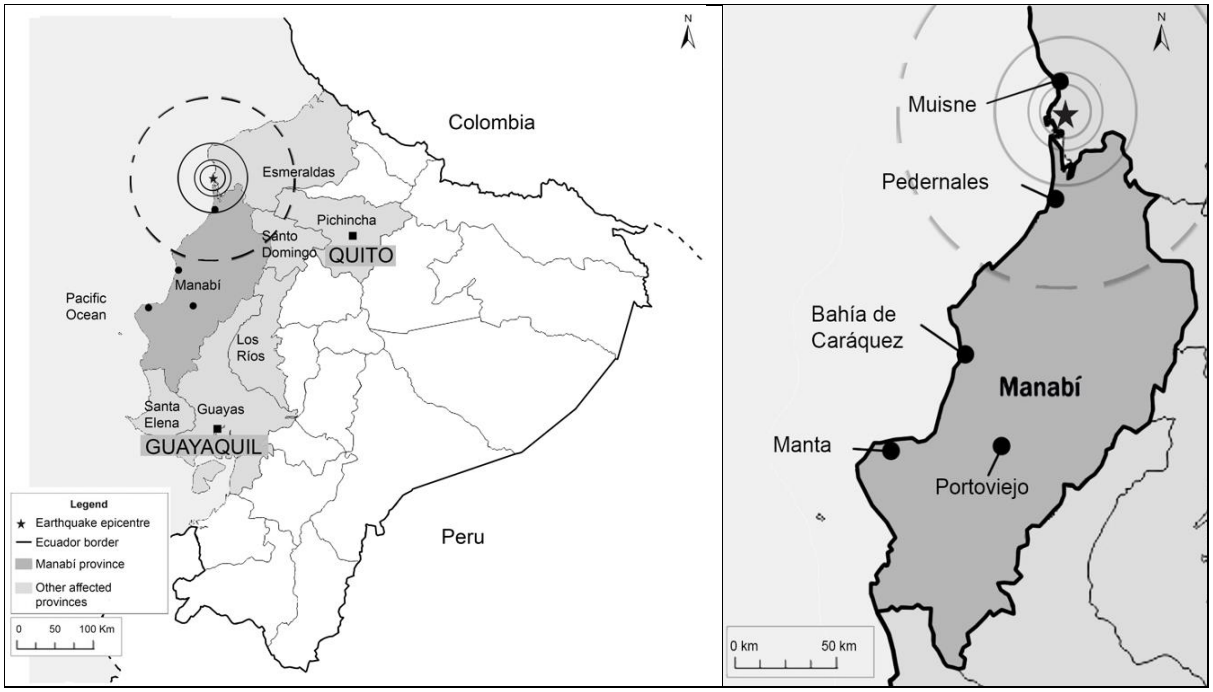


Figure 1: The geographical location of the case studies of this research.

Source: Own elaboration

## 3. Post-disaster reconstruction in Ecuador: policy and risk analysis

On 16th April 2016, Ecuador experienced an earthquake of magnitude 7.8 on the Richter Scale. The epicentre was located 27 km south-southeast of the coastal town of Muisne. Despite the Manabí province being the most hit area, damages were felt across seven provinces, affecting more than 68,000 households (Fig. 1). By approving emergency status under the Presidential Decree Nº1001, the national government immediately activated the corresponding emergency protocols as a response to the disaster. At the same time, national, regional and local Emergency Operation Committees covering different technical realms (rescue; health, sanitation, and hygiene; comprehensive care and security for the population) were mobilised. Ten days later, the Presidential Decree Nº1004 merged these committees in a single 'Reconstruction and Productive Reactivation Committee' chaired by the Vice-President. Corresponding tasks were scheduled in three phases:

1. Emergency phase for immediate post-disaster recovery, i.e., rescue, health, food, debris removal and demolition (Coordination: Ministry of Internal and External Security).
2. Reconstruction phase for public infrastructure and services, and the planning, design and construction of housing for affected households (Coordination: Ministry of Urban Development and Housing, MIDUVI).
3. Reactivation phase for the productive sector, applying special financial schemes supporting employment (Coordination: Ministry of Production, Employment and Competitiveness).

This research focuses explicitly and exclusively on housing resettlements developed in the second phase, targeting permanent solutions to households directly displaced by the earthquake. In that phase, damaged buildings were counted, the habitability was assessed, and damage levels were categorised. Only households that had lost their own house and had inscribed themselves in the Central Registry of Victims were entitled for relocation to a resettlement. Until the completion of the new house, all applicants were required to live in temporary camps, which were set in open spaces like airports or fields to accommodate mainly households from lower social strata, unable to cope on their own with the damages incurred by the earthquake. Besides,

households could also apply for two other financial support schemes of the Ecuadorian government, supporting in situ reconstruction on 'own land' and the repair of damaged housing (for details, see table 1). According to the national reconstruction plan *ReconstruYO Ecuador*, more than 45,000 interventions were initially targeted, of which approximately 50% were for reconstructions on own land, 40% for damage repairs, and slightly more than 10% for resettlements. However, no official data is available about the concrete implementation of the plan; our own research found out that in 11 resettlements in the four case studies, 2,716 housing units were built, which is equivalent to 91% of all housing units built in resettlements by the national government. This number is significantly lower than the targets expressed in the *ReconstruYO Ecuador* plan.

| Type of financial support | Beneficiaries | Amount | Co-payment |
|---|---|---|---|
| **Resettlements** | Households who were owners or tenants in risk areas. | USD 10,000 | 10% of total amount (max. USD 1,000), payable in 36 monthly instalments starting one year after receipt of keys* |
| **Reconstruction on "own land"** | Households who lost their houses or who were left with an uninhabitable house. | USD 10,000 | 10% of total amount (max. USD 1,000), payable in 36 monthly instalments starting one year after receipt of keys* |
| **Repair of recoverable housing** | Households with recoverable housing (no structural damage) constructed on their own land. | max. USD 4,000 | 10% of total amount (max. USD 1,000), payable in 16 monthly instalments |

* In 2019 the norm was changed, and inhabitants received the completed houses for free.

