The right to the city in informal settlements: two case studies of post-disaster adaptation in Latin America

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ABSTRACT: Today small-towns in western Uruguay are facing challenges related to informal settlements development, intensification of industrial agriculture, and climate change. In the last decade, different strategic plans and policies carried out by governments at multiple levels have attempted to regularize and/or resettle informal settlements in different towns and cities. Despite governmental efforts, informal settlements continue to grow in areas that are at high environmental risk, and where social-spatial fragmentation has increased between the formal and informal fabric. Lefebvre's concept "right to the city" is a response to social-spatial inequalities and it emphasizes the idea that disenfranchised communities have the right to occupy and transform urban space. Using Lefebvre's "right to the city" and "the production of space", this paper studies informal housing and informal settlements in two neighborhoods in a small-town in western Uruguay and how they adapt to climate change consequences. It reveals how local residents occupy and transform space in two informal neighborhoods to solve their housing needs and to access to resources and infrastructure after an extreme weather event. Based on two case studies, this article reveals spatial patterns of informal settlements, the relationship between formal and informal fabric, and the ways post-disaster informal settlements and environments are represented. Field-work was conducted in 2018 and methods included spatial mapping analysis, semi-structured interviews with key actors, participant observation, and analyses of secondary data. Findings suggest that top-down bureaucratic decision-making process during post-disaster reconstruction limited residents' agency and their right to participate and transform the urbanization process and the places they inhabit. This decision-making process was guided by restricted representations of space determining whether or not residents would qualify for subsidized housing programs. This study aims to encourage communities to develop community-based initiatives that could allow them not only to anticipate and react to environmental stresses but to thrive in the long-term future.

KEYWORDS: informal settlements, post-disaster housing, spatial justice, decision-making process

INTRODUCTION

Informal settlement developments in Latin America started approximately in the 1950s as informal land occupations without any legal title and any service infrastructure. These settlements began to consolidate over the years by on-going self-help housing constructions and gradual development of basic services and infrastructure provided by local governments. Despite the settlement consolidation or regularization, the majority of the housing quality continues to be precarious due to low-quality and improvised use of building materials and construction deficiencies (P. M. Ward 2015, 4-7)

Informal settlements are areas that are more vulnerable and at higher risk of being impacted by climate change. Although some Latin American cities have developed plans for adaptation to climate change (Sánchez Rodríguez 2013), the majority of remote small towns and rural areas are vulnerable to extreme climate events due to lack of information, lack of official

emergency response protocols, and limited resources for mitigation and adaptation (Thompson 2016).

In Uruguay different strategic plans and policies carried out by governments at multiple levels have attempted to regularize and/or resettle the informal settlements in different towns and cities. However, these plans have not incorporated climate change adaptation strategies. Despite governmental efforts to improve housing conditions of vulnerable and disadvantaged communities, informal settlements continue to grow in areas that are at high environmental risk and where social-spatial fragmentation has increased between the formal and informal fabric. Since urban informality and climate change adaptations are major issues faced in urban and rural areas, it is critical to understand why and how planning efforts for informal settlements need to consider both housing needs and adaptations to climate change.

Dolores is a small-town located in Southwestern Uruguay with a population of 17,174 inhabitants (Instituto Nacional de Estadísticas 2011) and it primarily relies on agricultural production. In the last two decades, this region has shifted towards industrial agriculture production and agri-businesses. Currently, Dolores is facing challenges related to climate change, growth of industrial agriculture (Thompson 2014, 2016), and increasing social-spatial inequalities (DINOT and Intendencia de Soriano 2017).

A tornado categorized as F3 in the Fujita scale touched down in Dolores on April 15th of 2016 (Escala Dolores 2017). This extreme weather event severely impacted informal housing areas in the low-income neighborhoods Barrio Cadol and Barrio Los Altos. Post-disaster housing adaptations were developed by governmental institutions at local and national level, primarily to assist affected residents from these informal settlements.

This article uses a spatial justice approach to understand uneven development and post-disaster reconstruction process in areas that are at high environmental risk. In informal settlements, vulnerability and risk are intensified by non-climatic factors such as poverty and unequal access to resources and infrastructure.

