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Residential Satisfaction of post-disaster resettled communities: A Case of Thakle Integrated Settlement

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Abstract
Nepal being one of the most disaster-prone countries followed by the demographic spread of the settlements, the need for resettlement in safer areas is prominent. Contrary to the popular belief that resettlement would improve the well-being of the people, the resettlement projects have largely failed to meet the long-term aspirations of the community ignoring their physical, socio-cultural, and economic needs. Despite huge investment and policy provision, the resettlement approach after Gorkha Earthquake has met with controversies and limited outcomes, and the residents have either abandoned or modified the housing provided to them. Various stakeholders such as the Local Government, Users Committee, and also National Reconstruction Authority claim Thakle Integrated Settlement to be a successful resettlement approach. However, there is a need to carry out the assessment of long-term user satisfaction of the resettled households over a period of time to determine the extent of its success. Thus, the study seeks to examine the residential satisfaction of the housing provided in the resettlement site to the displaced community and explore factors influencing housing modifications. Using 5 - point Likert scale, the residential satisfaction of 30 resettled households in Thakle Integrated Settlement was examined which was analyzed and compared with the resident's response through modifications evident from direct observation or Interviews. Findings from the study revealed that the residents were highly satisfied with Planning and design; Construction quality and technology; Plot Size; Building Material; and Architecture Style; while the reverse is true for the number of rooms; and Thermal comfort. The high satisfaction for Planning and design; Construction quality and technology; Building material can be attributed to the resident consultation in the planning and construction phase by the implementing agency. The low thermal satisfaction is due to the lack of consideration of climate-responsive building materials and construction technologies suitable to the local context. Despite greater plot satisfaction expressed, housing modification is an evidence of response to the dissatisfaction of the residents with the plot size, which largely failed to meet their physical, social, and cultural needs. The study concludes that the mismatch between the actual need of the resident and the houses provided resulted in the housing modifications by the households.

Keywords
Resettlement, Residential Satisfaction, Housing Modification

1. Introduction

Disasters are accompanied by higher levels of forced migration than conflict, with an estimated 24.9 million people displaced by the disaster in 2019 alone [1]. Out of the various measures adopted by the affected countries to manage such displacement, one of the widely practiced is resettlement. Resettlement can be defined as a planned, assisted, and permanent relocation of a displaced population. In most cases, resettlement are often seen only as a process of providing houses to the affected population [2] and have often been criticized for their inability to meet the long-term aspiration of the affected communities[3, 4, 5, 6, 7, 8]. Many resettled families adapt to their new living environment in varying degrees, while some have found it extremely difficult to survive in the new environment due to diverse circumstance[9]. The attempt to generalize and adopt a 'one-size-fits-all' approach to resettlement planning without having a detailed knowledge of the community has impeded resettlement planning. According to Oo et al., [7], the mismatch between the built housing and the lifestyle and expectations of the

users can partly be explained by the urgency to provide housing after disasters, which prevents the government agencies from perceiving the local culture.

The Gorkha Earthquake of 2015 resulted in massive loss of lives and properties across 31 districts of Nepal requiring, among others, the need for the resettling of 22,256 households along with infrastructure provision and settlement planning [10]. Although the Government of Nepal along with several stakeholders have designed and implemented several resettlement projects as Integrated Settlement, these resettlement approaches have met with several controversies and thus produced limited outcomes. Many Integrated Settlement projects completed, being completed and planned ones show problems related to lack of occupancy, disinterest of the affected communities, and the lack of integration of physical planning, design with socio-economic and cultural dimensions. This has led to the limited outcome of resettlement policy despite the investment in resettlement by the government and other organizations.

Thakle Integrated Settlement, located in Melamchi municipality of Sindhupalchok district was purposefully selected as Sindhupalchok is one of the worst affected districts by the Gorkha earthquake of 2015 and also has the highest number of resettlement sites. Out of the thirty resettlement sites at the different phases of implementation in the district, Melamchi municipality alone has eight Integrated settlements. Various stakeholders such as the Local Government, Users Committee, and also National Reconstruction Authority claim Thakle Integrated Settlement to be a successful resettlement approach. However, there is a need to carry out the assessment of long-term user satisfaction of the resettled households over a period of time to determine the extent of its success. Thus, the study seeks to examine the residential satisfaction of the housing provided in the resettlement site to the displaced community and explore factors influencing housing modifications. Understanding the long-term residential satisfaction is important to policymakers and implementers to better lead resettlement of affected communities in the aftermath of devastating disasters, especially for a disaster-stricken country like Nepal.

