Long-term satisfaction of post disaster resettled communities

The case of post tsunami – Sri Lanka

Nuwan Tharanga Dias, Kaushal Keraminiyage and Kushani Kulasthri DeSilva
Global Disaster Resilience Centre, School of Art, Design and Architecture, University of Huddersfield, Huddersfield, UK

Received 21 November 2015
Revised 31 March 2016
5 July 2016
Accepted 1 August 2016

Abstract

Purpose – After tsunami 2004, it was estimated that more than 98,000 permanent houses had to be rebuilt. However, ten years on, as communities, are they satisfied in their new homes? What are the indicators affecting the long-term satisfaction of resettled communities in relation to their new permanent houses. The purpose of this paper is to qualitatively evaluate the level of long-term satisfaction of two tsunami affected resettled communities in Sri Lanka in a bid to identify the indicators affecting the long-term satisfaction of post disaster resettled communities in relation to permanent housing.

Design/methodology/approach – In addition to the thorough literature review conducted to evaluate the state of the art in the subject area, a series of interviews were conducted with experts and tsunami affected communities in Sri Lanka to gather primary data for this research. The literature review is used to establish the initial list of indicators of long-term satisfaction of resettlements. The expert interviews and the community interviews were used to verify and refine the initially identified indicators.

Findings – A sustainable resettlement programme is just not merely reconstruction of a set of houses. A resettlement programme should re-establish the socio-economic and cultural life of people. Reconstruction of a house does not solve the housing issue; it is vital to look in to the indicators which can convert a house into a home and the surrounding into a neighbourhood.

Originality/value – This paper makes a significant contribution in terms of identifying indicators affecting the long-term community satisfaction with resettlement programmes taking into account economic, social and cultural factors with a special emphasis on post tsunami resettlements in Sri Lanka.

Keywords Success factors, Community satisfaction, Post tsunami, Resettlements

Paper type Research paper

1. Introduction

Sri Lanka was hit by its worst ever disaster and national tragedy caused by natural hazards on 26 December 2004, leading to tremendous destruction and the devastation of human lives and property, as well as severely affecting the environment and economy. As a result, approximately 1,100 km of the 1,583 km coastline of Sri Lanka, including west, south, east and north coasts, about 200-300 m and exceptionally, 1-2 km inland, were affected, depending on the coastal configuration (Domroes, 2006). About

Disaster Prevention and Management
Vol. 25 No. 5, 2016
pp. 581-594
Emerald Group Publishing Limited
0965-3562
DOI 10.1108/DPM-11-2015-0264

one million people became homeless with more than 35,000 lives lost. Due to the tsunami of 2004, most of the infrastructure on the coastline was damaged including houses, roads, railway lines, telecommunication networks, water and electricity supplies, schools and hospitals (Domroes, 2006).

It had been identified that more than 98,000 permanent houses needed to be rebuilt (Reconstruction and Development Agency, 2006). As elaborated by the Reconstruction and Development Agency (2006), rehabilitation took place in three different phases. The first phase was emergency shelters that were provided immediately after the catastrophe in the form of tents, mass quarters in school buildings, temples and churches with basic supplies of food, water and sanitation. The second phase was the provision of temporary wooden houses, with corrugated or thatched roofs and two to three unfinished rooms without a kitchen and private sanitary facilities but with common water and sanitary supplies. The third phase was ensuring the livelihoods for tsunami survivors with permanent housing consisting of solid houses equipped with adequate facilities for "normal" life. The standard size of the new permanent houses was between 46 and 51 square metres, with three small rooms and an attached kitchen, toilet facilities and verandah. All these houses were standardised, low-cost houses with a construction fee of initially around Rs250,000 (USD2,500), rising in the course of the first year to Rs350,000 and Rs400,000 (USD3,000).

Despite the fact that the rebuilding of new, permanent housing structures was completed successfully after the tsunami disaster, the key issue is whether the community is satisfied with the resettlement programmes and whether they will actually inhabit the houses in the long term. These issues establish a research question to be investigated on the indicators which affect the long-term satisfaction of permanent housing structures in post disaster resettlements. Accordingly, this paper examines post disaster housing construction in the context of Sri Lanka, relating to permanent tsunami housing reconstruction with special reference to two case studies in Ambalangoda and Kalutara, Sri Lanka.

2. Literature review

2.1 The importance of community satisfaction in resettlement programmes

Perera *et al.* (2013) stated that post tsunami housing in Sri Lanka was designed considering the physical structures only rather than addressing the emotional and psychological requirements of the disaster affected communities. As they have further stated, it is important to provide the feel of "home" in post disaster reconstruction in order to ensure community satisfaction. Similarly, Kennedy *et al.* (2008) have specified that satisfaction of the local community in resettlement programmes is vital in order to ensure the long-term sustainability and usage of the housing resettlement programmes. As per the view point of Davidson *et al.* (2007), community satisfaction is important in post disaster resettlements in order to obtain the long-term involvement of the communities in rebuilding their socio-economic lives. According to the argument of Ophiyandri (2011), community-based resettlement programmes create community satisfaction and community satisfaction leads to a sense of ownership which is beneficial in creating disaster resilient communities.