Through the lens of Lefebvre's "the right to the city" (1996), this article argues that asymmetric geographies can be challenged through community participation in the decision-making process and post-disaster housing adaptations. It studies how post-disaster environment is conceptualized, surveyed, and mapped. Thus, it exposes the power dynamics and post-disaster reconstruction actions guided by these "representations of space" (Lefebvre 1991). Finally, it discusses the challenges of subsidized post-disaster housing adaptions as a way for architecture and social scientists to reflect on environmental stresses.

1.0 SPATIAL (IN)JUSTICE IN INFORMAL SETTLEMENTS

1.1 The right to the city

In order to understand spatial justice implications in informal settlements post-disaster reconstruction process, it is important to analyze the relationship between social justice and urbanization processes and discuss the significance of spatial justice and the claim of right to the city as a way to challenge the current production of uneven development processes.

In the 1960s, Henry Lefebvre (1991) (1996) introduced the spatial dimension to social processes arguing that space embodies relationships of power and it is produced as an instrument of control and domination. Additionally, spatial injustice can be challenged by those who are negatively affected (Lefevbre 1996). Lefebvre's right to the city highlights the right of local residents to access to urban resources, to occupy urban space and to transform it. The right to the city is not associated to the term "citizenship" that implies membership in specific nationality or ethnicity. In contrast, it empowers inhabitants of space, it is earned by experiencing everyday life in the urban space (Purcell 2002, 102). This highlights the inclusive characteristic of the right of the city, as a right that also belongs to marginalized and

disenfranchised communities. In this sense, the right to the city is beyond the idea of the urban condition, including small-towns, rural areas, and rural communities (Limonad and Monte-Mor 2015).

Harvey's seminal work "Social Justice and the City" (1973) advocated for territorial distributive justice of economic resources to ensure the access to resources and urban infrastructure by the entire society (Harvey 1973, 14-15). Later, Smith (2008) highlighted the importance of addressing social inequalities by understanding uneven landscapes from multiple perspectives including natural, spatial, and social processes. Contemporary approaches to social justice and urbanization processes highlight holistic approaches including the spatial relationship of social and economic conditions (Connolly and Steil 2009, 34). Spatial justice theory argues that social and spatial inequalities created by unjust urbanizations and geographical uneven development, systematically oppress segments of the population reducing their well-being, their participation in social life, and their access to resources (Soja 2010, 71-79). Although participation in the decision-making process provides an opportunity to claim the right to the city, if they are not critically engaged and lack of inclusion, communities can experience barriers to participate in the decision-making process to claim their right to inhabit and transform space (McCann 2002, 78).

This paper uses Lefebvre's "The Right to City" and "The Production of Space" as a theoretical framework to discuss the ways disenfranchised communities in informal settlements are included or excluded from decision-making process and subsidized housing recovery actions, limiting their right to participate and transform the urbanization process.

1.2 Informal settlements' vulnerability, resilience, and adaptation to climate change

Informal settlements are produced by spatial injustices and are located in areas that are at high environmental risk, where the physical safety and health of its inhabitants is at risks on daily basis. As Mike Davis stated about informal settlers, "they are the pioneer settlers of swamps, floodplains, volcano slopes, unstable hillsides, rubbish mountains, chemical dumps, railroad sidings, and desert fringes" (Davis 2006, 121)

The Intergovernmental Panel on Climate Change (IPCC) defines vulnerability as the predisposition to be negatively impacted by climate change (Field 2014). Vulnerability involves risks and exposure to hazards, and lack of capacity to cope and adapt to climate change effects by moderating or avoiding harm. In addition, vulnerability and exposure are intensified by non-climatic factors produced by unequal development and multidimensional poverty (Field 2014, 39-40).

Resilience definitions can include both preparedness and reaction to severe weather events. In cases of extreme weather events or disturbances, reactive adaptation includes the capacity that communities have to rapidly restore basic services and infrastructure. Existing literature emphasizes the idea of transformative adaptation where communities are able to not just restore and repair their built environment but to transform it into better and more sustainable environment (Revi 2014, 548-549).

According to the IPCC, Latin America has been severely impacted by extreme weather events and one of its major challenges has been to reduce vulnerability and risks of exposure to climate hazards. Despite some countries' efforts to mitigate risks from climate change, the region experiences several constrains due to lack of appropriate information, lack of capacity-building, and limited resources (Magrin 2014). There are few Latin American cities that have developed strategies, policies, and plans for adaptation to climate change (Sánchez Rodríguez 2013, 71). In countries with increasing inequalities, climate change and extreme weather events will increase poverty, and will exacerbate the existing inequalities deteriorating livelihoods and wellbeing of communities, preventing access to resources and food, intensifying social exclusion, and inhibiting efforts to alleviate poverty (Olsson 2014).