2. Understanding Resettlement

2.1 Resettlement

Resettlement refers to planned, assisted, and permanent relocation of the affected population when voluntarily consented by the affected community. Such voluntary participation includes a number of dilemmas related to the choice of location, physical organization of settlement, and understanding of socio-cultural, economic, and everyday life of the affected people, and their participation in the process. Contrary to the popular belief that resettlement would drastically improve the well-being of the affected communities [11], it was found that many resettlement projects do not meet the expectation of the affected people for it largely fails to cater the population's socio-cultural needs, which are the core for the long-term satisfaction of the displaced population [3, 4, 5, 6, 7, 8]. In a similar vein, Sridarran et al. [2] opines that the community's choice to move to a resettlement location is highly influenced by climate adaptability and cultural appropriateness of the houses.

2.2 Residential Satisfaction

Residential Satisfaction (RS) is a measure of the difference between occupant's actual and desired housing. It is also described as a reflection of the degree to which the inhabitants feel that their housing is helping them achieve their goals [12]. Likewise, Danquah et al. [12] explored the expectancy-value model, in which the evaluation process is mostly dependent on people's expectations and beliefs as paired against the ability or the inability of the evaluated object to hinder the attainment of their goals. Churchill and Suprenant [12], explained that expectation has no effect on consumer satisfaction with durable products, but satisfaction is determined solely by the performance of the product. However, the author points out that the non-acceptability of projects and users' dissatisfaction is the most frequent risk under the conditions of post-disaster resettlement. In the long-term, authors [3, 4] have reported on the changes in resident satisfaction since homeowners were required to carry out modification, maintenance, and repair work in the provided housing. With the evidence on modification, rejection, and abandonment of permanent housing provided after disasters, residents' satisfaction is of paramount importance in the success of post-disaster recovery projects [7].

2.2.1 Housing Condition

Housing design is one of the key indicators for the long-term satisfaction of the resettled communities. Various researchers [5, 7, 8] have identified physical condition of housing as one of the major factors affecting Residential Satisfaction, given the long list of attributes. According to Dias et al. [5], a sustainable resettlement program is just not merely a reconstruction of a set of houses, but there is a need to look into the indicators which can convert a house into a home. Likewise, Carrasco et al. [4], pointed out that the resettlement projects do not meet the expectation of the affected people as the implementing agencies simply prioritized the attachment to economic parameters and technical standards over cultural or social concerns of resettled communities. In addition Oo et al. [7], in his study, have examined several dimensions such as level of completion of the house, the material used, size of the house, aesthetic value, size of rooms, the layout of the property, interior noise, visual privacy, housing design, access to utility supply, housing quality, lighting, and ventilation, feeling of home, easy to upkeep, convenience of space, interior design under attribute physical condition of housing.

In a successful example of post-tsunami housing reconstruction in Indonesia, Fanany [7] found that the residents' high level of involvement in the housing design, selection of materials, and in the construction processes is the key factor that helped them to deal with the devastation and loss caused by the tsunami. Likewise, the study carried out by Danquah et al. [12] regarding residential satisfaction in the resettlement sites of Ghana after ten years revealed that irrespective of the fact that the residents were satisfied with utility and infrastructural developments, communities were still unsatisfied with the number and size of the sleeping rooms and the plot size. One of the problems identified by Ozden [13] is an inadequate design of a number of the chimney for wood and coal burnt stoves, despite the construction of gas pipelines. Similarly, Tas et al. [5] identified that residential satisfaction is also determined by the aesthetics of the housing.

According to Dias et al. [5], the community should be consulted in selecting suitable materials for their houses for their housing satisfaction. As explained by them, the resettled communities in Sri Lanka complained that the project implementers used a sophisticated technique rather than simple roofing techniques that were in common practice, and consequently, the people faced difficulty in the repair of the roof. Similarly, Dias et al. [5] also revealed that the households in Sri Lanka were dissatisfied as the houses were built without considering the local climatic condition. Likewise, Oo et al. [7] identified that users abandoned the provided housing due to poor quality work, and technology; and design that were unsuitable for local weather.

