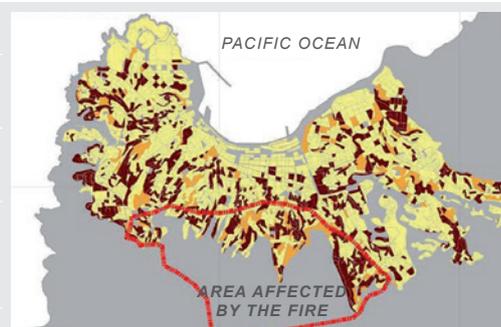


CASE STUDY

CHILE 2014-2016 / FIRE

KEYWORDS: Housing reconstruction, Subsidies, Self-recovery, Urban

CRISIS	Valparaiso fire, Chile, 12 April 2014.
TOTAL HOUSES DAMAGED	More than 3,309 destroyed (ONEMI, April 2014).
TOTAL PEOPLE AFFECTED	12,500 people (ibid.).
PROJECT LOCATIONS	Various locations across the city. The affected areas were the hills in the south, particularly the ravines known as “Quebradas”.
BENEFICIARIES	Emergency: 2,000 households (planned). Reconstruction: 3,870 households (Target: 4,912).
PROJECT OUTPUTS (As of Dec 2016)	2,000 Emergency shelters (planned ¹). 1,588 Reconstruction subsidies (target: 2,977). 1,914 Self-reconstruction projects.
SHELTER SIZE	Emergency shelters: 18m² Reconstruction: more than 45m² (Minimum requirement to apply for the subsidies).
SHELTER DENSITY	Emergency shelters: 5.3m² per person (based on average family size of 3.4). Reconstruction: min. 13.2m² per person (permanent houses).
PROJECT COST PER HOUSEHOLD	Approx. USD 40,000 (weighted average of the four subsidies described in this case study).

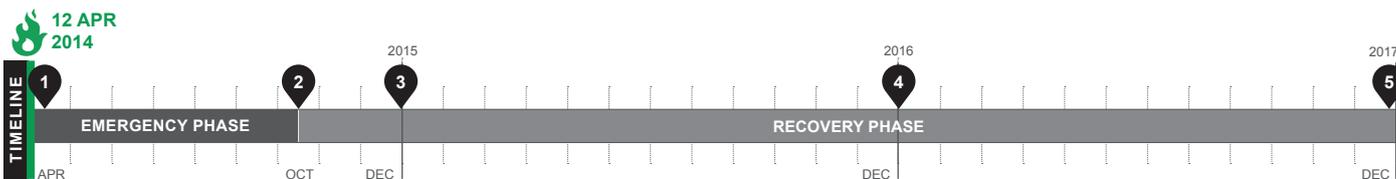


Map highlighting the area affected by the fire and the density of the dwellings, from high (red) to low (yellow). Source: Salinas-Silva 2015.

PROJECT SUMMARY

This government-led programme provided four types of reconstruction subsidies to over 3,800 families affected by the fire in the steep hills of Valparaiso, Chile. The majority of the subsidies were provided through an assisted self-reconstruction scheme, whereby the funds would be disbursed along with technical assistance by architects or engineers in coordination with local NGOs, and the families would take care of rebuilding themselves.

¹ ONEMI, April 2014, <http://bit.ly/2IXbLYa>.



- 1 17 Apr 2014: Government agency announces the construction of 2,000 emergency shelters for the families affected by the fire.
- 2 Oct 2014: Government launches revised reconstruction plan including self-reconstruction subsidies.

- 3 Dec 2014: 1,095 reconstruction subsidies granted (302 paid) 347 self-construction subsidies granted (25 paid).
- 4 Dec 2015: 1,948 reconstruction subsidies granted (835 paid) 1,420 self-construction subsidies granted (382 paid).
- 5 Dec 2016: 2,829 reconstruction subsidies granted (1,588 paid) 1,914 self-construction subsidies granted (961 paid).