The Economic Commission for Latin America and the Caribbean, highlights the importance of access to information to enable capacity-building and strategies for climate change adaptation (Sánchez Rodríguez 2013, 17). In case of severe weather events, the lack of information and official protocols for preparedness and evacuation can extremely affect low-income communities and informal settlements.

The built environment and infrastructure, depending on their design, construction, and structural qualities, can enhance or prevent the capacity for anticipatory adaptation to reduce climate change impacts. Additionally, the lack of appropriate infrastructure such as good quality of roads can prevent access of emergency vehicles and timely evacuation, and residents can experience barriers to access to food, work, and health care, among others (Revi 2014, 558-559)

2.0 METHODOLOGY

This study includes data collected during fieldwork in Uruguay during June and July of 2018. Purposive snowball sampling was used to identify major actors involved in local decisions. During fieldwork, 14 participants were interviewed, with diverse roles and views on community matters. Using a semi-structured questionnaire, participants were asked about post-disaster short-term and long-term effects. They were asked about post-disaster emergency actions, long-term reconstruction plans, and how different actors were involved in decision-making processes.

Using Geographic Information Systems (GIS) and cross-referencing information from *Relevamiento Emergencia Dolores* (MVOTMA 2016), spatial analysis was conducted to identify spatial transformations including the tornado path and its impacts on informal housing areas and the built environment. This spatial analysis was triangulated to verify data obtained from interviews and observations done during fieldwork in June-July 2018. Secondary data included research materials, reports and presentations by non-governmental organizations (NGOs) and new laws and regulations from governmental institutions.

2.0 CASE STUDIES: BARRIO CADOL AND BARRIO LOS ALTOS

3.1 Informal housing under an extreme weather event

After a natural disaster, spatial inequalities can be intensified by the different pace of recovery, different pace of assistance, displacement, and involuntary resettlement (Tafti and Tomlinson 2018, 4).

On April 15th, 2016 the small-town Dolores located in Southwestern Uruguay was affected by a tornado categorized as F3 in the Fujita scale with winds between 250 km/h and 330 km/h (Escala Dolores 2017). Approximately, a third of the entire town was affected by the tornado. In its pathway from West to East, the tornado passed through different neighborhoods including low-income and informal housing areas in Barrio Cadol and Barrio Altos de Dolores (see Figure 1).

Barrio Cadol is located in the West part of the town next to an industrial agriculture storage and processing facility. This is a middle-income and low-income neighborhood with both formal and informal housing. Barrio Los Altos de Dolores is a new development located in the periphery in the East part of town where the majority of housing and land tenure is informal. Both Barrio Cadol and Barrio Los Altos presented informal housing areas with severe overcrowded living conditions, with cases of multiple families living in a single house and cases of multiple housing units built per site. Capacity to resist and adapt to extreme weather events in these low-income neighborhoods was limited due to pre-existing overcrowded housing conditions, precarious housing constructions using light roofing materials, and lack of safe structural building systems (Notes from fieldwork).

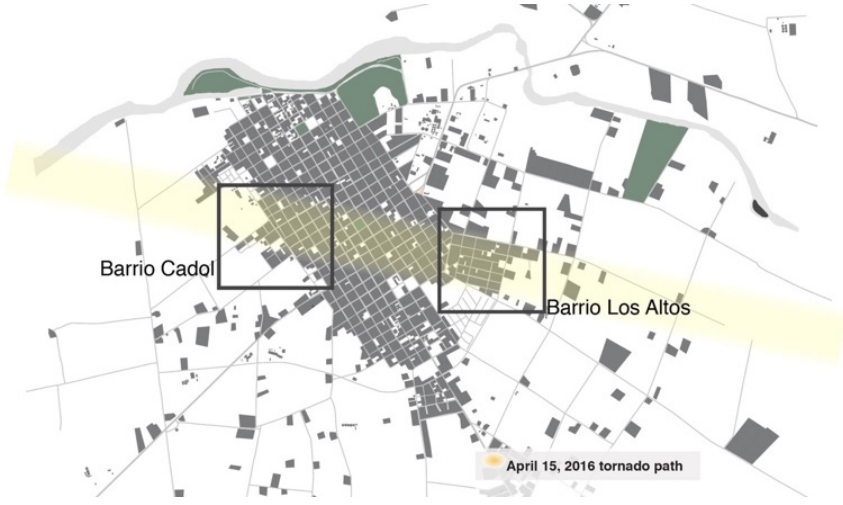

Figure 1: Barrio Cadol and Barrio Los Altos in Dolores, Uruguay. Source: (Authors 2018)

3.2 The production of space: post-disaster spatial representation

In this section we use Lefebvre's (1991) theory about "The Production of Space" as an analytical framework to understand the complex urbanization process where the production of physical space (spatial practice), the production of knowledge about space (representation of space), and the production of meanings of space (representational space) are interconnected (Schmid 2016, 27-41). When space is conceptualized, abstracted, and represented through maps and policies, it stablishes a particular order becoming a tool for empowerment or domination (Lefebvre 1991, 229-291). Maps represent a specific view of the world and they have the ability to include or exclude physical realties and communities from the discourse (C. Jacob 1996) (Jacob and Dahl 2006).

Furthermore, a critical analysis of representations of space, maps and policies, can reveal privileged dynamics of power, ideas, and actions guided by these representations. This can be illustrated in the post-tornado reconstruction process in the Barrio Cadol and Barrio Los Altos in Dolores where an initial survey and mapping development guided the decision-making process regarding resource allocations and post-recovery reconstruction actions.

Post-disaster survey and maps were conducted to identify a dynamic spatial boundary of the affected urban area and to quantify the tornado damage (see figure 2). They were directed by the *Intendencia* (Municipal government) with support from national government agencies (Agency of Social Development[i] (MIDES); Agency of Housing, Planning, and Environment[ii] (MVOTMA)) as well as local chapters of professional organizations (Uruguayan Association of Social Workers[iii] (ADASU) and the Uruguayan Association of Architects[iv] (SAU)). These representations of space, survey and maps were key instruments used by the government at municipal and national level to assess the physical impact of the tornado and to assign resources for reconstruction. A staff from the municipal government stated:

> "We identify a percentage of the affected housing units…the level of housing damage…this allowed the allocation of financial resources from the national government…this allowed the Agency of Housing to hire a Development and construction company to start the housing reconstruction…" (Dolores - staff from the municipal government, June, 2018)

During the survey, an audit housing form was used to assess the level of damage of each housing unit. Three different categories were used to classify the level of damage: category (A) included buildings with roof damage and load-bearing structural damage; category (B) included buildings with roof damage, load-bearing structure damage, and partial damage of the interior and exterior walls; and category (C) included buildings with 100% damage of the roof and walls (see survey results in Table 1).

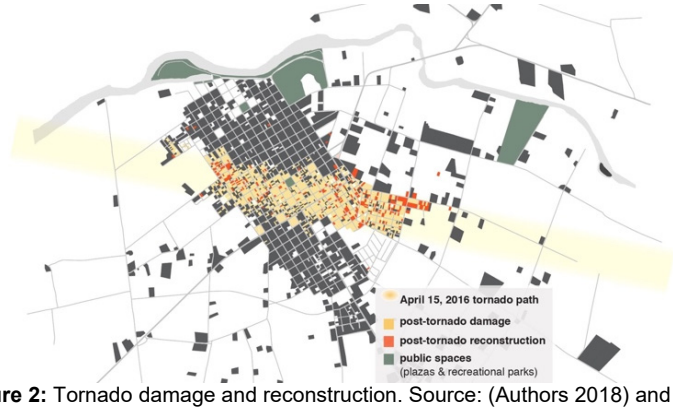

Figure 2: Tornado damage and reconstruction. Source: (Authors 2018) and (MVOTMA 2016)

Table 1: Number of buildings damaged by the tornado. Source: (DINOT and Intendencia de Soriano 2017)

Category	*Housing Units*	*Commercial and Institutional Buildings*	*Total*
(A)	1022	81	1103
(B)	304	55	359
(C)	606	72	678
Total	1932	208	