Table 1: Factors affecting Residential Satisfaction

Factors identified	Authors
Housing design	[13, 5, 6, 7]
Architecture Style	[5]
Number of rooms	[12, 5]
Building material	[13, 5]
Construction technology	[13, 5, 6, 7]
Thermal Comfort	[13, 5, 7]

2.3 Housing Modification

In their study on User's satisfaction, Onder et al. [14] highlighted that users over a course of time starts to change or create environment that are more flexible and open to change, which is not only affected by physical environmental features, but also by personal, social and cultural expectation and lifestyle of the residents. In addition, Kalra [15] have also identified that such modifications for adaptation have taken place and villagers have initiated changes and additions to personalize physical fabric such as the addition of rooms, outdoor kitchens, upper floors, and compound walls using local materials, skills, and labor. Moreover, Danquah et al. [12] also found that modifications and extensions attempts were made in Ghana after resettlement in response to their dissatisfaction.

3. Methodology

The research was carried out using a mixed-method to examine the residential satisfaction of the resettled communities. The 5 - point Likert scale was used (Value ranging from 1-Strongly Dissatisfied to 5 = Strongly Satisfied) to test the perception of the resettled household of Thakle Integrated Settlement employing Kobo Collect. Using sample determination

calculation developed by Krejcie & Morgan, a total of 30 resettled households were selected considering a 0.05 error margin at 99% confidence level.

$$Sample(n) = \frac{\chi^2 * N * (1-P)}{ME^2(N-1) + ((\chi^2 * P * (1-P))} \quad (1)$$

Where,

n = Required sample size

X = Chi square

N = Population size

ME = Desired Marginal error

Resident Satisfaction Score was calculated and analyzed using IBM SPSS 25 to compare the different residential satisfaction indicators. The result obtained is compared with the resident's response through modifications evident from direct observation or Interviews to validate the findings.

4. Study Area: Thakle Integrated Settlement

Thakle Integrated Settlement is a resettlement site located in Ward 9 of Melamchi municipality of Sindhupalchok district, one of the worst affected districts by the 2015 Gorkha earthquake. Before the earthquake, the houses were mostly two-storied with stone walls that were largely scattered on the hillside. Realizing the need for Integrated settlement, 31 displaced Tamang households were resettled on 12 ropanis of land in Thakle (Figure 1 and 2).The average household size is 5.03, where the majority of the households are involved in agriculture (77.3%), followed by labour (16.7%) and business (10%). Each household received the land of plot sizes varying between 4 – 6 aana of land based on the lottery system. The resettlement was initiated by the affected household with the support of a implementing agency – OXFAM in the overall planning and design presented in Figure 3, along with the supply of building material and construction phase. The community was consulted in the planning and design phase and they also contributed in the form of material and labour in the construction phase.The houses are single-storied with the ground floor consisting of a kitchen/ living room, three bedrooms, and a toilet with single flight stairs leading to the upper attic floor used as storage (Figure 4, 5 and 6). The houses are made up of interlocking blocks with cement mortar and CGI sheets for roofing.