Table 1: Types of financial support for housing reconstruction after the 2016 earthquake.

Source: Own elaboration.

In this sense, it is considerable that the resettlements, which are the only focus of this research, were designed as large-scale projects of up to 600 housing units each, applying standardised building typologies for a budget of USD 10,000 per housing unit. Under the emergency status, the construction of each resettlement was allocated to one single company, while the contracts bypassed ordinary planning procedures. The national and local governments collaborated to opt for specific resettlement sites. Following a public competition, five construction companies proposing eight different housing typologies were selected. Among them, three typologies were predominant: the so-called 4D typology (two thirds of all housing units), houses on stilts (one

fifth of all housing units), and one-floor single-family houses (see Table 2 for the main characteristics and visual representation of each typology). Housing was distributed to the affected households between January 2017 and December 2018. In other words, some households were living for more than two and a half years in temporary camps.

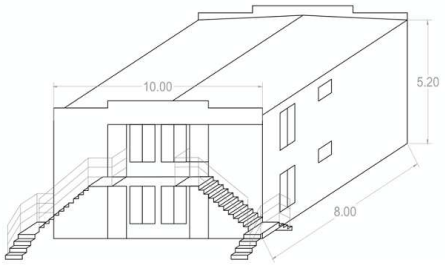
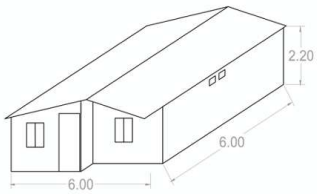
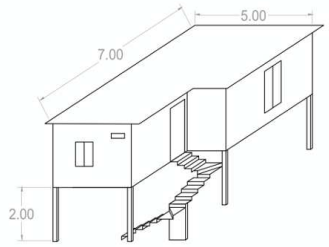
| Housing Typology | Construction typology | Description | Unit size | Housing drawing and dimensions |
|---|---|---|---|---|
| 4D | 8 - 10 cm reinforced concrete bearing walls<br>Roof: Steel joists with corrugated steel sheets | Apartment block of four housing units, distributed over 2 floors, and connected by exterior stairs.<br><br>Inside disposition:<br>1 Living-room + kitchen ~ 19 m²<br>1 bathroom ~ 3.5 m²<br>1 single room ~ 7.5 m²<br>1 double room ~ 9 m² | 38-41 m² |  |
| Single family house | | Single houses over 1 floor.<br><br>Inside disposition:<br>1 Living-room + kitchen ~ 18.5 m²<br>1 bathroom ~ 3 m²<br>2 bedrooms ~ 7.5 m² | 38-40 m² |  |
| House on stilts | Reinforced concrete frame, with infilled unreinforced masonry.<br>Pitched roof in steel joists with corrugated steel sheets | Single house unit, elevated over stilts, with exterior staircase.<br><br>Inside disposition:<br>1 Living-room + kitchen ~ 20 m²<br>1 bathroom ~ 3 m²<br>2 bedrooms ~ 8 m² | 40 m² |  |

Table 2: Housing typologies adopted in Ecuadorian resettlements

Source: Own elaboration.

Since the location of reconstruction sites was chiefly driven by land values and the availability of land, all resettlements are located peripherally to the corresponding city centres. Moreover, disregarding the national planning legislation, hazard risks associated with each area have only been scarcely analysed prior to the reconstruction process, since such information was not fully available at the time. However, according to experts' interviews, it was easily observable that some locations were risk-laden. In this regard, the analysis of GIS data clearly determines the

overlapping seismic, flooding, and landslide risks (Fig. 2). For Portoviejo and Bahía, the spatial analysis proves that two of the three resettlements are in areas affected by high seismic and flooding risk. Furthermore, in Manta the resettlements are located in medium landslide risk areas, while Pedernales has one resettlement located in an area exposed to medium landslide and high flooding risks. Since there is no publicly available register specifying where exactly residents were leaving before the earthquake, no comparison between risks prior and after resettlement can be done. However, following the cornerstone Sendai Framework (UNISDR, 2015) for post-disaster reconstruction based on the "Building Back Better" principles, risk analysis is essential to understand potential long-term impacts on housing projects. This is especially sensitive as various resettlements have already suffered multiple events of landslide and inundation. Following Fayazi et al. (2017) and pinpointing to the subsequent analysis, we may assert a considerable difference between the public vision of the national reconstruction effort, and the reality of the daily life in a settlement.