STRENGTHS

- + Large-scale programme to support safer self-construction.
- + Combined action of government subsidies and NGOs.
- + The subsidies took into account people’s needs.
- + The initial plan was adapted in response to the requests of the affected people.

WEAKNESSES

- The initial response did not consider affected people’s preference.
- Many families did not receive any subsidies due to land tenure issues, side-lining the most vulnerable.



The fire on 12 April 2014 affected the hills in Valparaiso, where most of the people settled in informal land, in very dense environments, close to the forest.



The “Quebradas” are the ravines overlooking the city of Valparaíso, famous for their colourful houses of great aesthetic value, but also site of many hazards.

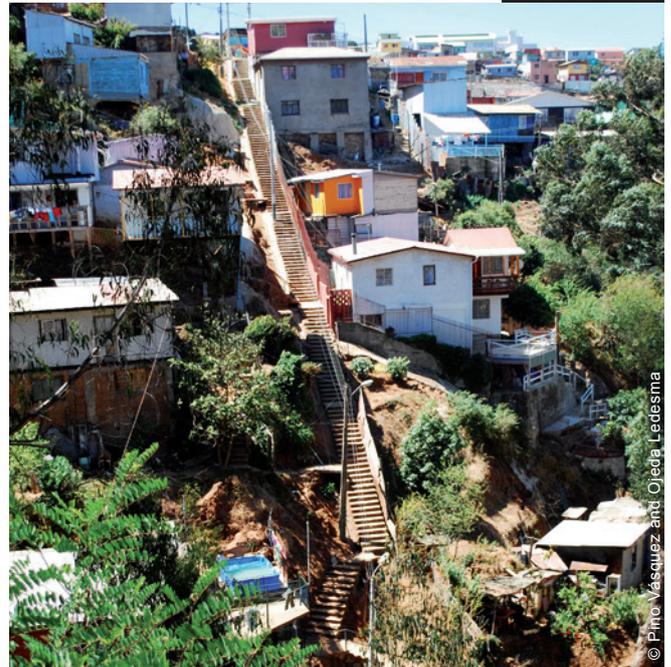
SITUATION BEFORE THE FIRE

Valparaíso is a coastal city of about 250,000 inhabitants, famous for its colourful housing stretching across densely populated hills of great aesthetic and cultural value. The hills are also the source of vulnerability to hazards, as a significant part of the city is built informally on the 39 so-called *Quebradas* (ravines). These form a historic informal area with many land seizures, which concentrate the highest rates of poverty and unemployment in the country. The *Quebradas* have little or no connection to urban infrastructure and vehicle accessibility is generally difficult, as access is mainly provided by steep stairways up and down the hills. **The hazards in these locations** include not only fires, but also landslides and slope failures, flooding in the lower areas, as well as the ever-present earthquake and tsunami risks along the Chilean coast.

According to a survey before the fire, the inhabitants feel that “inefficient policies” of the government have failed to meet the housing demand. Many current inhabitants of the *Quebradas* moved to this location as consequence of previous earthquakes destroying their homes (in 1906, 1965, or 1985). According to interviews, especially poor communities felt they did not receive enough assistance from the government for rebuilding or repairing their houses in the city centre after these disasters, hence moving to the ravines to build their own neighbourhoods, mainly by occupying unclaimed land. In the urban area, near the port, this would not have been possible.

Moreover, the government may have added to the desire of locals to remain on these sites, as staying in an illegally appropriated site is key to its subsequent legalization. A decree states that to legalize an occupied site one must be able to prove a presence on this site (in the form of a home) for more than five years, and the site also needs to be approved by the government. However, the sites on the ravines are often not legalized after these five years, due to the precarious and high-risk locations (steep slopes or proximity to the forest). Moreover, up to the legalization, people live in constant fear of eviction and they do not trust government agencies, even in the context of post-disaster reconstruction.

Self-construction in Valparaíso has happened for generations and many residents work in the construction industry,



Access to the ravines is extremely challenging, and the density is very high, as families build on informal plots and tend to expand their dwellings over time.

developing intuitive construction knowledge, including of structural risks and possible mitigation measures. It is estimated that approximately 80% of the housing stock in the city is self-built².

SITUATION AFTER THE FIRE

On 12 April 2014, a forest fire quickly spread into the urban settlements and destroyed over 3,000 homes, consuming 2,500 acres of land³. The fire, which was the largest urban fire in the history of Chile, also killed 15, injured 500 and left 12,500 people without a home⁴.

The fire affected especially the poorest areas, as they were informally constructed without any urban planning, leading to a high density of structures, proximity to the forests, and poor accessibility. During the emergency, fire-trucks could not reach the affected areas, worsening the situation further. The density of construction, mainly due to extended families building large complexes on the same plot of land to live in close proximity, contributed significantly to the fire spreading faster and more devastatingly. **Some neighbourhoods were hence burnt down completely.**

Despite being at risk of future catastrophes in the current locations, most residents of the ravines affected by the fire started to self-rebuild almost the next day. **Inhabitants of the ravines returned to their homes within hours** of the fire being under control, to salvage any material goods and clean up their land, worried about losing their land and unwilling to resettle outside of the city (as intended in the initial government plan).

INITIAL GOVERNMENT PLAN AND LOCAL REACTION

After the fire, the initial government plan was to clear everything and to rebuild the ravines in a “more orderly manner”⁵. The government also proposed to relocate citizens to safer sites, including social housing estates built outside the centre⁶.

² Pino Vásquez and Ojeda Ledesma, 2015, <http://bit.ly/2lthcAe>.

³ IFRC, 2014, <http://bit.ly/2ltg7bl>.

⁴ Salinas-Silva, 2015, The “great fire” of Valparaíso 2014.

⁵ Vergara, 2014, <http://bit.ly/2kJ92zj>.

⁶ Social housing had been built prior to the fire but in part it was also being built in response to it.



Houses were often built in clusters by families in the ravines of Valparaiso. These typical “Kinship-based Residential Complexes” were heavily affected by the fire, but people started rebuilding almost the next day. From left to right: January 2010; February 2012; April 2014, just after the fire; and October 2014, only six months later.

Moreover, the Ministry of Housing and Urbanism (MINVU), developed specific subsidies to address the scale of the disaster, but also the particular situation of illegal settlements in the ravines. However, before the legal framework of the new subsidies was established, the people had already started rebuilding. The government agency in charge of emergency shelter provided 6m by 3m units that were erected on new sites and in the *Quebradas* in “safe zones” determined by the government. The shelters were deemed of bad quality by the local population, further accelerating the drive to self-reconstruction.

Within six months the ravines were nearly completely rebuilt by the local population, much faster than public management and the vision of the planners. Notably, self-reconstruction in Valparaiso was heavily driven by women, who traditionally lead the household in the *Quebradas*, are very attached to their homes and try to keep the extended family close together. For this rapid recovery, locals used recovered building materials, but also improved the quality of their homes, partially due to the availability of government grants for self-construction.

ADAPTATIONS TO THE PLAN

The initial response plan by the government (relocation and emergency shelters) was heavily criticized by the local population, which resulted in the subsidies being adapted in order to be more efficient and useful for the needs of self-builders. This happened in approximately six months from the fire, thanks to demonstrations and the support of local NGOs, who consulted the residents and advocated with the government to propose alternative solutions.

MINVU’s revised plan in October 2014 (with a timeframe until 2021) was to invest about USD 510 million in the reconstruction of Valparaiso’s affected neighbourhood⁷. This included investment in a road around the city, as well as access roads to and in-between the *Quebradas*, and a geotechnical study of the slope stability of the affected areas.

⁷ MINVU, 2016. Visit <http://bit.ly/2l5vFlt>.

* MINVU, 2017, <http://bit.ly/2lhe48v>. // ** MINVU and CEHU 2016.

RECONSTRUCTION SUBSIDIES

Four separate types of subsidies for reconstruction were given to house the affected population, with the precondition that the new house be in a low risk zone (chosen by MINVU).

1) **The first subsidy** applied to families renting a property, as well as families living on their own site. It involved buying a new house with a value of 900 UF⁸ or an existing house with a value of 700 UF in a new location.

2) **The second subsidy** was for reconstruction of pre-designed houses in a new location by external contractors. No completed construction was reported by the end of 2016.

3) **Subsidies for reconstruction** in the same location were also available. The payment could be done before or after construction, but in the second case a contractor must have been hired for construction. This subsidy could be used to build a house according to designs proposed by MINVU, or own designs with assistance by an architect, often from a local NGO. The house could be an individual house or a group of houses for densification of a site owned by other family members. The subsidy covered 1,050 UF broken down as follows: 600 UF for construction costs, 300 UF for mitigation measures (e.g. seismic improvements), including the structure and ground, 80 UF for site preparation and any demolition work required, and 70 UF for technical assistance by architects. Additional funding was available for site densification (150 UF) as well as for mobility-impaired residents. About a half of the construction was finalized for this type of subsidies by the end of 2016, with the remaining projects mainly in the process of construction.

4) **The fourth type** was a subsidy for assisted self-construction (ACA). This offered about the same total financial aid as the previous one, with an average of 1,090 UF assigned per family⁹. From the fire up to the end of 2016, a total of 5,090 self-construction programmes were financed in Valparaiso by MINVU, of which 1,914 were reconstruction projects, corresponding to 39% of all reconstruction projects.

⁸ The Unidad de Fomento (UF) is a unit of account used in Chile and created in 1967. The exchange rate between the UF and the Chilean peso is constantly adjusted for inflation. In 2016, 1 UF was approximately USD 40.

⁹ MINVU and CEHU, 2016.

TYPES OF SUBSIDIES FOR RECONSTRUCTION

	SUBSIDY	VALUE (USD)	TARGET (FAMILIES)	PROGRESS TO DATE	SITUATION AS OF JANUARY 2017*		
					FINALIZED	ONGOING	NOT INITIATED
1	BUYING A HOUSE IN NEW LOCATION	~35,000 / 27,000	994	98.2%	976	18	0
2	RECONSTRUCTION IN NEW PLOT	~41,000	761	0%	0	684	77
3	RECONSTRUCTION ON ORIGINAL PLOT	~41,000	1,222	50.1%	612	539	37 + 34
4	SELF-CONSTRUCTION**	~42,500	1,914	50.2%	961	NA	NA



Architects and local NGOs helped affected people rebuild their damaged houses, thanks to the "assisted self-construction" subsidies provided by the government.

SELF-RECONSTRUCTION SUBSIDY AND THE ROLE OF LOCAL NGOS

Conversations with residents suggested that **many people did not like the government-designed solutions**, as the houses were too small, built with a poor choice of materials (steel profiles + PVC), and all adopted the same design. In Valparaiso, family identity is strongly associated to diversity in style of the house, and people have a strong feeling for location and aesthetics of their homes, hence preferring staying in unsafe sites than moving to often smaller social housing or locations outside their communities.

The ACA subsidy provided the resources to design and build a house, as long as the beneficiary owned or had some rights over the land. This could **also include densification of a site**, in which other family members lived, which was particularly relevant in the ravines of Valparaiso.

A local NGO was very active in informing the population about the possibility to self-rebuild and assisting in the process using the ACA subsidy. The NGO believed that self-reconstruction was the best way for the local community to get involved in shaping housing that responded to the needs of each individual family.

The role of local NGOs in sharing the information about the ACA and the other types of subsidies was essential, as many residents were not aware of the different options available and had a general distrust in the government, mainly due to past initiatives that failed to assist them.