Figure 1: Thakle Integrated Settlement

Figure 2: Thakle Integrated Settlement

Figure 3: Master Plan of Thakle IS

Figure 4: Prototype Housing in Thakle IS

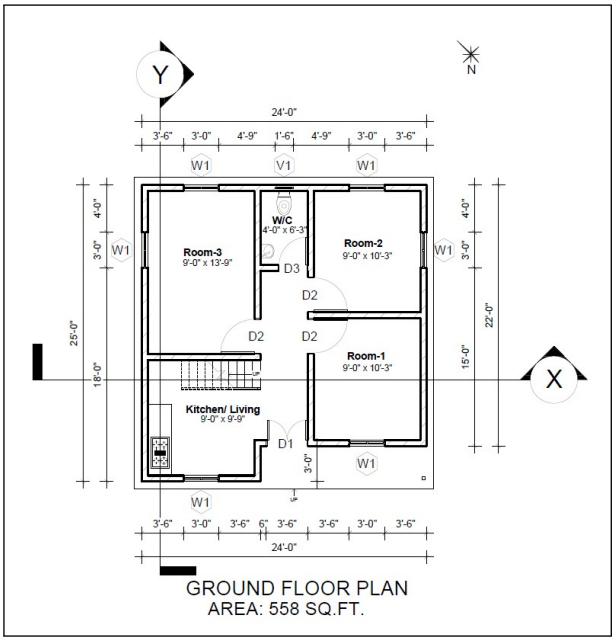

Figure 5: Ground Floor Plan

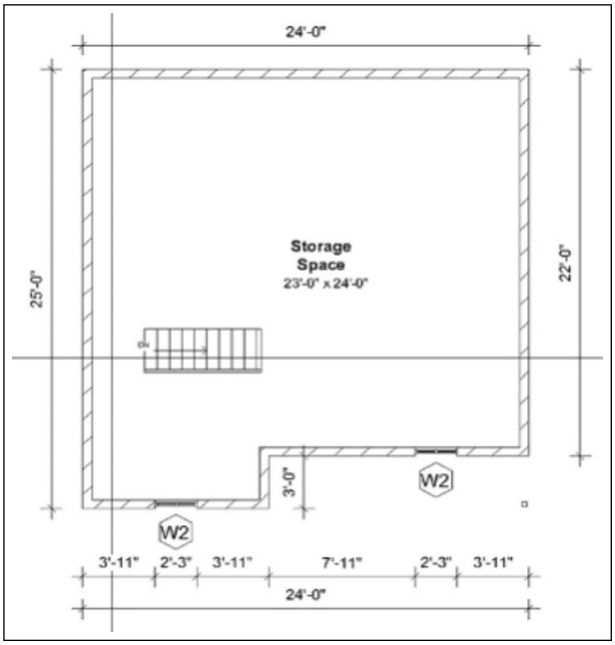

Figure 6: Attic Floor Plan

5. Discussions and Findings

5.1 Housing Satisfaction

Housing Satisfaction was analyzed with seven different indicators pertaining to housing condition – (i) planning and design; (ii) plot size allocated; (iii) number of rooms; (iv) architecture style; (v) building material; (vi) construction quality and technology; and (vii) thermal comfort and was discussed with the modifications made by the household in response to their dissatisfaction. The Residential Satisfaction score presented in Figure 7 highlights that the resettled households are highly satisfied with the planning and design of the house with a satisfaction score of 99. Likewise, the residents also expressed higher satisfaction for construction quality and technology (97), building material (91), plot size (91), and architecture style (90). The high satisfaction score can be attributed to the consultation of the community in the planning and design phase by the implementers. However, the residents expressed medium satisfaction for the number of rooms with a score of 83. Thermal Comfort received a minimum satisfaction score in Thakle Integrated Settlement with a score of only 70.