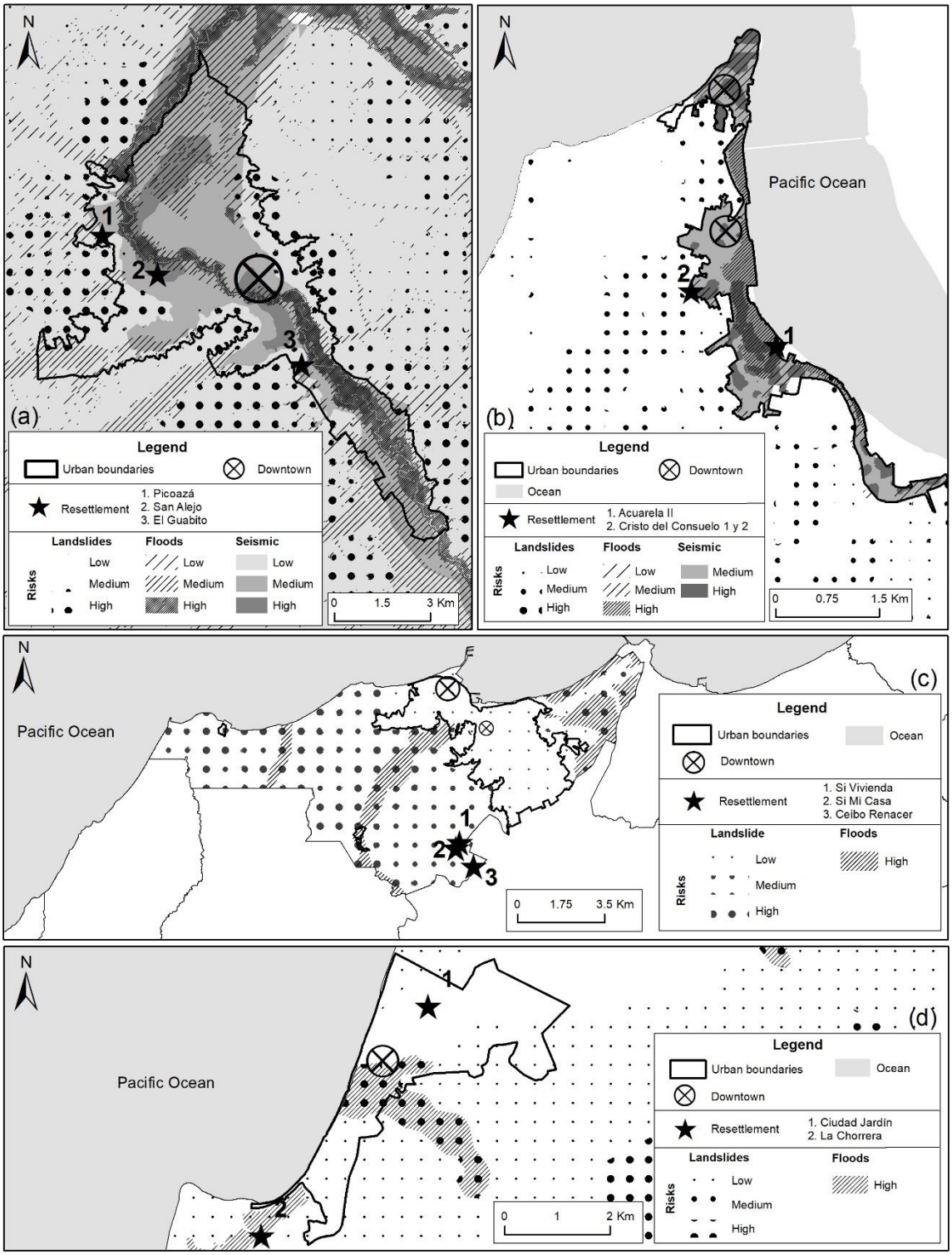



Fig 2. Research cities, resettlements, and risk. (a) Portoviejo, (b) Bahía de Caráquez, (c) Manta, (d) Pedernales.

Source: Own elaboration based on local government GIS data

## 4. Re-constructing urban habitat: an analysis of socio-spatial practices

The previous analysis of the reconstruction process after the 2016 Manabí earthquake triggered valuable insights into potentially adverse long-term impacts. In this section, insights about concrete individual living conditions will provide a complementary understanding regarding to what extent the UN-Habitat principles for adequate housing were considered during the reconstruction process[1]. By analysing social transformations and material adaptations of the built environment over time, the research considers how the resettlement conditions may have affected the socio-economic reproduction capacity of households, as well as their perceived quality of life. This approach informs interdisciplinary dialogues with scholarship questioning public policies adopted also in other similar environments; such as social housing projects and reconstruction processes after earthquakes, fires and tsunamis in other Latin American cities (Imilan et al., 2015; Micheletti et al., 2020). Yet the analysis also considers emotional and affective bonds prompting social cohesion and socio-spatial integration, and it refers to the participatory creation and appropriation of inclusive urban habitat, allowing to overcome the traumatic experiences of un-homing (Delgado and Scheers, 2021; Matus Madrid et al., 2019). For this, two analytical perspectives are applied: part 4.1 explores the socio-spatial conditions of the resettlements, while section 4.2 discusses the ways in which people are adapting their homes.