In coordination with local NGOs, **architects (paid through the ACA subsidy) provided technical advice to the families**, teaching them how to build their own houses, which were designed based on their needs and proposals. This ensured a safe design of the house, as well as a more lasting impact, as families often expand their houses with time. Several NGOs worked on rebuilding sustainable wood and earth structures, based on traditional construction concepts in Chile.

THE CASE OF MINGAVALPO

A group of local architects and volunteers joined after the fire to provide a model of self-reconstruction using local and recycled materials, based on sustainability principles and a community workshop approach (*Minga*, a Chilean tradition of community self-help). The structures are built with a timber structure, walls are made of reused pallets, filled with straw mixed with mud and in some cases eco-bricks (plastic bottles filled with compacted plastic bags), finished with a mud and straw render. The result is a well-insulated house with a very low carbon footprint, for a cost of approximately USD 39,000 excluding labour, which was provided by volunteers.

Franco, 2014, <http://bit.ly/2lXsKd3>; Visit <http://www.mingavalpo.cl/>.

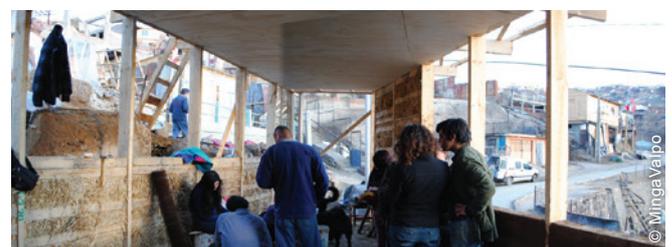
The statistics do not paint a full picture of the number of self-rebuilders and also crucially ignore the geographical and social component of subsidy allocation. However, it can be said that assisted **self-reconstruction is particularly popular in Valparaiso**, especially compared to the much lower number of such subsidies after other disasters, both in Valparaiso and in other Chilean cities. Similar ACA funds existed after the 2010 earthquake, but much lower numbers of these were applied for and allocated. Additionally, the subsidies were heavily improved after the 2014 fire, due to the fact that Valparaiso represents a special case in Chile, with such a high number of self-built houses.

LAND TENURE ISSUES

Land tenure issues proved to be crucial in the context of this response, as it is often the case in similar post-disaster scenarios¹⁰. Given that access to the subsidy was conditional to a proof of land ownership, many households were not assisted. Several disputes over land ownership arose, but no large scale solution was found. Most of the families who knew they could not apply to the subsidy started rebuilding very quickly, replicating the same vulnerabilities that existed prior to the fire, e.g. high density, proximity to the forest and poor accessibility.