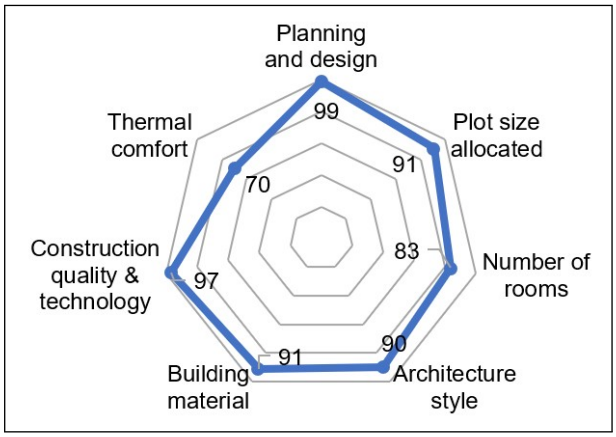

Figure 7: Residential Satisfaction Score

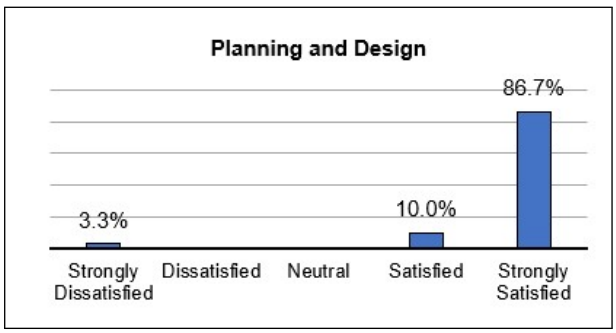

Figure 8: Planning and Design

Figure 8 illustrates that a significant proportion of residents (86.7%) were strongly satisfied with the planning and design while only 3.3% were strongly dissatisfied. The reason for the high satisfaction can be attributed to the consultation of the community in the planning and design phase by the implementing organization as informed by about 70% of the households. Likewise, about 60% of the households were strongly satisfied with the size of the plot allocated to them followed by satisfied (26.7%), neutral (10%), and strongly dissatisfied (3.3%) as presented in Figure 9. The plot sizes are only 4- 6 aana, which is much smaller than the plot size that their houses had before the earthquake. The smaller plot size is unable to meet the social, cultural, and economic needs of a typical rural Tamang community. The housing plot largely lacks space for a kitchen garden, cattle sheds, outdoor cooking space along with an open space for social interaction in the front of the house. The National Reconstruction Authority (NRA) [10] has also reported that the many houses are too small to accommodate the need of the local rural communities.

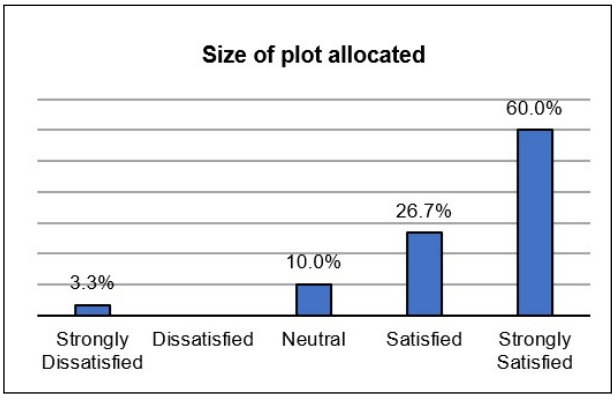

Figure 9: Size of Plot

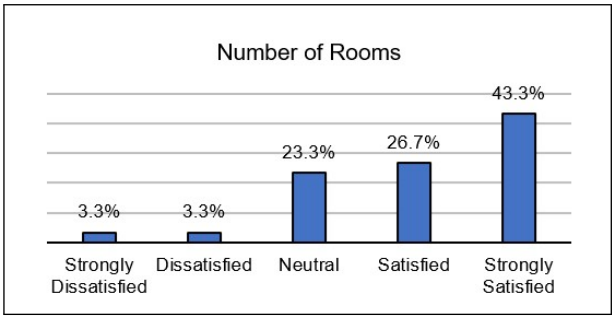

Figure 10: Number of rooms

Figure 11: Interior Space in a house

Figure 12: Attic used as Store

Figure 10 shows that the resettled households are comparatively unsatisfied with the number of rooms provided in their new houses. About 43.3% reported strong satisfaction while 6.6% residents were not satisfied with the number of rooms. Although there are four rooms including a small living cum kitchen, the families are in chaos regarding appropriation of rooms. The interior space organization is completely different than a typical hilly Tamang house that has open ground floor plan and doesn't represent their everyday life. The interior spaces do not meet the socio-cultural needs and lack adequate light and ventilation (Figure 11 and 12). Since the houses are of the same size with the same number of rooms, the house is not fit for the large family size. The "one size fits all" approach fails to meet the variation of family sizes, which is also reported by NRA [10]. Besides, the houses lack space for the storage of grains, which is one of the important spaces for the rural community. The resettled households are satisfied with the building materials of their house as presented in Figure 13. Although implementing agency provided the majority of the material support, the community had contributed in the form of labour and material support. In addition, the bricks used for the construction were locally made by the community and the construction was also supervised by them to ensure the quality of construction material.