These survey and maps impacted the decision-making process during reconstruction, regularization, and resettlement of informal housing. Throughout the survey and mapping process, surveyors encounter several challenges due to the oversimplified and restricting nature of the housing audit form and the rating scale system to asses building damage. Thus, the representation tools, survey and mapping methods, had not been designed to be used in the specific context of informal housing. For example, surveyor found there were several housing units and several families living in one land parcel and the audit form did not allow to include that information. A staff from the municipal government stated:

> "Another challenge that we had when we were assessing housing damages was that there were four or five families living in one land parcel, so it wasn't reasonable to re-build in the same overcrowding conditions." (Dolores - staff from the municipal government, June, 2018)

Additionally, the post-disaster representations of space in Barrio Cadol and Barrio Los Altos guided a top-down bureaucratic decision-making process that privileged on-site reconstruction and created displacement of some residents. Since the post-disaster survey and maps represented the affected land parcels but not the different housing units within each parcel, residents with land tenure benefited from on-site reconstruction. On the other hand, residents who did not own the land were occupying, and were resettled into the subsidized new social housing development "Complejo el Prado", located in other area of the town.

3.3 The right to the city: post-disaster housing adaptations

In this section we highlight the need for clamming the right to the city as a way to challenge the power dynamics that produce uneven geographies. Claiming the right to the city through participation in the decision-making process could empower disenfranchised communities embracing their right to transform the spaces they inhabit. This section illustrates the different ways informal settlers' right to the city was ignored limiting their agency and participation in the decision-making process in the post-disaster housing recovery actions.

Right after the tornado in 2016, an emergency shelter was improvised as a first response to accommodate the residents who had experienced substantial housing damage, especially from Barrio Cadol and Barrio Los Altos. After a week, residents from these neighborhoods were resettled in shipping container emergency homes provided by the MVOTMA. The initial survey and maps determined the placement of these emergency homes as well as the final housing reconstruction in-situ or in a resettled area. Depending on residents' land tenure,

shipping container emergency homes were placed on residents' owned land or in public owned sites. The majority of these containers were placed in three municipal and public sites: two sites were owned by the municipality (one across the School 97 and another one in Prado Park), the third site was in the land of the elementary School 102. Residents lived in the shipping container emergency homes until their housing reconstruction was completed (in some cases, took more than one year). Housing reconstruction was subsidized by the Agency of Housing, Planning, and Environment (MVOTMA) and MEVIR[v]. An elected official described:

> "MEVIR built around 60/70 homes… and a total of 180 new housing units were built by MEVIR and a private construction company hired by MVOTMA in land donated by the Intendencia." (Dolores – elected official, June, 2018)

Like the emergency housing relief, there were different approaches to housing reconstruction depending on the residents' land tenure. In-situ reconstruction was as done through self-help housing with building materials and technical advice provided by governmental institutions. This type of in-situ subsidized housing benefited residents that had land tenure in Barrio Cadol and Barrio Los Altos (see Figure 3). The majority of the residents from Barrio Cadol and Barrio Los Altos, who did not own the land and were occupying, were not resettled in their original neighborhoods. They slowly transitioned from the shipping container emergency homes and resettled in the subsidized social housing complex *"Complejo el Prado"* located in the North-Eastern part of the town. This resettlement created new challenges for the affected residents who had to adapt to a new life style in a multi-family housing environment with shared services and building policies.

Figure 3: In-situ housing reconstruction. Source: (Authors, 2018**)**

Residents who qualified for subsidized housing relief programs and residents who did not qualify for those programs, were identified using the initial survey and maps. This presented another significant challenge for residents who did not qualify for subsidized housing programs and were not able to afford reconstruction of their homes. Two years after the tornado some residents were still struggling to adapt and reconstruct their damaged homes (see Figure 4). A staff from the municipal government stated:

> "The Housing Agency (MVOTMA) was the institution that determined which families would

> benefit from subsidized housing (…) all the decisions were made using the survey. Using the survey, the MVOTMA determined who would qualify for subsidized housing and who would not qualify." (Dolores - staff from the municipal government, June, 2018)

Figure 4: Damaged house, 2 years after the tornado. Source: (Authors, 2018)

Moreover, the post-disaster housing reconstruction process represented a challenge and controversy within and outside the community. There were major concerns about the appropriateness of time-consuming housing solutions in case of emergencies. A community member stated:

