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Community level indicators of long term disaster recovery

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Abstract

The experience of individuals, families and communities affected by a major disaster is indicative of the nature of the diverse effects of the disaster and how various interventions, both state and non-state, help or do not help affected communities to recover from the adverse effects of the disaster. An important step in understanding disaster recovery is to define and measure it. However, no such wide-ranging, inclusive and well accepted method of measuring recovery at the community scale currently exists. This paper reports on field work carried out as part of a longer-term study aimed at developing a more integrated, holistic assessment of the disaster recovery process. Using qualitative data from a sample of communities in Sri Lanka affected by the 2004 Indian Ocean Tsunami, the study refines and validates a multidimensional assessment framework for monitoring and evaluating recovery processes after a disaster. An earlier study focused on ten communities in Galle, Batticaloa and Ampara districts. This study adopts the same multidimensional assessment framework and indicators, but focuses on ten different communities across Matara, Batticaloa and Trincomalee districts. After examining the recovery process in a significant number of communities over a long period of time, and across twenty communities during two major field studies, the results suggest that the assessment framework has captured the ten most important dimensions of recovery. Since post disaster recovery usually involves a process of resettlement of affected families and individuals, more attention needs to be paid to more vulnerable groups such as children and women, as well important aspects of well-being such as livelihoods, housing, social infrastructure and long-term maintenance of infrastructure. The framework indicators capture these aspects but also the determinants of the nature and level of recovery, indicating the possible precautionary measures to avoid significant shortfalls in recovery in the long term.

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1. Introduction

This paper reports on field work carried out as part of a longer-term study aimed at developing a more integrated, holistic assessment of the disaster recovery process. Using qualitative data from a sample of communities affected by the 2004 Indian Ocean Tsunami, this field study seeks to further refine and validate a multidimensional assessment framework for monitoring and evaluating recovery processes after a disaster. The earlier study [1] focused on ten communities in Galle, Batticaloa and Ampara districts. This study adopts the same multidimensional assessment framework and indicators, but focuses on ten different communities across Matara, Batticaloa and Trincomalee districts, as shown in Appendix A. In doing so, it seeks to further validate the framework and associated indicators, but also provide a wider insight into the effectiveness of post-disaster recovery across Sri Lanka. The field study on which this paper is based was conducted between May and September, 2017 in ten new settlements established in Eastern and Southern Sri Lanka after the 2004 Indian Ocean Tsunami.

1.1. Background to the study

Recovery is understood to be a complex process that is non-linear and multi-dimensional [2]. Several studies have attempted to examine the impacts of interventions on communities [3], but recovery is often cited as the most poorly understood phase of the disaster cycle [e.g., 4, 5].

A vital first step in understanding disaster recovery is to define and measure it. Unfortunately, and as highlighted in the background to Hettige and Haigh's earlier study [1], no such wide-ranging, inclusive and well accepted method of measuring recovery at the community scale currently exists. Indicators are usually recognised as beneficial for developing a knowledge base, testing hypotheses, validating models, and informing policy [2]. However, their development is not straightforward, in part due to the complexities associated with the long-time frame of recovery, the wide geographic area that may need to be assessed, the breath of issues to be considered, and the varying availability of data [1]. It is therefore recognised that indicators should be used together with other forms of qualitative and quantitative information to develop better understandings of recovery outcomes, trajectories, and processes. Chang [2] suggests the need for a more systematic, holistic framework that can be used to measure disaster recovery at the community scale.

As is well documented, the 2004 Indian Ocean Tsunami is the largest natural disaster to affect the region in recent history. In the case of Sri Lanka, over 100,000 families were directly affected by it and over 40,000 died with many more people sustaining injuries [6]. Nearly two thirds of the country's coastline was affected by the Tsunami, forcing people to run away from their habitats to safety. Yet given low lying nature of the terrain in the coastal regions, many vulnerable groups such as women with small children, the elderly and the disabled failed to reach higher ground and, as a result, succumbed to Tsunami waves.

It is against this background that the authorities declared a buffer zone along the coast to prevent the affected families from setting down again near the coast. Many new settlements were built away from the coast but restoring their social, economic and personal lives in new settlements proved to be a challenge. Despite large scale external assistance, concerns were raised regarding the transparency, equity, communication and coordination of the recovery effort [7]. Nevertheless, many families and individuals were resettled, and have, to varying degrees, adapted to their new living environment. Some have found it extremely difficult to survive in the new environment due to diverse circumstances. Many of them have left their new settlements and returned to their former residential areas along the coast despite the risk of facing a similar disaster in the future.

This research is intended to capture the present state of recovery of people who have settled down in a number of newly established communities. The experience of people in resettled communities over the last decade provides useful insights to researchers, planners, policy makers, civil society organisations and development assistance agencies.

2. Methods and data

The overall research strategy replicates that of the 2015 study, including the ten indices of recovery identified within the original framework [1]: Settlement plan; Quality of construction of house; Land rights; Social

infrastructure; Maintenance of physical infrastructure; Land disputes; Livelihood opportunities; Community cohesion; Child welfare; and, Opportunities for Women.

The initial field research on long term disaster recovery was conducted in ten new settlements in eastern and southern Sri Lanka in 2010 [1]. This follow up research, conducted in the same two provinces in 2017, covered the same number of settlements equally divided between the two provinces. A profile of the communities used as field sites is given in Table 1. One of the main considerations in selecting the new settlements for field research in the validation phase was the geographical coverage in the two provinces. An additional consideration in the eastern province was the ethnic mix of the population. In the southern province, the field research was extended to a new district, namely, Matara, while in the eastern province, the field work was extended into Trincomalee district, in addition to Batticaloa district. This has ensured the representation of both Tamil and Muslim communities. Since the southern province is mostly inhabited by Sinhalese, this was not an important consideration in the selection of communities in Matara. However, the distance of the new settlements from the coast was considered important. In the earlier study, this had already been observed as an important factor that influenced the recovery process, particularly with regard to livelihood restoration.

A combination of several qualitative methods was used for data collection. