

POST-EARTHQUAKE RECONSTRUCTION IN THE ZAGREB SETTLEMENTS MARKUŠEVAC AND ČUČERJE

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Abstract

The Zagreb settlements of Markuševac and Čučerje were significantly affected by the 2020 Zagreb earthquake, and over the past four years have been undergoing a process of both technical and socio-demographic renewal. The analysis of post-earthquake renovation in these settlements was carried out by qualitative methodology and semi-structured interviews. They were conducted during the year 2024 (from May to September) on a sample of 20 residents and experts (16 residents and 4 experts in the construction profession). The research focus was on reconstruction models of damaged houses and the program for obtaining replacement houses, as well as the secondary accommodation of residents during the process of renovation. The results showed that the majority of residents went through the process of renovation by owners (self-renovation) and independent involvement in the renovation of their houses. They relied only partially on the help of the City of Zagreb and the Ministry of Physical Planning, Construction and State Assets, both in the administrative and financial sense. A smaller part decided for constructive reconstruction in administrative agreement with the Ministry, primarily those whose houses were demolished. The position of residents, who lived in temporary accommodation and in the so-called container houses or in isolated parts of their property that they reconstructed ad hoc, was particularly difficult. According to the different situations in which the residents found themselves we can conclude that they believe that, regardless of the great investment of the state, they were not adequately and on time returned to their own houses. Their expectations were focused on a permanent return to their own houses and to their property, especially because they are mostly elderly and therefore do not want to move out compared to the younger population.

Keywords: Zagreb settlements Markuševac and Čučerje, post-earthquake reconstruction, self-renovation, replacement houses, satisfaction with the reconstruction process

1. Introduction

Two earthquakes hit the City of Zagreb and the areas near Zagreb's northern settlements Markuševac and Čučerje in 2020. The first one occurred on March 22 at 6:24 a.m. with a magnitude of 5.5 on the Richter scale and had its epicentre in Markuševac, 7 kilometres from Zagreb, at a depth of ten kilometres. After the earthquake, some projections show that more than six thousand buildings, public and private, were temporarily unusable (multifamily buildings, kindergartens, primary and secondary schools, faculties and other institutions) [Atalić, 2021]. In 2020, the second and even more devastating earthquake of magnitude 6.2 according to Richter took place on December 29 of the same year. Its epicentre was 3 km southwest of the town of Petrinja in Sisak-Moslavina County. The Petrinja earthquake became one of the two strongest instrumentally recorded earthquakes in the Republic of Croatia (since 1909), and its devastating effects were also felt in Zagreb, where additional damage occurred, especially in the central parts of the city, on the oldest buildings [Svirčić Gotovac et. al. 2021: 138]. The Ministry of Spatial Planning, Construction and State Property adopted The new Reconstruction Act, first in September 2020, half a year after the earthquake, and the new version in February 2023 [*Act on the Renovation of Damaged Buildings, 2023*]. According to the Ministry, the right to post-earthquake reconstruction is granted to all owners or co-owners of real estates damaged in the earthquakes of March 22, or December 28 and 29 2020, respectively, under the condition that the

real estates are existent [Ministry of Physical Planning, Construction and State Assets, 2024¹]. In November 2020, the Fund for the Reconstruction of the City of Zagreb, Krapina-Zagorje and Zagreb County was established, and state and city institutions started to participate together in the recovery process. The measures are aimed at residents who are existentially threatened due to the loss of housing security in these areas, especially in the Zagreb region and the Petrinja region, which are threatened the most. Due to a large damage, Croatia was granted funding from the EU Solidarity Fund twice, in a total amount of over a billion euro to recover from the damage. Based on the request from Croatia, and following a thorough examination, the Commission concluded that the circumstances were meeting the criteria justifying an exceptional prolongation of the deadline for the implementation of the EUSF aid for recovering from damage caused by the Zagreb earthquake until June 30 2023 [Representation of The European Commission in Croatia, 2022]. The multi-year post-earthquake renewal is primarily led by Ministry of Physical Planning, Construction and State Assets, after the Fund for the Reconstruction of the City of Zagreb, Krapina-Zagorje and Zagreb County has been closed. During these years, the reconstruction of private and public buildings was implemented paralelly in all damaged areas. The renovation of private family houses was much slower than the renovation of public buildings. The problems hindering private renovation are mostly related to property rights, administrative in the sense of applying and waiting for the implementation of the request on the type of reconstruction, and financial in the sense of approval of funding granted to the owners by the Ministry. This will be discussed in more detail in the Results section. Minister Bačić and the Ministry stated at the session of the Expert Council for Reconstruction in June 2024 that the construction of replacement houses started not earlier than 2023, and until that day there were 255 family houses built, while additional 48 replacement houses were built in 2024. It is expected that all the planned replacement houses will be finished until 2027, and the comprehensive reconstruction until 2030.² This is definitely not an expected dynamic for the owners of houses, who have now been waiting for already 4 years after the earthquake for the reconstruction and the return to their homes.