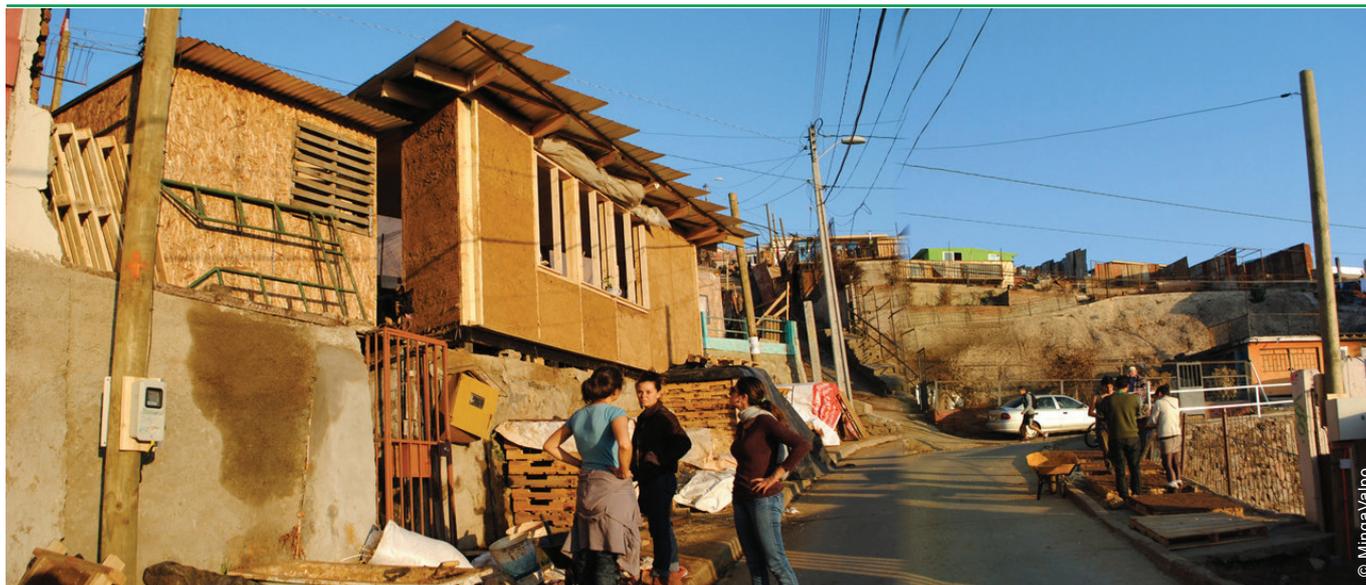
In January 2017, a new fire in the same areas affected again those who were in these hazardous situation. Although the municipality started to work towards an improvement of the land tenure situation in Valparaiso, **this example shows how the cycle of vulnerability was not broken**, even though best efforts were taken to consider the needs of the local population through the ACA subsidies.

¹⁰ See for instance the overview A.39 of the Ecuador Earthquake in 2016.



Local groups of architects organized building workshops to rebuild some of the houses affected by the fire on the Quebradas.

STRENGTHS, WEAKNESSES AND LESSONS LEARNED



Many houses were rebuilt thanks to the subsidies, with the help of local architects. In some cases, houses were built during community self-build workshop, experimenting with low-cost materials.



The damage caused by fires in the ravines of Valparaíso is often extensive. Entire neighbourhoods were burnt down by the fire in April 2014. The same areas were again affected by a fire in January 2017.

STRENGTHS

+ As of late 2016, **almost 2,000 houses had been rebuilt by their owners with the guidance of architects**, having improved construction quality, materials and size. Before the fire of 2014, the houses built in the ravines were precarious, constructed mostly with recovered materials from shelters and emergency housing.

+ **The combined action of government subsidies and NGOs** that tried to promote the use of these subsidies to help people rebuild, engaging them in the design and teaching them how to build safer.

+ **The subsidies took into account people's needs** and for instance allowed for the option of densifying a site to ensure families could live together and self-built houses could evolve with need and occupancy.

+ **The initial plan was adapted** to take into consideration the needs and requests from the affected population.

WEAKNESSES

+ **The initial response did not account for affected people's preference** in terms of designs or location.

+ **Many families did not receive any subsidies** as they decided to remain and self-rebuild in informal locations, without ownership and in high-risk zones. The risk of fires spreading across the ravines hence remained, as many structures were rebuilt close to the forest. The fire in January 2017 proved that **the most vulnerable remained so**, even after this large-scale response.

LEARNINGS

- **Affected people are the first responders, and will start rebuilding as soon as possible.** This response showed how recognizing this and supporting self-recovery as quickly as possible can have a significant impact in the success of the reconstruction and longer-term resilience of affected people.
- **Relocation is seldom the solution.** People settle in specific locations due to a variety of reasons, and as proved in this case they rarely want to relocate to far-away areas, distant from their social ties and livelihood opportunities, or to move into standardized housing blocks which did not cater for their needs and aspirations. **Locally sensitive, tailored solutions proved to be more effective** and accepted by the residents of the affected areas.