These arguments inform us that the satisfaction of the communities in resettled houses is extremely important in order to ensure the sustainability and the success of post disaster housing reconstruction projects. However, the material question is: what makes people happy and satisfied and what are the indicators which actually make

people happy and satisfied in the long term in permanent housing resettlements? The following section synthesises the literature on the indicators for community satisfaction in post disaster permanent housing provision.

2.2 Indicators in creating community satisfaction in permanent housing reconstruction

Kennedy *et al.* (2008) argue that post disaster reconstruction should "build back better" in terms of safety, security and livelihoods. Accordingly, in order to ensure safety, security and livelihoods, post disaster housing reconstruction should ensure the integration of five interwoven topics. As they explain, materials used in post disaster housing provision are extremely important in order to ensure community satisfaction. Furthermore, it is explained that maintaining the relevant housing standards in housing construction, as well as the engagement of the communities, are the other most important indicator to ensure long-term community satisfaction. In addition, beneficiaries have stated that the type of houses (design) as well as the provision of grants are other important indicators to ensure community satisfaction.

Perera *et al.* (2013) have conducted an evaluation that compares the post disaster tsunami resettlements in Sri Lanka with the resettlement of communities due to the southern harbour development. The difference between the two community resettlements was that in the tsunami resettlements, the people were already displaced and were living in temporary houses such as in camps, but in the case of the southern harbour development, people were not displaced and they were just being relocated due to land acquisition. This comparative evaluation has identified many indicators in the long-term satisfaction of people in relation to housing provision.

Accordingly, it was revealed that one of the indicators for long-term satisfaction of people is the opportunity given to the community to design their own houses by themselves, where they are provided with financial compensation, allowing them to design their housing according to their requirements. Takesada *et al.* (2008) have found that one of the indicators in long-term satisfaction is the transfer of responsibilities to the people, rather than keeping them in the hands of project implementing agencies. This is more or less similar to the findings of Perera *et al.* (2013). Perera *et al.* (2013) further found that basic amenities and facilities, such as electricity, should be provided at the same time as people are resettled. Furthermore, the study has indicated that the selection of an appropriate site for the settlement is the most crucially important factor contributing to success.

Another key factor for long-term satisfaction is the provision of deeds to the community as soon as the legal transfer process is completed. Even though people are provided with the legal documents regarding the resettlement, they are not satisfied until the deeds are transferred to their name. They have further revealed that community engagement in site selection and design is crucial in order to ensure long-term satisfaction. Perera *et al.* (2013) have stated that provision of financial assistance, such as micro loans, is also an indicator of long-term satisfaction. This allows the community to rebuild their livelihoods or even to adopt new livelihoods. On the other hand, they have explained that the provision of facilities such as temples, mosques and churches in close proximity is another crucial factor for long-term sustainability. As they have explained, non-allocation of enough spaces and land plots for other socio-economic infrastructure is a key problem in post disaster housing provision. Adding to the findings of Kennedy *et al.* (2008), Johnson *et al.* (2006) have specified that including the community in the post disaster

reconstruction process is vital in order to ensure the satisfaction of the community. Therefore, the need for developing community capacities in post disaster reconstruction is also highlighted.

Davidson *et al.* (2007) categorised the level of community participation in post disaster housing reconstruction into five aspects: the level to which the community can manipulate, inform, consult, collaborate and empower, where in the last category, the community has more power to control the reconstruction project. Davidson *et al.* (2007) indicated that, if the community is empowered, they are happy and satisfied regarding housing and resettlement.

Similarly, Karunasena and Rameezdeen (2010) introduced an argument that owner-driven housing reconstruction projects are more successful than donor-driven housing reconstruction. As they have explained, the Government of Sri Lanka has been using mainly two approaches in housing reconstruction namely: the donor-driven approach and the owner-driven approach (cash-based approach). In the donor-driven approach, housing reconstruction is entirely handled by the donor agency from inception to handing over of housing units to the recipients. The owner-driven approach enables communities to undertake building work themselves with external financial and technical assistance. According to their analysis, communities who received houses from the owner-driven approach show a higher satisfaction score compared to the donor-driven approach, except for one parameter, namely: functionality. Parameters such as functionality and aesthetics have scored comparatively higher ratings for the donor-driven approach. However, for all the other parameters, such as durability of houses, space availability, incorporation of beneficiary requirements at the design stage, flexibility to make changes in future, location of the house, size of land, etc., the owner-driven approach has become more successful among communities. These findings further justify the assertions of Perera *et al.* (2013).

All of this literature points to the need for community engagement and for allowing the community to design for themselves, as well as ensuring the establishment of socio-economic infrastructure parallel to the housing construction. Steinberg (2007) noted that the long-term satisfaction of people in housing resettlements is associated with community empowerment. As he has found, to re-establish the communities and their lives, community participation plays an indispensable and useful role. Housing reconstruction, empowered by the community, will enhance community satisfaction as well as increasing the resilience of communities to face future disasters.

In addition to the role of the community in post disaster housing reconstruction, Steinberg (2007) has found several other indicators that affect the long-term satisfaction of people in housing resettlements. As he has stated, one of the key indicators is the clearance of the land and property ownership as soon as the people are relocated. He has referred to this in the context of housing resettlements in Aceh and Nias, Indonesia. As described above, Perera *et al.* (2013) have identified the same indicator in the context of housing resettlements in Sri Lanka.

In addition, Steinberg (2007) found that livelihood restoration was another indicator for the long-term satisfaction of the resettled communities. This factor has been identified by many researchers as described above. Similar to the findings of Kennedy *et al.* (2008), Steinberg (2007) has discovered that the selection of proper locations for housing, as well as the housing design, are other indicators for long-term satisfaction of resettled communities. In addition to the findings of Kennedy *et al.* (2008), Steinberg (2007) has discovered that the materials used for housing reconstruction also plays a key role in creating long-term satisfaction. As he has

discovered, it is necessary to seek the community's ideas in selecting suitable materials for their houses. However, on the other hand, he has specified that it is extremely important to consider the resilience of the materials in order to face any potential future disasters.

The findings of Steinberg (2007) reveal another extremely important, but often ignored, indicator for the long-term satisfaction of people. As he has discovered, it is important to plan and design a village rather than just constructing sets of houses. As he has specified, the resettled area should provide a socio-economic infrastructure along with the feeling of being a "neighbourhood". The villagers should have the feeling that they are living in their own village rather than living in a desert. Ruwanpura (2009) has discovered similar findings to Steinberg (2007) and has stated "putting houses in place" should be embedded within local social relations. This indicates that the relevant authorities cannot just relocate people to any new area. The relevant authorities should have a mechanism to identify the social relations and interactions in the previous settlement and they should be at least capable of locating the new houses in order that they can still maintain social relationships. The idea introduced by Steinberg (2007) and Ruwanpura (2009) can be seen as the concept of maintaining the features of the former neighbourhood in the new resettlement. These findings are extremely important as these indicators are often ignored in post disaster housing resettlements.

Buckle and Marsh (2002) noted that agencies and aid workers must recognise that the unique infrastructure of villages and towns represents centuries of complex social, spatial and architectural thought. Such places represent a cultural treasure that cannot be replaced with simple reconstruction of new homes and buildings. Culturally appropriate redevelopment that is rooted in local traditions is essential because these projects enable people to maintain and extend inhabitation patterns, uniting new communities with the unique history from which they have grown. Such efforts also provide unique opportunities to redress social or historical inequities and promote cultural transformation. Accepting the above argument and further supporting it, Shaw and Pardasani (2006) stated that, after a disaster, the social capital is destroyed and that social capital should be restored in the post disaster reconstruction. As the authors have stated, based on the World Bank Group (2005a, b) reports, social capital is the glue which holds together the interconnection among the community members. Accordingly, the other authors state that the social capital of the community should be rebuilt in order to ensure the long-term satisfaction of people. These findings are also extremely important as these intangible social facts are often ignored in housing reconstruction and as a result, in the long term, the resettled people are not satisfied.

Tas *et al.* (2007) have categorised the long-term satisfaction of people in permanent housing reconstruction into three broad categories and under each category, they have explained the indicators for long-term satisfaction. The three broader categories for permanent satisfaction of people in housing resettlements are: residential satisfaction, satisfaction with social conditions and satisfaction with physical and natural conditions. As they have explained, all these broader categories are the key to ensure long-term satisfaction of people in permanent housing reconstruction. It was found that residential satisfaction is determined by the conditions of pavements, width of streets, safety perceptions, residence aesthetics and aesthetics of the housing. The sub-indicators under the social conditions are easement of access to the city centre, educational buildings, religious buildings, sanitary buildings and public

transportation. The physical and natural conditions for housing satisfaction are the order of buildings in relation to the vicinity (creation of neighbourhood), green areas, the relationship between buildings and nature, walking paths, urban furniture, appearance of the buildings, garden organisation, parking lots, environmental cleanliness, landscape, street lighting, noise levels and drinking water. The findings of Tas *et al.* (2007) are comprehensive and they have confirmed many indicators which were found during the literature review.

Throughout this literature review, key indicators that affect the long-term satisfaction of communities in post disaster housing resettlements were identified. As seen from the literature review, one of the main indicators is empowering communities in post disaster housing reconstruction which allows them to work with the funding bodies in order to design their own houses. Many other socio-economic indicators were also identified as explained in the above sections. Accordingly, based on the literature review, the research team has categorised the identified indicators (Table I) which specifies the findings of different authors and researchers which led to the identification of the indicators. Thereafter, the research team synthesised the literature findings (Figure 1) which describes the indicators as a summary for the long-term satisfaction of the resettled communities in permanent houses.

Having developed this conceptual framework, the research team has conducted a comprehensive field survey with the resettled communities as well as with the experts in order to verify and further expand the indicators which affect the long-term housing resettlements of post tsunami Sri Lanka. However, the existing findings were not revealed to the participants in the data collection, allowing the participants to freely express their ideas. Thereafter, the research team conducted the analysis in order to triangulate the literature review with the analysis findings.