The reconstruction of public buildings was much more successful. A large number of schools, kindergartens, churches, museums and similar public institutions were renovated or rebuilt both in the city of Zagreb, and in Petrinja and Sisak. The Ministry's web-site reads: "With regard to the reconstruction of public property and infrastructure, a total of 1,309 projects were agreed for the Zagreb and Petrinja earthquake, amounting to 3.63 billion euro. A total of 997 projects were finished until June 30 2024. Further reconstruction of public purpose buildings will be funded by the National Resilience and Recovery Plan and the state budget. The Government also provided a loan from the World Bank amounting to 200 million dollars" [The 4th session of the Expert Council for Reconstruction, held on September 17, 2024, Ministry of Physical Planning, Construction and State Asset]. Regarding that the current state of the post-earthquake renovation process in Croatia is very complex and includes more counties, cities and villages, as well as private and public objects, and all reconstruction types in line with the most recent Act on Reconstruction of Damaged Buildings 2023, the research presented in this paper analyses only the reconstruction of private family houses and the building of replacement houses.

¹ Also, the right to renovation and co-financing of renovation costs, or the costs of construction of a replacement family house is in more detail regulated by the Act on Reconstruction of Buildings Damaged in the Earthquake and the Programme of Measures for the Renovation of Buildings Damaged by the Earthquake [Ministry of Physical Planning, Construction and State Asset, 2024, <https://obnavljamo.hr/obnova-nekretnina-ostecenih-u-potresu/>].

² „When referring to the very implementation of the renovation, we have renovated 10,847 non-construction objects, and in the very period of those six months we conducted 763 non-construction renovations and in total the whole project of non-construction renovation costed 43.7 million euro. By building family houses we gradually achieve the desired dynamic. Until January of last year, not a single replacement house was built. Today we have a total of 255 replacement family houses. In these six months, additional 48 replacement family houses were finished" reported Minister Bačić to members of the Council. He communicated that the renovation, i.e. the construction of all replacement family houses and buildings, around 900 of them, should be finished until the end of 2026, or the first half of 2027, respectively, while the complete renovation should be finalised until 2030. [The 4th session of the Expert Council for Reconstruction, held on September 17, 2024, <https://mpgi.gov.hr/vijesti-8/odrzana-4-po-redu-sjednica-strucnog-savjeta-za-obnovu/17861>].

The paper will also analyse the new model proposed by the Act, the self-renovation model, by which the renovation steps are decided upon faster and more independently, for the owners choose the architect, contractor and the surveillance of the construction work by themselves, as well as the beginning and the end of the construction work [<https://obnavljamo.hr/samoobnova/>]. In this paper, we analyse the situation four years after the earthquake in the areas of peripheral and rural settlements near Zagreb, Markuševac and Čučerje, which are still in the reconstruction process.

2. Theoretical approaches to post-earthquake reconstruction: putting people first

Post-earthquake reconstruction can be viewed in relation to examples of countries that have already gone through a similar process, and based on that it can be seen which models are currently in use and how applicable they are in the case of the explored settlements near Zagreb. In this sense, some important and newer approaches to post-earthquake reconstruction are distinguished, which also concern the participation of residents and the ways in which reconstruction can be achieved. The literature mentions primarily the process called Postearthquake Recovery and Reconstruction Planning – PERR, which is directed towards many dimensions of reconstruction, among which the construction of housing objects is the most important part and the priority in planning [Johnson, 2007; Wu and Lindell, 2004; Svirčić Gotovac et al., 2021: 142]. It was the construction and renovation of private family houses that was in the explored cases the main goal and need for the citizens who lost their homes in the earthquake, or their homes were severely damaged and in need of reconstruction. The literature thus often points out the principle that people and their houses need to be the priority, i.e. the “people first” principle [Yang et al., 2017:1847], along with warning about the inevitable role of citizens in the renovation process, for their satisfaction will eventually depend on it [Svirčić Gotovac et al., 2021: 142].