### 4.1 The socio-spatial conditions of the resettlements

In line with similar approaches in most Latin American countries, the analysed Ecuadorian resettlements have been attempting to balance between: economic and logistic restrictions; the resulting market-oriented approaches to resolve housing crises; and the claims of local communities to better address the UN Sustainable Development Goals (Horn and Grugel, 2018). Hence, also the socio-spatial conditions originated in the post-Manabí earthquake resettlements resemble the complexity of a policy field addressing the (re-)construction of space and place, in conditions oscillating at the margins of formal and informal processes of urbanisation (Peek et al., 2018; Delgado and Scheers, 2021). On these grounds, the subsequent analysis pinpoints to three aspects illustrating the potential shortcomings of such projects: (i) the geographies of

[1] Such principles refer to the house in relation to its affordability, habitability, accessibility, location, availability of services, cultural adequacy, and security of tenure (UN-Habitat, 2014).

the resettlements, (ii) the material conditions of the urban space, and (iii) the social conditions of the urban habitat.

#### 4.1.1 *The geographies of the resettlements*

The peripheral location of Manabí's resettlements (Figure 2) plays a vital role, influencing negatively the social and economic reproduction capacity of households. This is especially the case since most interviewed residents previously lived in more central areas of the corresponding cities[2]. While interviewees expressed that prior to the earthquake they could easily reach their jobs and meet friends by foot, the localisation of the resettlements now compromises their urban connectivity, and thus the perceived quality of life. Moreover, commuting, often largely exceeds the financial resources of households. Alternatively, the limited number of bus lines and the distant location of bus stops, makes transportation also excessively time-consuming. The corresponding spatial segregation is reinforced by the lack of spaces allowing economic reproduction activities like shops, restaurants and offices. In line with many other large-scale social housing developments in Ecuador and other Latin American cities, this lack of opportunities rules out the prospects of earning a wage on-site (Peek et al., 2018).

#### 4.1.2 *Material conditions of the urban space*

The lack of crucial infrastructure noticeably affects the social reproduction of households. While all settlements are connected to the energy and sewerage grid, the access to drinking water is often precarious, as the following quote demonstrates: *"There are days we have no water, so we constantly need to wait for a pipe to come, which is an extra-cost sometimes hard to pay"* (male inhabitant). It has also been frequently reported that the water is not drinkable and needs to be boiled. Moreover, collective services such as police stations, churches and health centres are regularly lacking, thus corresponding with negative side-effects: *"Imagine, if someone is sick and there are no taxis, or if people do not have money and must take a bus, this place is very far away. A medical centre would be the first we need"* (female inhabitant).

[2] Our research demonstrates the variety of reconstruction plans for the city centres: While some are still destroyed to a great extent, others have been widely regenerated. For instance, the commercial centre of Manta has not received any proper reconstruction process, while Portoviejo relocated residents in resettlements pursuing profound regeneration of the centre. Hence, the only circumstances in which households were not displaced was for the cases receiving support for 'reconstruction on own land'.

Finally, the adverse material conditions of urban space also compromise effective social interaction in space. For instance, collective inside-areas like activity centres for children, women, and elderly people do not exist. In discrepancy with the national planning law, open public spaces usually consist only in a sports field and a small playground, additionally suffering rapid decay and deterioration due to the lack of maintenance.

#### 4.1.3 *Social conditions of the urban habitat*

Being relocated into a new socio-spatial environment away from the previous community of belonging has created for many interviewees feelings of loneliness, isolation and a sense of blame. By referring, for instance, to mutual distrust, households try to minimise interaction with their neighbours. This is a trend identified in many other lower-income housing estates and relocation projects elsewhere in Latin America, with the corresponding alteration of decades-long existing social networks (Durst & Ward, 2015; Hamdi, 2007; Peek et al., 2018). Even more alarming is that such feelings of discomfort and degradation of social relations are frequently accompanied by trends of violence that contribute to the worsening of the social conditions of the urban habitat. For instance, a neighbourhood leader discourages visitors to move unaccompanied in the settlement because of robberies and assaults. Likewise, drug dealing and consumption was reported as common: *"There are many children with drugs, even in my block there are people who sell drugs. There are kids who have been damaged, and among those is one of my children. I have been asking him to stop smoking, but he cannot quit, because those who consume and sell are right around the corner"* (female inhabitant).

The research found also that the citizens' involvement in the neighbourhood's management drastically dropped over time, as expressed by a household: "*Right now there are no such organisations. Before, we met at the block level and then had general meetings"* (female inhabitant). While initially, participatory processes organising neighbourhood assemblies and collective social events were commonly supported by local governments to create a sense of community for the new residents, they were not fruitful in the long term. This decline shows the growing disillusion towards the local administration, and a sense of abandonment felt by the inhabitants, as expressed by one neighbourhood leader: "*To be honest, authorities come to visit us only when they are on [an electoral] campaign. I have sent them requests, but they don't come"* (male neighbourhood leader). Correspondingly, an interviewed expert involved in participatory processes testified: *"After a year and a half, I went back to the project where I was*

*in charge of delivering the homes... They recognised me, but I was afraid to stay in that neighbourhood, although I was once supporting social life"* (male public officer). The statements demonstrate how social cohesion and, more generally, the social conditions of the urban habitat had gradually degraded, and this resonates also the complex consequences that processes of un-homing have for local communities.