3. Methodology

The main purpose of this research has been to establish the indicators affecting long-term satisfaction of communities in the context of post disaster permanent housing. As the nature of the research problem demands in-depth evaluation of indicators affecting the long-term satisfaction of post-disaster resettlements, in-depth, semi structured interviews were used as the main data collection technique. As part of the research approach, two cases related to post tsunami permanent housing projects were studied in Sri Lanka, with a view to understanding the indicators which contribute to the long-term (ten years on) satisfaction (or lack of it) in the resettled communities. A multi-storied apartment complex, constructed to house about 150 tsunami affected families, which is located about 200 m away from the shore, in the Kalutara area, was selected as the first case. The tsunami affected community re-housed within this multi-storied apartment complex was predominantly a fishing community, who used to live very close to the shore in illegal, temporary dwellings. The second case is based on a housing complex located in Galle, comprising 204 semi-detached houses to accommodate another tsunami affected community. This is a more diverse community in terms of their livelihoods and their pre-tsunami housing.

In both the cases, the data collection was done in two phases. First phase interviews were conducted with officers from government and non-government organisations to understand the process related to the identification and involvement of various stakeholders (including the beneficiaries, if applicable) and any strategies adopted to ensure long-term satisfaction of the communities who were resettled. In total,

Success factor	Findings of different authors led to identify success factors
1. Maintenance of housing standards	Maintaining the relevant housing standards in housing construction is an important factor to ensure long-term community satisfaction (Kennedy *et al.*, 2008)
2. Housing design	Allowing the community to design their houses by themselves is a factor for long-term satisfaction (Perera *et al.*, 2013) Transfer the responsibility to the people in housing reconstruction (Takesada *et al.*, 2008) Owner-driven approach shows a higher satisfaction score compared to donor-driven approach (Karunasena and Rameezdeen, 2010) Housing design is a key factor for long-term satisfaction (Steinberg, 2007) Residential satisfaction is determined by the sub-conditions of pavements, width of streets, safety perception, residence aesthetics and aesthetics of the housing (Tas *et al.*, 2007)
3. Provision of basic facilities at the same time people are resettled	Basic amenities and facilities such as electricity should be provided at the same time people are resettled (Perera *et al.*, 2013)
4. Location of the relocation site	Location of the house has scored a higher score (Karunasena and Rameezdeen, 2010) Selection of a proper location for the house is a key factor (Steinberg, 2007)
5. Proper legal transfer	They are not satisfied until the deeds are transferred to their name (Perera *et al.*, 2013) One of the key success factors is the clearance of the land and property ownership as soon as the people are relocated (Steinberg, 2007)
6. Rehabilitation of livelihoods	Post-disaster reconstruction should "build back better" in terms of safety, security and livelihoods (Kennedy *et al.*, 2008) Provision of financial assistance such as micro loans is also a success factor to ensure the long-term satisfaction. This allows the community to rebuild their livelihood or even to adapt to a new livelihood (Perera *et al.*, 2013) Livelihood reconstruction as another success factor for the long-term satisfaction of the resettled communities' (Steinberg, 2007)
7. Provision of social infrastructure	Provision of facilities such as temples, mosques, churches in the close proximity is another crucial factor for long-term satisfaction (Perera *et al.*, 2013) Provision of social infrastructure is long-term success factor (Steinberg, 2007)
8. Materials used for housing	Materials used in the post-disaster housing provision are extremely important in order to ensure the community satisfaction (Kennedy *et al.*, 2008) Materials used for the housing reconstruction play a key role in creating long-term satisfaction (Steinberg, 2007)
9. Re-creation of the neighbourhood	It is important to plan and design a village rather than just constructing set of houses, should provide neighbourhood feeling for the people (Steinberg, 2007) Relevant authorities should have a mechanism to identify the social relations and interactions in the previous settlement (Ruwanpura, 2009)
10. Restoration of culture and cultural heritage	Must recognise the unique infrastructure of villages and towns represent centuries of complex social, spatial and architectural thought. Cultural treasures cannot be replaced with simple reconstruction of new homes and buildings (Buckle and Marsh, 2002) Social capital should be restored in the post-disaster reconstruction (Shaw and Pardasani, 2006)

(*continued*)

Table I.
Literature based indicators

Success factor	Findings of different authors led to identify success factors
11. Empowerment of the community	Engagement of the communities is one of the most important factors to ensure long-term community satisfaction Allowing the community to design their houses by themselves (Perera *et al.*, 2013) Transfer the responsibility to the people in housing reconstruction (Takesada *et al.*, 2008) Incorporating community within the post-disaster reconstruction process is vital in order to ensure the satisfaction of the community (Johnson *et al.*, 2006) Community can manipulate, inform, consult, collaborate and empower, where in the last category the community have more power to control the reconstruction project (Davidson *et al.*, 2007) Owner-driven projects are more successful than donor-driven projects (Karunasena and Rameezdeen, 2010) Long-term satisfaction of people in housing resettlements is associated with the community empowerment (Steinberg, 2007)

Table I.

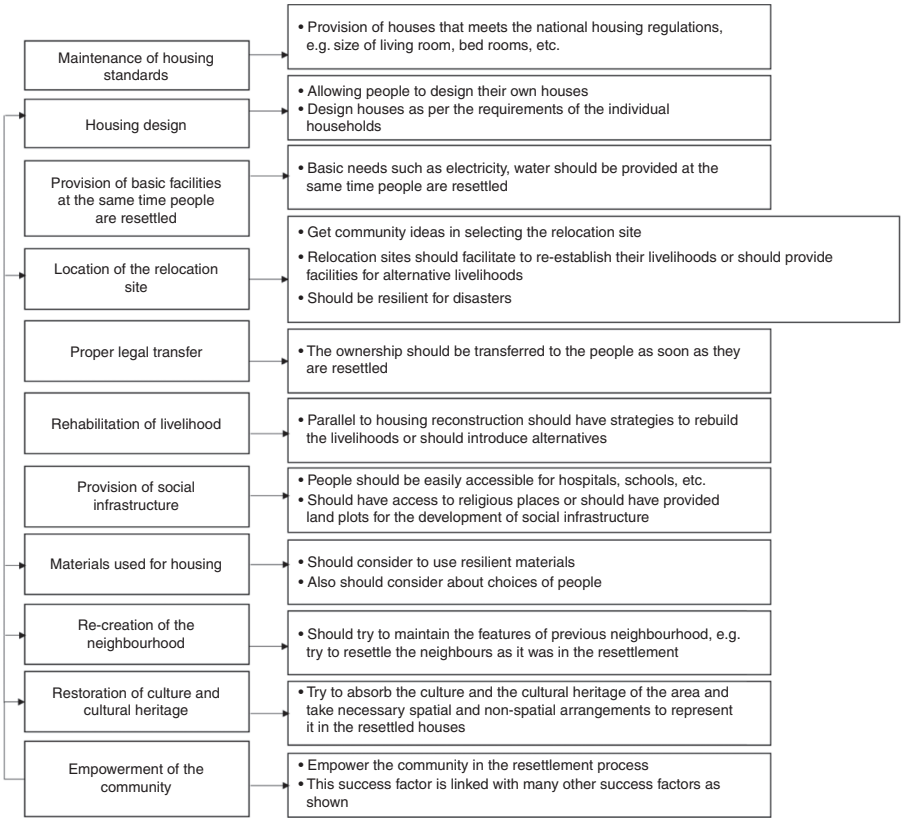

Figure 1.
Summary of the findings from the literature synthesis for long-term satisfaction of resettled communities in permanent houses

six in-depth interviews were conducted in this phase and the interviewees were selected based on a selective sampling approach, predominantly using the snowballing technique.

In the second phase of data collection, community members from the two cases were interviewed. In total, ten in-depth interviews were conducted in this phase and the interviewees were carefully selected from the communities, to represent different viewpoints. In both the cases, informal community leaders could be identified and they were interviewed to start with. Subsequently, the rest of the interviewees (identified through recommendation and through the snowballing technique) were better placed to answer the questions about different aspects of their long-term satisfaction.

Qualitative data collected through in-depth interviews was then analysed through a pattern matching and content analysis technique and triangulated with the secondary data identified through the literature review, to identify the indicators for long-term satisfaction of post-disaster permanent housing.

4. Analysis and findings

The analysis revealed many indicators which affect the satisfaction of people in permanent housing reconstruction. Some of the literature findings were repeatedly identified from the data analysis which confirmed the accuracy of the research findings. As described in the methodology, the findings are developed from the community perspective as well as from the expert perspective. The following sub-sections discuss each and every indicator that was identified from the analysis.

4.1 Site selection for the housing resettlements

Selecting the correct location for the housing relocation is one of the basic but key indicators which should be considered to ensure the long-term satisfaction of people. Selecting suitable locations for the displaced communities is linked with rebuilding the livelihoods of people. As the community revealed, if the selected site does not facilitate the continuation of their livelihood, the location should have potential to provide new livelihoods for the people in affected communities. The site selection is not only a crucial factor in relation to livelihood development, but the site selection is also related to the accessibility of people to other aspects of social infrastructure such as schools, hospitals, etc. The community in the resettled houses has faced many difficulties in the continuation of their day-to-day activities since they have been relocated miles away from the places they originally were. As a result, the resettled community is not satisfied with the housing resettlement.

4.2 Spaces for social gathering and social functions

As the analysis revealed, another indicator for long-term community satisfaction is the creation of spaces for social gatherings and functions. As informed by community members, the apartment blocks constructed for people do not have any kind of social gathering place. As a result, people who live on upper floors have faced difficulties such as dealing with a funeral function in their own houses, since no elevator or public space were provided on the ground floor. The residents had to carry the coffins by themselves to the upper floors. This is a very sensitive situation where the people have already lost their loved one and damage to the dead body is regarded as disrespectful to the relatives who recently left them. These issues are sensitive matters in post-disaster housing resettlements and have a strong effect on the satisfaction of the people. In

addition, the community members have stated that they do not have a small playground or a park to let their kids play in and enjoy.

The important finding here is that some community members are keen to go back to their old houses which were originally constructed by using temporary materials and were constructed illegally on the coastline. Even though people have received far better houses than they had before, they are not happy as there is no freedom in these houses due to the non-availability of social gathering places. They have revealed that when they were living along the coastline they were able to use the coast as their social gathering place as well as the place for their kids to play. This finding indicates that the provision of better housing structures with permanent materials is not always helpful for the long-term satisfaction of people. In fact, "better housing structures and designs" have a strong influence on creating long-term satisfaction but merely providing permanent houses with resilient materials does not create long-term satisfaction.

4.3 Socio-economic rehabilitation of the affected persons

Socio-economic rehabilitation of the affected persons is another indicator that affects the long-term satisfaction of people in housing resettlements. This indicator relates to the establishment of the livelihood of the people and training the work force. In fact, this factor is also linked with the indicator: "Site selection for the housing resettlements". However, this indicator reveals more sensitive information on livelihood development and training than the indicator: "Site selection for the housing resettlements". As revealed by the community, there was no support from the relevant authorities to re-establish their livelihoods or even to train the affected people for alternative livelihoods. Women and young people in particular were not supported with counselling on various aspects of employment such as alternative livelihoods, wages, working hours, diverse working conditions/environment and expectations that would have enhanced the family income with improved economic status. As it was identified, the relevant authorities had concentrated on provision of houses rather than re-establishing or considering the socio-economic lives of the community. As a result, ten years after the tsunami, people are not satisfied with their housing resettlements as they have not been able to rebuild their socio-economic lives.

On the other hand, in re-establishing their socio-economic lives, the planners and designers should have comparative evaluation criteria in order to ensure that all people in the community get an opportunity to re-establish their livelihoods and if not, provide training for them on alternative livelihoods. For example, the fishing community received adequate fishing equipment to re-establish their livelihoods but the people who owned small shops and engaged with tourism-related services were disadvantaged in tsunami resettlement in terms of livelihood recovery. Even though they were provided with houses in interior locations, such places did not have tourism prospects. Therefore, communities are dissatisfied with settlements that did not support their livelihoods.

4.4 Empowerment of the community and community participation

Empowerment of the community can be included under many indicators. However, one of the key findings of this study is the need for empowering the community by designing their own houses. As revealed from the analysis, the resettled community did not have any choice in selecting appropriate housing designs for themselves. They had to accept whatever housing types were provided by the funding bodies. The analysis

showed that many community members are not satisfied about this as some of the house designs do not really suit their requirements. Some community members have stated that they used their houses for self-employment activities and the new housing designs do not really help them to continue with those activities. Accordingly, the community members have stated that they would have been happy and satisfied if the relevant authorities had asked them about their preferred housing styles. The community specifically mentioned that they should be allowed to select suitable housing designs for themselves. This was repeatedly identified in the literature review and therefore it can be noted that this is one of the key indicators which should be considered in constructing permanent housing.

4.5 Selection of suitable building materials and use of common construction techniques

Selection of suitable building materials is a hidden, but crucial, indicator for the long-term satisfaction of people in post disaster housing reconstruction. The communities in the resettled houses have stated that the project implementers have used iron materials for roofs and windows which are not sustainable in the long term due to coastal corrosion. Parts of roofs and windows have already started to decay and as a result, many houses are affected by massive water leaks during the rainy period. In addition to that, the windows are not functional due to coastal corrosion and therefore people suffer from ventilation issues. The other key issue associated with this is the repair of these roofs. The roofing technique used was not common as the project implementer used a sophisticated technique rather than simple roofing techniques and consequently, the resettled people cannot fix the issue even by hiring an available roofer in the neighbourhood. Due to this situation, people are not satisfied as they are facing continuous problems and issues in addition to the psychological trauma that they have already been through. However, this indicator is linked with the previous indicator (Section 4.4) as empowerment of the community in housing designs is a better way to identify the local climatic conditions and other issues.

4.6 Maintenance and management

This indicator can be described as one that directly affects the satisfaction of people in the long term. As revealed from the analysis, people have many maintenance issues in their newly resettled houses. One of the examples is the issues associated with the roofs. Another important issue is the blockage of the drainage system. The communities living in these settlements are mainly fishermen or they engage in many informal employment activities. Their ability to bear maintenance costs has become a significant issue. Most of them lived in unauthorised settlements and used simple techniques to manage their maintenance issues but since they are now living in purposely designed housing schemes or in apartments, they cannot use those simple techniques to manage their maintenance issues. For example, one family specified that they have an issue with the drainage system and therefore the rain water does not flow out from their house. Since it is a housing scheme, they cannot create a simple drainage system by themselves as then it might block the water flow of other neighbouring houses. They cannot afford to hire a plumber to fix the issue in a proper way. Since the project implementers have already left the area, the people do not have the authority to report their maintenance issues and the local government bodies are passing the responsibility to others. Therefore, in the long

term, people are not satisfied and are facing many problems and issues. Accordingly, the analysis points to the need for a proper management authority to address the maintenance issues.