In the four-year process of post-earthquake renovation, both in Zagreb and in other parts of the country, it can be pointed out that it has been mostly led institutionally by the state, or the Ministry, respectively, and guided by the so-called top-down model. The involvement of citizens in the decision-making process through the bottom-up model was almost non-existent. The voices and opinions of citizens were noticed only at the level of receiving requests and occasional complaints, which could be heard of in the Ministry's offices' communication with citizens, and in the media. The process of decision-making during post-disaster reconstruction is constantly confronted with tradeoffs between speed and quality, roles of professional and lay people, temporary and permanent housing, to name a few [Pezzica et al., 2021; Davis and Alexander, 2015]. Thus, the rising recognition of traditional construction in the post-disaster context is closely related to a shift in reconstruction schemes from a top-down approach (e.g., donor-driven reconstruction [DDR]) to a participatory approach (e.g., owner-driven reconstruction [ODR] and people-centered reconstruction [PCR] [Wang and Ng, 2023: 2]. The top-down approach has a limitation or weakness that it cannot meet the specific needs of individual communities. The advantages of 'owner-driven reconstruction' - ODR, on the other hand, include, among others, the dweller control of the reconstruction process with customized designs, reduced costs through a short logistic chain of building resources and strengthened community ties through shared participation [Barenstein and Iyengar, 2010; Barakat, 2003; Maly and Iwata, 2019].

In our cases, the principle of participation or PCR was not present, but rather only some critiques and complaints of citizens regarding the renovation process. It was only two years after the adoption of the Act that some of the citizens' demands were accepted, while reducing the pressure on the Ministry, which prior to that used to be much larger. The changes that enabled the self-renovation model and financial aid to citizens have somewhat speeded up the process and enabled more intensive construction. Therefore, a very important renovation principle applicable to the explored cases is the one that the literature labels as “*build back better*”, or BBB, respectively [Maly, 2018]. This phrase became popular for the improvement of recovery. Mannakkara and Wilkinson (2014) have developed a BBB framework that includes: risk reduction, community recovery and implementation. Community participation as well

as clear communication during the entire process and also shelter to the residents is vital. Kennedy et al. (2008.) conclude that 'build back to a less vulnerable state than before' or 'building back safer' might be a more appropriate term. In that context it is important to emphasize that the renovation is expected to provide much safer conditions of housing and living, and not just a return to the conditions prior to the catastrophe. Therefore, both the construction models and the self-renovation models are legally obliged to guarantee the reinforcement of construction and greater safety in case of repeating earthquakes, which the type of construction requiring both time and money, and is often slow-paced. Those citizens who did not want this model, would often withdraw and shift to faster and more affordable variants of independent reparation of damage on their houses.

Although the 'People-centered housing recovery' is also one of the approaches that puts people at the center of recovery, in the explored settlements, Markuševac and Čučerje, mostly the "build back better (BBB)" model was employed; and only in the part that is focused on technical safety, whereas less on the needs and preferences of the residents. Compared to the BBB, the People-centered housing recovery could represent a more detailed way to consider and evaluate varied aspects of housing recovery projects [Maly, 2018: 92]. As will be shown in the results, the citizens in the explored settlements were not included in the very process equally. Due to that, as well as the renovation that was not fast enough and the problems that were hindering it, the example of these settlements illustrate that "when citizens are not invited in the process of catastrophe management, the decisions and activities of those who bring these decisions are often disputed [Pearce, 2003: 217] because even in the results one can see a certain dissatisfaction and contestation of the adopted measures. In this chapter some important and newer approaches to post-earthquake reconstruction are distinguished, which especially concern the participation of residents, and the ways in which reconstruction can be achieved so that the build-back is better and also safer [Kennedy et al., 2008]. It would be advisable to connect the mentioned principles of people-centred reconstruction, people-centered housing recovery and 'build back better' (BBB), to provide a greater participation of residents, and to make their housing construction more satisfactory. However, as shown by the analysis of reconstruction in Čučerje and Markuševac, only a partial BBB principle was implemented, the one implemented in a strictly legal and technical way from the top-down to the local level. This is discussed in more detail in the Results section.