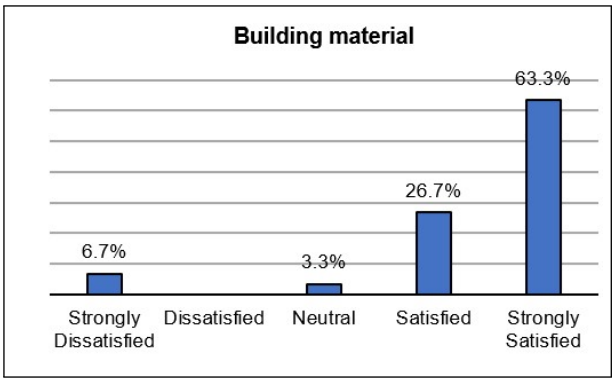

Figure 13: Building material

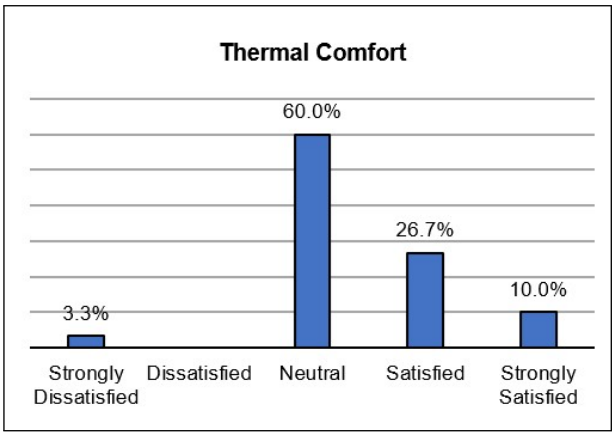

Figure 14: Thermal Comfort

Figure 14 shows that the beneficiaries were less satisfied with the thermal comfort in their new houses as only 10% of residents stated being strongly satisfied. About 60% of the residents were neutral with the thermal comfort provided in their new houses. Most of the surveyed households also complained that thermal comfort was the major problem faced along with other problems such as insufficient water supply, livelihood opportunities, location proximity, access to basic services, etc. As explained by Dias et al. [5], the selection of suitable building materials is a hidden, but crucial indicator for the long-term satisfaction of people since it can directly affect the thermal comfort in the housing. The building envelope of the traditional vernacular houses has climate-responsive features. However, the new houses lack consideration of local materials and technology which largely resulted in the poor thermal performance of the buildings. Also, the CGI roofs make interior space colder in winter and warmer in summer, leading to thermal discomfort. Moreover, improper daylight and ventilation have created damps and smoke-induced health issues.

5.2 Housing Modification

Various stakeholders including Ward Chairperson, National Reconstruction Authority claims that the Integrated Settlement stands successful. As per the Committee Chairperson, people of other locations also come to visit to take it as a model settlement to develop their settlements. However, as explained by [15], the uniform design does not suit the individual household needs and thus households have started modifying their houses in Thakle Integrated Settlement. The modification of houses can be considered as a response to their dissatisfaction with their new housing which fails to meet their physical, social and cultural needs and aspirations. Similar to the findings of Carrasco et al. and Onder et al. [3, 14], due to lack of consideration of the user's need and also true participation in the resettlement process, the modifications can be seen in the interior as well as the exterior of the houses. The community removed the partition walls between the living room and the corridor to increase the size of the small living room to meet their need. Likewise, the attic space was also later added, which was absent in the initial designs by the implementing agency. According to the households, attic was important for the storage of their grains.

Figure 15: Pole for a flag (Tamang culture)

Figure 16: Space between houses used as the kitchen garden

Also, the houses have added a space in the front of each house for placing the flag in their festival Lhoshar as can be seen in Figure 15. Besides, Figure 16 shows that the residents have used the space between the two houses as a kitchen garden and have also added a washing area in the space.

6. Conclusion

The urgency to provide housing after disasters prevents the implementing agencies from perceiving the aspirations of the local people. Rather than focusing on the social and cultural needs of the vulnerable Tamang community, the implementing agency in Thakle Integrated Settlement has also stressed more on the technical construction standards and economic requirements. The study revealed that the residents were highly satisfied with planning and design; construction quality and technology; plot size; building material; and architecture style while they were comparatively less satisfied with the number of rooms; and thermal comfort. The reason for the higher satisfaction can largely be attributed to the community consultation during planning and design, and construction phase. However, lack of climate responsive and socio-culturally inappropriate design was found to be one of the reasons behind the low residential satisfaction. The mismatch between the housing provided and the aspiration of the resettled community resulted in several housing modifications to meet the daily social and cultural needs of the household. Thus, the study concludes that the dissatisfaction of the resettled communities is reflected by the housing modification in the resettlement sites. Understanding the resident's satisfaction based on the indicators is suggestive that planning and design fails to accommodate the real participation of the community.

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