4.7 Preparedness for disasters and awareness

Apart from all other indicators in housing redevelopment and socio-economic re-establishment, "Preparedness for disasters and awareness" has been another key indicator for the long-term satisfaction of migratory people. On the one hand, the disaster risk is not over, even though there are many methods applied. On the other hand, since people have already had a devastating experience, they expect to take precautions to avoid such kinds of disaster risks. Therefore, if the community is not properly trained to prepare for future disasters, they are not satisfied with their new living environment. As the community and the experts revealed, people are now quite ready to face a devastating experience such as a tsunami as they are now aware of the evacuation procedures. Some experts say that there should be continuous training and awareness programmes for the people who live in disaster prone areas and they have emphasised that the academic community and the governmental and international agencies should continually work with people. As described earlier, when they are aware of the future disaster risks, they feel more comfortable and safe to live in their new housing settlements.

4.8 Findings from the data analysis

Throughout the analysis and findings section, seven indicators were reviewed that affect the satisfaction of people in permanent housing resettlements. As described in the discussion, many of these indicators are connected and reinforce each other, contributing to the satisfaction of people in permanent housing reconstruction. Based on these findings, the research team has developed a summary which is based on the data analysis (Figure 2). The data-based summary will be critically evaluated with the literature-based summary in order to produce a triangulated and verified set of indicators for long-term satisfaction of post-disaster resettled communities.

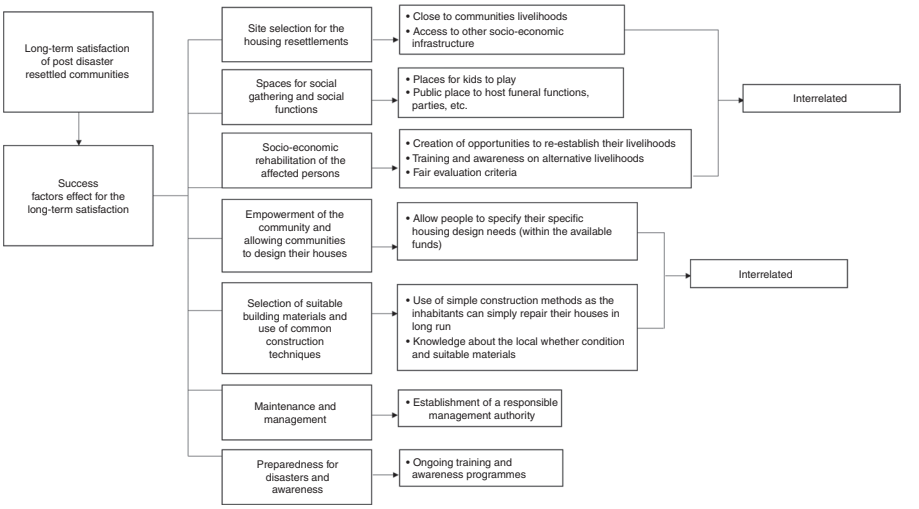

Figure 2.
Summary of findings of data analysis

4.9 The way forward – triangulated findings on indicators for long-term satisfaction of post-disaster resettled communities

This section of the paper presents the final set of indicators, merging the "literature-based findings" and the empirical "data-based findings". Accordingly, these triangulated findings inform the indicators for the long-term satisfaction of the resettled communities in permanent houses and the sub-indicators which affect each main indicator (Figure 3).

5. Conclusions

The housing resettlement strategy should use a "systems approach" which integrates the socio-economic and environmental functions with the housing development. Therefore, identifying housing resettlement as a master planning exercise would ensure that these different aspects are integrated, rather than merely providing permanent houses to people and then deciding about the provision of other facilities. In addition, the project implementers should use a community-based approach in order to provide "homes" for people and not just "houses" which contain resilient materials. Finally, the most important measure would be the establishment of an authority which manages the maintenance of these settlements. If not, in the long term, people will not be satisfied as they cannot maintain the property due to lack of finance, knowledge, technology, etc. As a whole, it can be noted that people in the resettled communities in this study are not satisfied in the long term due to many physical, social and economic factors.