3. Methodology

In the research conducted from May until September 2024 in the Zagreb settlements of Markuševac and Čučerje, the method of semi-structured interviews with the residents and interested actors from Local Committees and City Districts, and civil engineering experts was employed. The research participants were either directly affected by the earthquake as residents of these settlements, or participated as experts in the process of renovation of damaged buildings in the settlements of Markuševac and Čučerje. The total sample consisted of 20 respondents (N=20), of whom 14 men and 6 women. There were 16 residents and 4 experts from the explored settlements (1 member of the Local Committee and 1 member of the City District Council, also an organizer of the construction and an active participant in the renovation, and 2 civil engineers). In the settlement of Markuševac there were 9 respondents, and all were older than 60. In the settlement of Čučerje there were 7 respondents, of whom 4 were older than 60, one older than 50, and two in a younger age category of 25-30 years. The research received approval of the Ethical Committee for conducting the field part of the research. The main aim was to analyse the process of renovation during the past years, and the residents' satisfaction with the repairment of houses and the building of new or replacement houses. Also, an additional aim was to explore how satisfied are the residents affected by the earthquake with the whole process of renovation, both through self-renovation and construction renovation, with regard to the state and city institutions and local government units (Local Committees and City District Councils).

Based on these aims, an a-priori protocol for questions was written according to which the researchers conducted semi-structured interviews by the face-to-face data collection method. The criterion for the

involvement of interlocutors (tenants) in the sample was ownership over a real estate property and the damage of objects in which they reside (to a smaller or greater extent), and for expert actors it was involvement in the post-earthquake renovation process. The obtained results or transcripts were then transcribed and analysed by NVivo 12 thematic analysis [Boyatzis, 1998]. The interviews lasted for 30–60 minutes. The coding was primarily deductive, and based on the gained insights the codes and topics were identified. The results of semi-structured interviews processed in the thematic analysis were singled out in 3 most important topics that were also, which is important to mention, arranged according to the temporal sequence in which the post-earthquake renovation was taking place: 1) *Help of the local community (Local Committee)*; 2) *Damage repair and types of reconstruction*; 3) *Satisfaction of residents with the construction of replacement houses*. The obtained results are interpreted further in the text.

4. Results

Most of the residents included in the research had a red sticker after the preliminary static examination, with a lesser part having a yellow sticker. Most often they emphasised that they started the reparation of the occurring damage and the renovation of houses, so that they could return to their homes. A part of them left their place of residence visiting the family or relatives for a certain time, and then returned to the renovated house. A smaller part is still outside their houses. Older residents, prevailing in the sample, mostly stayed in auxiliary objects near their houses, e.g. garages or external kitchens, which were adapted to permanent housing, so that they could be close and work on the main object. To them it was enough, while pointing out that leaving was not a desirable option for them. One part was living in the containers that were provided by the state and the city, but this type of residence was prolonged to 4 years, and it could be inferred that they were particularly unsatisfied with this solution.

1) *Help of the local community (Local Committee)*

In the days following the earthquake, along with a great shock there was a great engagement of the people and institutions as of how to help the most affected people as quickly and efficiently as possible. In that context, it was important to ask them how did the immediate local authorities react through the Local Committees, whose members themselves reside in the same area. The residents mostly observed that their contribution visible in the cooperation of the Local Committee and the local Voluntary Fire Brigade, who were asking for the provision of various construction material from the City of Zagreb, which was then distributed to the people, which is confirmed by a statement of an expert actor and member of the Local Committee.

It was the main commander of the firemen who was in the crisis staff, and with them I was able to provide help, a load of material for Markuševac, for the renovation, the plankings, the laths, cement, and then we gave it to the people, yes. So, I think that this way the Local Committee did help. For this area, since it was in the epicentre, a load of that material was needed. We gave plenty of the material to the people. (member of the Local Committee, Markuševac, M, 75)

The residents, however, did not point that much to their help, and were more oriented towards themselves. They did not find the work of the Committee that important, but stated that they knew about their agency. The Committee helped them take the things out of their houses or were circling around the area and providing construction material. A part of the residents have never heard of their engagement.