## 4.2 Adapting to the housing units: the inhabitants' perspective

### *4.2.1 Housing design*

The building typologies implemented in the investigated resettlements present three main criticalities, connected to: size, flexibility, and comfort. All housing units are around 38-41 square metres regardless of family size (Table 2). Moreover, the overall resettlement layout, with houses very close to each other, strongly discourages progressive growth[3]. Indeed, *"I think authorities should have thought… We need to have the possibility to expand on top or on the sides"* (male inhabitant). Yet only the houses on stilts, which are a traditional regional housing typology included in some resettlements potentially favouring ventilation and the use of the ground floor, would allow an expansion of the ground floor (Moser, 2009). However, since these typologies are adopted in areas at risk of inundation (Fig. 4), the construction of any room or deposit would again increase the vulnerability of the inhabitants.

The coupling of small dimensions, with the lack of any possibility for interior flexible arrangements and the limits on progressive growth are main concerns for the inhabitants, that indeed say: "*The house is too small for a family. There are six of us, me, my four daughters and my wife.....and there are also families with six children, I have no idea how they can make it"* (male inhabitant). During the interviews the problem of room dimensions also arose. Indeed, although the house complies with the minimum useful area established by the Ecuadorian regulations, the room dimensions do not always adhere to it. "*It's difficult for us, because only a dresser and a bed fit into a room. The girl is small now, and sleeps on a hammock, but she will need a bed for herself soon, and there is no space"* (female inhabitant). The result is dysfunctional spaces for daily activities.

[3] Contrary to the World Bank promotions of sites-and-services programmes in the Global South during the 1970-80's (e.g. in Kenya, India and Pakistan), housing polices favouring incremental housing strategies were largely discontinued since the late 1990s, in favour of market-led housing programmes (Peek et al., 2018).

In terms of climatic comfort, the building materials and techniques adopted in the resettlements were not appropriately designed for the hot and humid tropical climate. The most common typology, the 4D (Table 2) is made of loadbearing reinforced concrete walls and steel roof finished with corrugated steel sheet that tends to become extremely warm during the day. This typology is also the strictest one in terms of potential expansion, in particular for the dwellers living on the second floor who neither have the possibility to expand on the sides, nor on top. Clearly, none of the local vernacular architecture strategies for climate comfort were considered, such as a slightly elevated ground floor and opposite windows location to favour cross-ventilation, or overhanging roofs for shadows, or inclusion of arcades, porticus, or eaves to reduce the solar gain (Camino Solórzano, 1998; Sevillano Gutiérrez, 2016). Equally, no attention has been posed to the orientation of the houses with respect to the influence of the sun and the winds. As testified by an interviewed inhabitant: "*Before I installed the gypsum panels, the sun hit terribly. Even the fan was blowing just hot air. However, even when I open this window, the one down there and the patio door, still very few air flows*". This, not to say that vernacular features should be reproduced in urban settlements tout court, but cultural adequacy should be respected as one of the fundamental pillars of adequate housing.

### *4.2.2 Housing building process*

The resettlement building process was a top-down act that excluded the involvement of future residents. Some of the interviewed local builders and Ecuadorian policy officers involved in the reconstruction process, indeed, criticise the approach by saying "*People know how to build and make the finishes of a building, and if not, they have a brother or a friend who knows"* (male provincial public officer). Notwithstanding, interviews demonstrated that active involvement of the future inhabitants was never considered, allegedly due to time constraints in attempting to deliver finished houses to all the affected people as quickly as possible. The strategy of delivering ready-made dwellings follows a culture, which neglects the local know-how, or the involvement of citizens and refuses fostering any sense of ownership in the name of economic savings and construction speed. Such approach has been proved to be also needlessly rigid, as a household reported: "*Once, I went onsite and told the builders that I could pay a little more if they would leave me good foundations to build an extra floor. But they just indicated to me the plan and said that there is no exception*" (male inhabitant).

*4.2.3 Adaptations, spatial appropriations, and land titles*

Despite the lack of flexibility of the housing units, to make dwelling more welcoming and adapted to their needs, some inhabitants have strived to make modifications. As response to the increasing necessity of space, appropriations on the front, and/or back of the house to develop extra rooms or private external spaces were carried out (Table 3). These horizontal additions have been only done at the ground floor, while they are evidently neglected to the inhabitants of the first floor of the 4D housing typology. To improve the internal thermal comfort and avoid overheating, some households have added gypsum-based insulation panels under the roof. The resulting incremental growth may be considered as strategy for improving current inhabitants intimacy, security, and facilitate economic activities, and very often are also triggered by having in mind homes for future generations.

However, the two most diffused barriers to make improvements are the lack of economic resources and the absence of tenure titles. Indeed, one inhabitant said: "*Honestly, I have only done one thing, which is a kitchen isle, because the counter is very small, but I have not been able to paint. I have not been able to do anything, because my husband is not working and you can't spend the little we earn to refurbish"* (female inhabitant). Regarding formal property titles, households were initially required to pay 10% of the house price to the Ecuadorian state (see table 1) to receive the tenure titles. However, since this payment was eliminated later on, the emission of property titles was also halted. Consequently, inhabitants are not the legal owners of their houses, and they cannot sell, rent, move out of their homes, or substantially invest in upgrading properties.

Land titles are also enumerated among the UN-Habitat principles for adequate housing, and their absence is a fundamental obstacle to neighbourhood development (UN-Habitat, 2014). Interviewees complain that "*they have always promised us the titles, but time passes and we are still waiting. Without titles you cannot make any little credit and go into any business"* (female inhabitant). The absence of dwelling's ownership makes the struggle for wellbeing and inclusiveness harder, not only for discouraging most inhabitants from making improvements in their private sphere, but holding back the creativity for implementing a variety of uses, such as shops, laundries, playgrounds and triggering lack of care and maintenance. Preventing households from being eligible for bank loans, and then to invest into any local entrepreneurship, is thus highly detrimental for the livelihood of the community. Furthermore, the uncertainty of each one's property grows worries of future displacements; being the property titles felt as the only insurance against potential eviction.