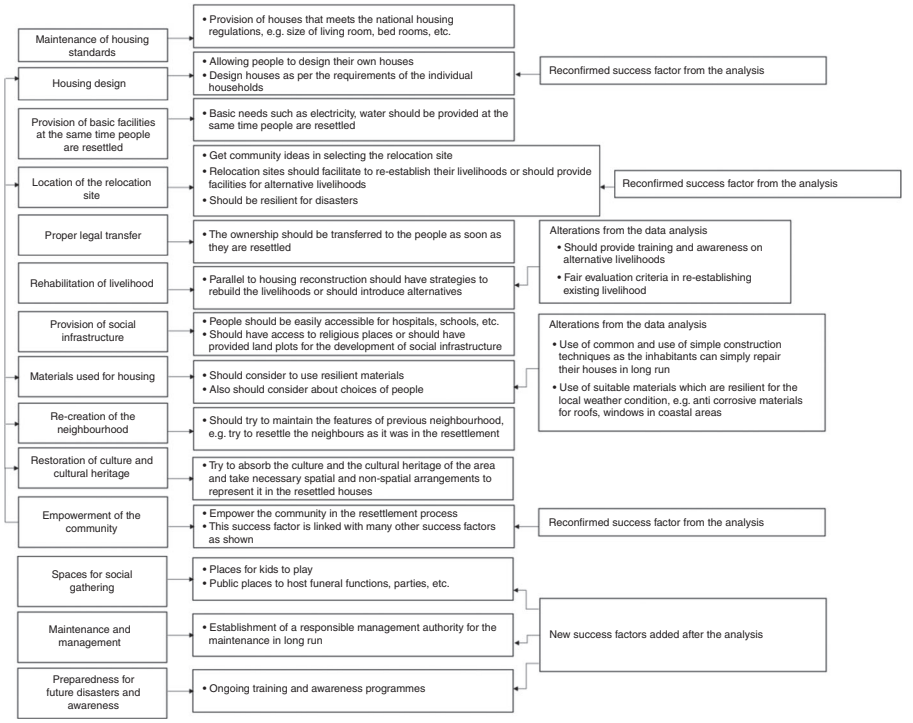

Figure 3.
Triangulated findings for long-term satisfaction of resettled communities in permanent houses

References

Buckle, P. and Marsh, G. (2002), *Local Assessment of Disaster Vulnerability and Resilience: Reframing Risk*, International Sociological Association (ISA), Brisbane.

Davidson, C.H., Johnson, C., Lizarralde, G., Dikmen, N. and Sliwinski, A. (2007), "Truths and myths about community participation in post-disaster housing projects", *Habitat International*, Vol. 31 No. 1, pp. 100-115.

Domroes, M. (2006), *After the Tsunami: Relief and Rehabilitation in Sri Lanka, Re-Starting Towards the Future*, Mosaic Books.

Johnson, C., Lizarralde, G. and Davidson, C.H. (2006), "A systems view of temporary housing projects in post-disaster reconstruction", *Construction Management and Economics*, Vol. 24 No. 4, pp. 367-378.

Karunasena, G. and Rameezdeen, R. (2010), "Post-disaster housing reconstruction: comparative study of donor vs owner-driven approaches", *International Journal of Disaster Resilience in the Built Environment*, Vol. 1 No. 2, pp. 173-191.

Kennedy, J., Ashmore, J., Babister, E. and Kelman, I. (2008), "The meaning of 'build back better': evidence from post-tsunami Aceh and Sri Lanka", *Journal of Contingencies and Crisis Management*, Vol. 16 No. 1, pp. 24-36.

Ophiyandri, T. (2011), "Community-based post-disaster housing reconstruction: examples from Indonesia", in Amarathunga, D. and Haigh, R. (Eds), *Post-Disaster Reconstruction of the Built Environment: Rebuilding for Resilience*, available at: http://onlinelibrary.wiley.com/book/10.1002/9781444344943

Perera, T., Weerasoori, I. and Karunarathne, H. (2013), "An evaluation of success and failures in Hambantota, Siribopura resettlement housing program: lessons learned", *Sri Lanka Journal of Real Estate*, No. 6, pp. 1-15.

Reconstruction and Development Agency (2006), *Post Tsunami Recovery and Reconstruction*, Reconstruction and Development Agency, Colombo.

Ruwanpura, K.N. (2009), "Putting houses in place: rebuilding communities in post-tsunami Sri Lanka", *Disasters*, Vol. 33 No. 3, pp. 436-456.

Shaw, R. and Pardasani, M. (2006), "Tsunami reconstruction and redevelopment in the Maldives: a case study of community participation and social action", *Disaster Prevention and Management: An International Journal*, Vol. 15 No. 1, pp. 79-91.

Steinberg, F. (2007), "Housing reconstruction and rehabilitation in Aceh and Nias, Indonesia – rebuilding lives", *Habitat International*, Vol. 31 No. 1, pp. 150-166.

Takesada, N., Manatunge, J. and Herath, I.L. (2008), "Resettler choices and long-term consequences of involuntary resettlement caused by construction of Kotmale Dam in Sri Lanka", *Lakes & Reservoirs: Research & Management*, Vol. 13 No. 3, pp. 245-254.

Tas, N., Cosgun, N. and Tas, M. (2007), "A qualitative evaluation of the after earthquake permanent housings in Turkey in terms of user satisfaction – Kocaeli, Gundogdu Permanent Housing model", *Building and Environment*, Vol. 42 No. 9, pp. 3418-3431.

World Bank Group (2005a), *World Bank President Urges Tsunami Reconstruction be Driven by the Affected Communities*, Washington, DC, January 12.

World Bank Group (2005b), *Maldives: World Bank Supports Tsunami Relief Efforts*, Washington, DC, March 17.

Corresponding author
Nuwan Tharanga Dias can be contacted at: nuwantcp@gmail.com