Collaboration with the Local Committee consists only of helping me carry my things from the upper floor. I think it was the guys who organized themselves on their own. (Vidovec, Ž, 75)

I had no contact with the Local Committee. But I know they were walking around. They were asking about the damage and all. And, what do I know, they gave to the people who had some small damage, some material, roof tiles. (Vidovec, M, 60)

We did not collaborate with the Local Committee, nor did we hear about their engagement. (Čučerje, M, 28)

Members of the Local Committees were engaged in the obtaining of housing containers for the residents that needed them, and were not able to stay in their houses. According to an actor from the Local Committee, there was extreme dissatisfaction with the containers.

In the beginning, we were even fighting for those housing containers, and we provided quite a few of them, for the people who were in need, who had nowhere or no-one to go to. There are still plenty of them. They were extremely dissatisfied. (member of the Local Committee, Markuševac, M, 75)

2) Damage repair and types of reconstruction

When the renovation of houses started, most residents and involved experts counted on the help of the city or the state. They stated that the financial aid under the public call of the City of Zagreb in 2021 amounting to 50,000 kn was indeed a great help with which the first repairments started on the roofs and walls. Nevertheless, they pointed out that the state and the Ministry did not provide much financially, and that the renovation process started much more complicatedly and for some even administratively very hard. The majority repaired the damage by themselves, because such houses were not labelled with a red sticker, and were able to be renovated within some shorter time, mostly within a year, which was the case for the majority less damaged in the earthquake. For that other part of the houses, which were seriously damaged, the renovation process got prolonged for up to even a few years, while in some it is still taking place. The examples of such houses can be found on the landslides or among the residents who are not satisfied with the attributed model of reconstruction.

I got those 50,000 kn from the city, while the state gave nothing. All right, we used that. So, we were sleeping upstairs on the upper floor, while the ground floor was being repaired. And then, when we got those 50,000, the facade was on the house. (member of the Local Committee, Markuševac, M, 75)

And nobody ever gives us the right answer. And those 50,000 kn, I don't know if you remember, we did not take that because they told us not to take it because our house will be demolished, and that the money was for the construction renovation. I mean, people, I have nothing against them, but they got the option and the money, and we got nothing. I have five kids. We are not here, but down (op.a. in the city). (Čučerje, F, 52)

A part of the residents got and received the aid from the City of Zagreb, and the other did not. Thus a division emerged among those who managed better, and those who navigated worse in the initial repairment of the damage. After initial housing repairments, so that they could serve for residing, particularly for those who could not or did not want to leave them, this aid was especially important, and in this way they would stay and repair them. Some were afterwards involved in the construction renovation, and submitted their requests to the Ministry. The majority of residents, it was only after four years after the earthquake that the administrative request could be brought to the execution phase and the beginning of self-renovation or construction renovation. It was by the new Renovation Act of 2023 that the self-renovation model extended the opportunities of owners who could now classify the demolition of houses under this model, which was not possible by the previous Renovation Act. The implementation is for a part of them expected during 2025 (the project, surveillance, and implementation of the strengthening of housing constructions).

Some residents have thus adapted the initial request for construction renovation to the new self-renovation model, and waited for the state funds, which were then paid to contractors under conducted tenders. As one of the expert actors states, it was the intention of the Ministry to speed up the process of renovation with the self-renovation model, because construction renovation would be much more

complex and the whole process would in practice be prolonged to a few years, to enable the matching of certain conditions, which was often impossible, and everything was additionally slowed down.

If it is not self-renovation, then the architect is determined following a tender. This also took long. Then an operation coordinator has to be determined, as some kind of a project leader. Then the constructor, and then the surveillance. When all these 4 points match, it lasts 3 years. Also, not every tender succeeds, some of them fail, because they offer prices 100% higher than the planned, or nobody applies (surveillance engineer, M, 62)

In addition, in the whole process of renovation, there were often unclarities regarding the renovation model, and the waiting on the decision on the request. Many took their reconstruction 'in their own hands', and did not create projects with their constructors, and were thus lacking bills for the conducted and authorized works, which was later not regarded in the Ministry's refunding, which caused dissatisfaction.

People were doing self-renovation and some non-construction renovations. Plenty of those did not have their works supported with written documentation. They did not have a project. They started with some initial project, but not by an authorized constructor, they did not register him, and did not have surveillance. (civil engineer, M, 55, Markuševčki Popovec)

In the construction renovation there might be some kind of participation. Later he has to deal with it by himself. He gets paid for the construction part, but has to solve the later phases alone. Construction renovation is construction renovation. Elements will be reconstructed. After that, you won't really be able to live inside. Somewhere, even he finishing floor coverings were not provided. Maybe the bathrooms were, tiles in the bathrooms, but some other places, you don't even have the flooring. (surveillance engineer, M, 62)

An additional problem is that there were multiple constructing sites active at the same time at various places, causing the work to be running late, for there was a lack of both craftsmen and contractors. Also, the Ministry was running late with the payment expected by the owners and contractors, so that the process was sometimes stuck in one place.

For example, the situation. A friend is here, working, and says: look, there are problems, he is also doing self-renovation, and is having problems with the sub-contractor. He won't work. He says: I gave him the money. I gave him my part. The state did not give him its part. Because you've made a mistake somewhere in the legal part, and so... (M, 62, organizer of construction and councilor of the City District Council)

...They give you 50 thousand euro, for example... 50, 30, 25 goes for the constructive renovation. The rest goes to the account of the owner who is broke, cannot pay even for the bus ticket. And what happens then? Then it happens that you see scaff here in Gornja Dubrava, in markuševac. Abundance of scaffolding! So, the renovation has started and all of it is going? (M, 62, organizer of construction and councilor of the City District Council)

For such cases it is important to emphasise that they very extremely hard for the residents themselves. Some cases, as the following in Čučerje, would not be finished without the help of expert actors from this area who were involved in the process, and who had the role of so-called construction organizers. The actor mentioned by the interlocutor has significantly helped bring the process to an end, and enable the state to begin with construction renovation of more houses in the area of Čučerje villages.

Yes, we did receive 50,000 kn from the City, and we used it to partially solve what we were solving, and also by borrowing, friendly help, and so on, and thus we started the self-renovation. In order to function in that object... We are now expecting that stabilization. As Mr says, we need construction renovation and safety, with no more fear when some noise goes under the house that I have to cover my head. (Šuškovićev odvojak street, F, 68)

The statement of an expert actor who continued to lead the process until the end and was able to get financial aid for the owners in a part of Čučerje, so that the construction and comprehensive renovation would start after four years, speaks of the longlasting process of renovation, particularly for those mostly affected by the earthquake.

I was expecting 30-40 thousand euro. And when we started, I realised that maybe it could be brought to 60 thousand. When the lady sent it to me on Monday, I was thrilled, we got 94 thousand plus the project. About 110 overall. The house is not finished. What the gentleman was doing was painting interventions, that we need to bring down, repair and then return to the state in which it was. This will be the most demanding object I have had until now, because it involves complete renovation. We can call this comprehensive renovation because we are doing also the construction renovation and we are returning it to the original state. (M, 62, organizer of construction and councilor of the City District Council)

Both the another object in Vidovec is continuing with the construction renovation, to reinforce it. It is implemented by an expert actor, who is helping with the finalisation of the renovation.

This way the construction renovation is done really well, both vertically and horizontally. Upstairs, I now have the walls that are this thick on the upper floor, because the old wall remained which was binded and the new wall was made. As they made these vertical pillars, then connected that with a cornice, and then on the cornice another wall was put next to this wall. (Vidovec, F, 75)

Besides these cases that eventually reached the end of renovation, although through different phases, a part of residents is extremely unsatisfied for they have still not begun with the renovation of their houses. The example is a resident from Slanovec, who is not satisfied with neither the communication, nor the solution offered by the Ministry, and does not want construction renovation, but demolition of his house and construction of a new one.

They (the Ministry) said that the terrain should be drilled, if it's not all right, then the house should be demolished and built on some other terrain. Then we got a decision to wait for the decision on construction renovation. They said the project was over, and they did not go out in the field. I don't know based on what they made the project, based on photos, they did not conduct a deep measuring of that terrain, they did nothing in the legal sense, and you cannot complain, I am now only waiting for that project, to go sign that project, and then I will not sign it, do you get it? I will ask for my house to be demolished. (Slanovečka street, M, 62)

As with the end of 2023 the Ministry finalised the process of receiving requests for the construction of replacement houses, this case is not simple and creates an impression of neglect towards house owners, who are therefore extremely dissatisfied, and their further communication with the Ministry is lacking. Another case is that of a family whose house is located on a landslide, and does not have a constructing permit anymore, without a solution to a total amount by which the family could buy a house in the Zagreb area, because the Ministry is not providing enough, while not allowing the change of location either. The family was thus unable to solve anything in 4 years, and are still renting a social apartment, which they pay for on their own.