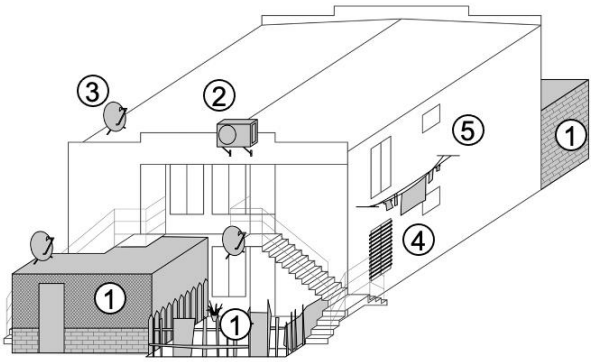
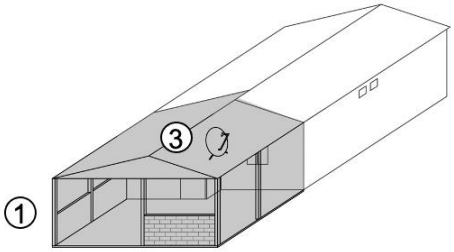
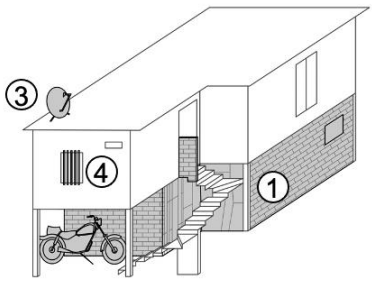
| Typology | Modifications' description | Modifications' drawings |
|---|---|---|
| 4D | ▪ Construction of:<br>1. fences and walls appropriating the collective spaces on the front and back of the ground floor apartments<br>▪ Installation of:<br>2. air conditioning<br>3. cable tv parabolas<br>4. fences to protect the windows<br>5. clothes drying hangers |  |
| Single family house | ▪ Construction of:<br>1. open roofed structures used as housing extension or parking<br>▪ Installation of:<br>3. cable tv parabolas |  |
| House on stilts | ▪ Construction of:<br>1. Fences and walls on the ground floor to delimit the property and create a new room or as parking<br>▪ Installation of:<br>3. cable tv parabolas<br>4. fences to protect the windows |  |

Table 3**:** Housing adaptations made by the residents

Source: Own elaboration

## 5. Final discussion and conclusions

This research has provided novel insights into the limits and deficits of an entirely top-down strategy of post-disaster resettlements, which was part of a broader reconstruction scheme including subsidies for in-situ reconstruction and repair of damaged housing. The Ecuadorian management after the 2016 earthquake disregarded the policy advice of most voices in international cooperation, urban planning and academia. The resettlements precisely epitomise an approach that neglects the "Building Back Better" principles of the Sendai Framework, and

lacks to embrace crucial international standards for adequate housing and liveable habitat. Furthermore, the empirical research also sheds light on the long-term individual, social, economic and spatial impacts of an erroneous post-disaster reconstruction process consolidating the unhoming of people instead of mitigating their situation. Five years after the earthquake, the resettlements have become widely stigmatised, segregated and socially disintegrated places, and the inhabitants are mainly struggling to cope with the negative outcomes of peripheral location, lack of accessibility, hazard risks, and rising insecurity. At the same time, the housing typologies prove to be difficult in terms of size, structural rigidity obstructing progressive growth, and bioclimatic comfort. The lacking property titles, moreover, allow only limited investment into housing improvements. The analysis of the modifications made by the residents, however, proved ingenuity, a strong desire for a better quality of life and for counterbalancing the multifaceted violence operating on individuals through the way the resettlements were organised. Consequently, our findings evidence that post-disaster resettlements must be understood as a much more complex venture than building new housing units quickly and at fixed costs.

By assessing this empirical analysis against the state of the art in the academic literature and the UN-Habitat principles for adequate housing, the conducted research allows several crucial conceptual reflections for further academic and political discussions of post-disaster recovery strategies. Firstly, by providing nuanced empirical understandings from ordinary cities, like the small and medium-size case studies in the Ecuadorian province of Manabí, this article actively engages in decentring 21$^{st}$ century urban theory by evidencing the specificities of places usually unattended in academic discussions. In this regard, when confronted with similar unexpected situations, the post-disaster resettlements in Manabí demonstrate essential challenges that similarly complex places in the Global South may also face. Many difficulties may be referred back to the ways of conceiving public policy and the State, including the existing clientelist relations between crucial actors and a general mistrust between public administrations and citizens.

Moreover, the conducted research demonstrates that the post-disaster resettlements precisely repeat common inaccuracies of massive (social) housing projects elsewhere in Ecuador, in other places in Latin America, and also worldwide. Relevant investigations into market-oriented urban restructurings have emphasised that lower-income inhabitants are habitually deprived of the right to the usufruct of centrality (Janoschka, 2016), and of an urban environment allowing a mixture of different uses and people from various social strata (Durán et al., 2020). In this regard, the experience from Manabí stands exemplarily for other strategies of relocation

dismantling social networks, with the potential rise of (drug-related) crime and other delinquency (Nikuze et al., 2019). Finally, by financing private construction companies, it aligns with a tendency of favouring, after a natural disaster, the private sector (Peck, 2010).