> "There was big pressure from the community, the Housing Agency (MVOTMA) was not providing timely emergency solution because they said that they were conducting the survey to understand how they were going to help." (Dolores – community member, June, 2018)

Community members criticized the top-down bureaucratic decision-making process during reconstruction, and the lack of flexibility to access to financial resources for housing reconstruction. A community member stated:

> "For the families that did not qualify for subsidized housing, the government offered financial assistance through loans for housing reconstruction but this was a long bureaucratic process (…) so families did not receive their loans on a timely manner and had to endure a rainy and cold winter with damaged roofs and walls." (Dolores – community member, June, 2018)

During the reconstruction process, community members and actors were concerned about the quality and durability of the new constructions. A staff from the municipal government stated:

> "During the reconstruction process, in self-help housing, the architects offering advise found several construction mistakes (…) it was common to see very poor quality of reinforced concrete (…) columns without foundation." (Dolores - staff from the municipal government, June, 2018)

Some of the post-disaster housing solutions got building pathologies within one or two years after reconstruction because of the use of low-quality materials, lack of quality control during the construction process, and lack of appropriate design (Notes from fieldwork). Long-term

sustainability of post-disaster housing relief in Barrio Cadol and Barrio Los Altos could be undermined by their durability and building performance, limiting the capacity to adapt and resist to future hazard climate events.
Because of the top-down nature of the bureaucratic decision-making process, informal settlements' residents experienced barriers to access to post-disaster housing relief and resources and their participation in the post-disaster reconstruction decision-making progress was limited.

CONCLUSIONS

Like many remote small-towns and rural areas in Latin America, small-towns in Southwestern Uruguay are vulnerable to climate change and extreme climate events due to lack of information, lack of official protocols, and limited resources for mitigation and adaptation. Poverty and unequal access to resources and infrastructure increases vulnerability in informal settlements, affecting their capacity to adapt to climate change. In Barrio Cadol and Barrio Los Altos, pre-disaster overcrowded conditions, use of precarious housing materials, and lack of safe structural systems, undermined the capacity to resist to extreme weather events.

The case studies in Barrio Cadol and Barrio Los Altos illustrate how spatial inequalities can be intensified by unequal access to subsidized housing, unequal access to financial resources, and involuntary resettlement after an extreme weather event. This study highlights the significance of claiming the right to the city as a way of shifting power relations in the post-disaster reconstruction decision-making process, understanding the way post-disaster environment is represented and surveyed to address social-spatial inequalities in post-disaster recovery process. We aim to illustrate how these post-disaster spatial representations can guide reconstruction actions but can also create uneven power dynamics, benefiting some residents while neglecting others. In Barrio Cadol and Barrio Los Altos, post-disaster survey and maps were key instruments used by the government at municipal and national level to assess building damages, and to guide reconstruction actions regarding allocation of resources determining, whether or not, residents would qualify for subsidized housing programs. Additionally, the post-disaster survey and mapping process presented several challenges in Barrio Cadol and Barrio Los Altos due to the nature of these tools which were not suitable for informal housing.

Finally, this study reveals barriers for adaptation to climate change that limit resilience in informal settlements. During the post-disaster housing reconstruction process, residents in Barrio Cadol and Barrio Los Altos experienced barriers to access to housing and resources due to lack of timely housing solutions, top-down bureaucratic decision-making process, and the lack of flexible financial resources. These barriers limited residents' agency and their right to participate and transform the urbanization process and the places they inhabit. As communities continue to experience the effects of climate change, it is important to develop community-based initiatives that could allow communities not only to anticipate and react to environmental stresses but to thrive in the long-term future.

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ENDNOTES

[i] Agency of Social Development stands for Ministerio de Desarrollo Social (MIDES)

[ii] Agency of Housing, Planning, and Environment stands for Ministerio de Vivienda Ordenamiento Territorial and Medioambiente (MVOTMA)

[iii] Uruguayan Association of Social Workers stands for Asociacion Uruguaya de Asistentes Sociales (ADASU)

[iv] Uruguayan Association of Architects stands for Sociedad Uruguaya de Arquitectos (SAU)

[v] MEVIR (Movimiento para la Erradicación de la Vivienda Rural Insalubre) is a governmental commission for the eradication of the unhealthy rural housing.