We're down there in Jelkovec for four years already. I don't know what to say. They offered us to buy a house for 150.000 eura, but in the city of Zagreb area. So, not Dugo Selo. I cannot buy it. I buy for 90.000 euro and I found it. The rest of the money cannot be provided by them, but it goes to the state. So, I cannot renovate anything due to the landslide. I cannot do anything. (Čučerje, F, 52)

3) Satisfaction of residents with the construction of replacement houses

According to a statement by a surveillance engineer involved in the renovation process in these settlements from the beginning, the situation is not satisfactory, and according to him many more houses should have been demolished. He points out that the introduction of self-renovation and extension of possibilities of renovation according to this model is a good solution.

So, it should have been done right away, in those first field visits and afterwards, let go, 100, 200, 500 houses, as now 5 companies have done two years ago, lets bring this down, and later see if replacement is needed, if construction renovation is maybe possible, i fit doesn't need to be demolished, and so on. I think there were 2,800 such objects in the Zagreb area. Surely, half of them would be down until now. For now, we've taken down 80. Now as the latest it has emerged that self-renovation includes demolition, so that the people, if they opt for it, can request the same and look for the contractor. However, something has now slowed it down. (surveillance engineer, M, 62)

Replacement houses grew in the place of those with a red sticker, which were completely unusable, and projects were made on the construction and the location in which the construction will take place. Depending on the number of household members, the so-called typified house was built, with three sized offered by the Ministry and the deadline of 6 months for finishing it.

Here, there were houses that were red, that were unusable. First it was demolished, and then a typified project was noramlly adapted to the terrain. The typified houses are not classical. Each is a little different with regard to the terrain configuration. Our deadline is some 6 months for a house. (civil engineer, M, 55, Markuševčki Popovec)

Some owners are satisfied with the process of construction of new replacement houses. A resident from Čučerje is one such example. To him, the process was fast and he has no objections. Nevertheless, there are divided attitudes on the whole renovation and construction of replacement houses process. A parti s completely satisfied both with the way and the time of construction, and the final outcome, while the second part is extremely dissatisfied.

They started somewhere in September when they put the tables stating that the construction will be done, while they prepared the binding and materials, they started more seriously in October, and in March (2024) it was over, end of March. 74 square metres and I am satisfied. It was really not done in a haste, in some drainages, isolations they put the first, the second, the third, and so on. (Čučerska street, M, 66)

The residents who got a replacement house, for example in Markuševčki Popovec, think that their new typified house is not satisfactory, primarily in size. They used to have a significantly bigger house that they compare to the new one. Nevertheless, as the owners of these houses are mostly the elderly living in two-person housholds, the typified house model that they can get is 55 m². According to the interlocutor, this is very unfair and they are therefore not satisfied.

Well, I am not satisfied, well relatively yes, but I object that there is some mugging here, where I got too little, in terms of the house. This house was firm, it was larger, and because there is only my wife and me alone, we got what we did, 55 square metres. (Markuševčki Popovec, M, 79)

Besides with the size, they are dissatisfied with the Ministry's relationship towards them in the process of house demolition, because they were not notified about it in due time, but was instead just begun with the demolishing. In that situation, the owners were not allowed to enter their houses, nor to take anything out of them, which was for them, unjust and unnecessary.

This is how they brought it down, they brought it down as if I was that F-thing..., I could neither take anything out of it, nor use anything, nothing. (Markuševčki Popovec, M, 79)

5. Conclusion

Our research through interviews with both residents and experts indicate the complexity and long-term nature of post-earthquake reconstruction, as well as the various obstacles they encountered in this process, both administrative, legal and technical. The experts' responses were particularly important in understanding the technical details of the restoration process, as well as the time course in which the reconstruction occurred, its different stages and models, and the ways in which it was carried out. In

some of the thematic units we have singled out, we can notice the division of residents, i.e. their divided satisfaction with the reconstruction process, while in others they are more homogeneous in terms of similar answers and views on the process of post-earthquake reconstruction.