The research may also support key recommendations for more sustainable hazard recovery policies. For instance, the reconstruction should include in all stages the existing knowledge of local communities and citizens. Following Lyons et al. (2010), this would make recovery processes much more efficient than a top-down housing delivery, allowing beneficiaries to be transformed from passive victims, into actors responsible for their life (Davidson et al., 2007). Such strategy may include an effective training of communities, i.e. in building techniques and in preserving and updating traditional architecture capable to cope with the local climate and hazard risks. Additionally, this would potentially facilitate progressive growth and further adaptation of housing units, which is fundamental in Latin America (Ward et al., 2011; Peek et al. 2018); in this sense participatory approaches may be considered as crucial to build, appropriate and transform urban habitat, exercising the right to territory (Delgado and Scheer, 2021). From a planning perspective, on-site reconstructions are crucial for preserving social structures, and to be efficient, they would require an updated cadastre and a bank of municipal land available for potential reconstructions. While land titles are compelling, other innovative forms of co-housing ownership aligning to the New Urban Agenda, may be considered (UN-Habitat, 2016). Instead of constructing only housing units, post-disaster recovery should be planned in a way that the initial expenditure is conceived and implemented as a public investment that considers liveable habitat with the corresponding social and civic infrastructure. All this can be finally resumed by stressing the cultural norms and perceptions of people. Ecuador has a rich and deep culture of social innovation and civic engagement; if considered in future housing projects, this will most likely produce inclusive and far-sighted plans to be globally praised.

**Acknowledgments**

The research reported is part of the NOVA VIDA "NOVel Approach for Vital Infrastructures post-DisAster" funded by British Academy (UWB190207) coordinated by Dr Ornella Iuorio. The Authors would like to thank Gustavo Duran from FLACSO University for the support in the research, Carolina Proaño for her support in the interviews, and all those who have contributed to the discussion.

**Bibliography**


Atkinson, R. (2015). Losing one's place: Narratives of neighbourhood change, market injustice and symbolic displacement. *Housing, Theory and Society, 32*(4), 373-388.

Baeten, G., Westin, S., Pull, E., & Molina. I. (2017). Pressure and violence: Housing renovation and displacement in Sweden. *Environment and Planning A: Economy and Space*, 49(3), 631-651.

Barenstein, J. D., & Iyengar, S. (2010). India: From a culture of housing to a philosophy of reconstruction. *Building Back Better*, *163*.

Bredenoord, J., & Verkoren, O. (2010). Between self-help–and institutional housing: A bird's eye view of Mexico's housing production for low and (lower) middle-income groups. *Habitat International*, *34*(3), 359-365.

Camino Solórzano, A.M (1998). La vivienda en Manabí – Ecuador (Evolución y caracerísticas). Doctoral thesis. Universidad Politécnica de Cataluña.

Daly, P., & Brassard, C. (2011). Aid accountability and participatory approaches in post-disaster housing reconstruction. *Asian Journal of Social Science*, *39*(4), 508-533.

Davidson, C. H., Johnson, C., Lizarralde, G., Dikmen, N., & Sliwinski, A. (2007). Truths and myths about community participation in post-disaster housing projects. *Habitat international*, *31*(1), 100-115.

Delgado, A., & Scheers, J. (2021): Participatory process for land readjustment as a strategy to gain the right to territory: The case of San José–Samborondón–Guayaquil. *Land Use Policy* 100, 105121.

Diem, S., Young, M.D., Welton, A.D., Mansfield, K.C., & Lee, P.L. (2014). The intellectual landscape of critical policy analysis. *International Journal of Qualitative Studies in Education*, 27(9), 1068-1090.

Durán, G., Bayón, M., Bonilla Mena, A., & Janoschka, M. (2020). Vivienda social en Ecuador: violencias y contestaciones en la producción progresista de periferias urbanas. *Revista INVI*, *35*(99), 34-56.

Durst, N.J., & Ward, P.M. (2015). Lot vacancy and property abandonment: Colonia and informal subdivisions in Texas. International Journal of Housing Policy, 15(4), 377–399.

Elliott-Cooper, A., Hubbard, P., & Lees, L. (2020). Moving beyond Marcuse: Gentrification, displacement and the violence of un-homing. *Progress in Human Geography*, 44(3), 492-509.

Félix, D., Branco, J.M. & A. Feio. Temporary housing after disasters: A state of the art survey. *Habitat International* 40: 136-141.

Fischer, F., Torgerson, D., Durnová, A., & Orsini, M. (2015). Handbook of Critical Policy Studies. Cheltenham: Edward Elgar Publishing.

Hamdi, N. (2007). Vulnerability and violence: What agenda for urban planning. *The Urban [F] Actor: Challenges Facing Sustainable Urban Development*. Brussels, Belgium: BTC, 32-34.

Herath, D., Lakshman, R. W., & Ekanayake, A. (2017). Urban Resettlement in Colombo from a Wellbeing Perspective: Does Development-Forced Resettlement Lead to Improved Well-being? *Journal of Refugee Studies*, 30(4), 554-579.

Horn, P., & Grugel, J. (2018). The SDGs in middle-income countries: Setting or serving domestic development agendas? Evidence from Ecuador. *World Development* 109, 73-84.

Jain, G., Johnson, C., Lavell, A., Lwasa, S., Oliver-Smith, A., & Wilkinson, E. (2017). Risk-related resettlement and relocation in urban areas. Climate and Development Knowledge Network.

Janoschka, M. (2016): Gentrificación, desplazamiento, desposesión: procesos urbanos claves en América Latina. *Revista INVI* 31.88 (2016): 27-71.

Janoschka, M., & Arreortua, L. S. (2017). Peripheral urbanisation in Mexico City. A comparative analysis of uneven social and material geographies in low-income housing estates. *Habitat International*, *70*, 43-49.

Jiménez Alay, L. (2019). Reasentamientos Humanos Posteriores al sismo de abril de 2016 en Ecuador. Análisis Integral. Master thesis. University of Seville.

Johnson, L. A., & Olshansky, R. B. (2017). *After great disasters: an in-depth analysis of how six countries managed community recovery*. Cambridge: Lincoln Institute of Land Policy.

Imilan, W., Fuster, X. & Vergara, P. (2015). Post-disaster reconstruction without citizens and their social capital in Llico, Chile. *Environment and Urbanization 27*(1), 317-326.

Iuorio, O. (2007). Cold-formed steel housing. Pollack Periodica, 97-108

Lizarralde, G. (2011). Stakeholder participation and incremental housing in subsidized housing projects in Colombia and South Africa. *Habitat International*, *35*(2), 175-187.

Lizarralde, G., Johnson, C., & Davidson, C. (2009). *Rebuilding after disasters: From emergency to sustainability*. Routledge.

Lyons, M., Schilderman, T., & Boano, C. (2010). *Building Back Better: Delivering people-centered housing reconstruction at scale*. Practical Action, London South Bank University & International Federation of Red Cross and Red Crescent Societies (IFRC).

Maly, E (2018): Building back better with people centered housing recovery. *International Journal of Disaster Risk Reduction* 29, 84-93.

Mardešić, S., Herrera, R.A., Sebastián S., de Pina Castiglione D. (2017). Ecuador 2016. Respuesta al terremoto Contribución al cambio Informe de evaluación de impacto. Oxfam

Martin, R. (2001). Geography and public policy: the case of the missing agenda. *Progress in Human Geography* 25(2), 189-210.

Matus Madrid, C. P., Ramoneda, Á., & Valenzuela, F. (2019). La integración social como desafío: análisis del programa de campamentos en Chile (2011-2018). *Revista INVI*, 34(97), 49-78.

Micheletti, S., Pancani, D., & Pisani, E. (2020). Análisis comparativo de la lógica técnico-política de reconstrucción: terremoto e incendios forestales en el Maule, Chile. Revista INVI, 35(98), 155-183.

Moser, C. (2009). *Ordinary families, extraordinary lives: Assets and poverty reduction in Guayaquil, 1978-2004.* Brookings Institution Press.

Nikuze, A., Sliuzas, R., Flacke, J., & van Maarseveen, M. (2019). Livelihood impacts of displacement and resettlement on informal households-A case study from Kigali, Rwanda. *Habitat International*, *86*, 38-47.

Opdyke, A., Javernick-Will, A. & Koschmann, M. (2019): Assessing the impact of household participation on satisfaction and safe design in humanitarian shelter projects. *Disasters* 43.4: 926-953.

Peck, J. (2010). *Constructions of neoliberal reason.* Oxford University Press.

Peek, O., Hordijk, M., & d'Auria, V. (2018). User-based design for inclusive urban transformation: learning from 'informal'and 'formal'dwelling practices in Guayaquil, Ecuador. *International Journal of Housing Policy,* 18(2), 204-232.

Sadiqi, Z., Trigunarsyah, B., & V. Coffey (2017): A framework for community participation in post-disaster housing reconstruction projects: A case of Afghanistan. *International Journal of Project Management* 35(5), 900-912.

Sevillano Gutiérrez, A. (2016). Ecuador Costa. Practicas Constructivas Locales de bajo costo. CRAterre, 18.

Sullivan, E., & Ward, P. M. (2012). Sustainable housing applications and policies for low-income self-build and housing rehab. *Habitat International*, *36*(2), 312-323.

UN-Habitat (2016). The New Urban Agenda. Quito: H. I. Secretariat Ed.

UN-Habitat (2014). The Right to Adequate Housing. Retrieved from: https://unhabitat.org/sites/default/files/documents/2019-05/fact_sheet_21_adequate_housing_final_2010.pdf Accessed on: 13 August 2020.

UNISDR (2015). *Sendai framework for disaster risk reduction 2015–2030*. Retrieved from: http://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf. Accessed 2 October 2020.

Viratkapan, V., & Perera, R. (2006). Slum relocation projects in Bangkok: what has contributed to their success or failure? *Habitat international*, 30(1), 157-174.

Ward, P. M., Jiménez, E. R. J., Grajeda, E., & Velázquez, C. U. (2011). Self-help housing policies for second generation inheritance and succession of "The House that Mum & Dad Built". *Habitat International*, 35(3), 467-485.

Ward, P. M. (2015). Housing rehab for consolidated informal settlements: A new policy agenda for 2016 UN-Habitat III. *Habitat International*, 50, 373-384.