In the first category, which concerns the assistance received by residents from the local community, there is a divided perception of residents of their awareness of the engagement of local committees, especially through their communication with the City of Zagreb in terms of seeking and sharing various construction materials, removing things from houses or visiting the terrain. For a part of them the assistance of the local committee was insufficient, and they were using it very little, while pointing out that some others were using it much more than them, suggesting the relative dissatisfaction with their involvement in the renovation process. The most visible engagement of the local committees is in obtaining housing containers, which was also stated in the answers by the members of the local committees themselves.

In the second category of questions concerning damage repair and types of reconstruction, some residents express dissatisfaction, especially with the slowness of the reconstruction, the fact that they did not receive much financially and the complexity of the procedure. The initial request for structural reconstruction by residents was adapted to the new model of self-reconstruction, where funds were expected much faster from the state. A part of the residents thus managed to complete the renovation only through professional help with the construction organization, without which the whole process would not be finished. Some still failed to start or complete their renovation. Such cases are still unsolved and fall into the most difficult category, with the owners in some way pointing out that they are forgotten and that four years are too long for returning to homes, while highlighting a great disappointment. The example are houses on a landslide, for which new construction is not allowed, and demolition is not approved. From what has been said by the residents related to this category, it is possible to conclude that a problem still exist in the communication between the people whose houses were damaged in the earthquake and the Ministry. Nevertheless, it can be argued that the new self-renewal model has finally resulted with some improvements and finalisation of the structural reconstruction.

In the third category of questions, which concerned the residents' satisfaction with the construction of replacement houses, there is perhaps the biggest division between the respondents. A part is very much satisfied with the construction of a replacement house, both with the size and the quality, while another part is completely dissatisfied. Most often, the most dissatisfied were the elderly residents who previously had a much larger home, and the current typified house does not meet their needs. Thus, the approaches to post-earthquake reconstruction that we have mentioned (putting people first, people-centered reconstruction and recovery and build back better approach) show that these concepts were not implemented and the communication with the residents was missing. Some negative consequences of the top-down approach could be avoided with better communication, especially the dissatisfaction of residents due to insufficient participation [Kennedy et. al., 2008] in the renovation process of building of a replacement house. This type of action on the part of the Ministry indicates a behaviour on the part of the authorities that does not correspond to the stated approaches of community involvement in the decision-making process. According to the results obtained in 2022 on the problems and challenges of post-earthquake renovation in the inner city center of Zagreb, it was also concluded that citizens had much higher expectations from the state and city authorities in the financing and coordination of the complete renovation process: they also expected the setting up of new standards of post-earthquake renovation, which did not happen [Svirčić Gotovac et.al., 2022: 128].

The division of opinions in terms of satisfaction in this category points to the previously mentioned problems of insufficient and unclear communication between residents and the Ministry, but also to an insufficiently planned and implemented renovation process in which it can be said that some residents 'got lucky' while others were largely stuck in the process, both with the bureaucratic part of the process, and in situations they did not expect regarding the finding of construction workers, the poor quality of the renovation, and lack of control over the entire process in general. It can be highlighted that one of the conclusions in the whole process is that priorities were not respected and the residents that were in

need of assistance were still left without solutions, and that in their relationship institutions-citizens there was little understanding for the finding of the best solution. Institutions have found the best solution for themselves, but not for the citizens, and in these cases the top-down model of managing the renovation process was confirmed. In the cases of Markuševac and Čučerje we can therefore conclude that the previously mentioned top-down approach (DDR) as well as some parts of the BBB approach [Maly, 2018; Maly and Iwata, 2019] are more applicable than the approaches considering 'people first' [Yang, et al., 2017]. In other words, it is possible that this outcome of post-earthquake reconstruction is precisely the result of insufficiently elaborated reconstruction plans and especially of low involvement of residents in the reconstruction process, and for the most severe cases the solution is yet to be found, which has not been done after four years. On the other side, it needs to be pointed out that the technical side of the 'build back better' model although long-lasting for most of the affected citizens, and with the help of the self-renovation model and organized help in managing the process by the experts, has been successfully brought to the beginning of the construction renovation, which will for the majority last the next two years. After that, the Ministry will be able to say that the renovation in these Zagreb settlements has been finalised successfully.

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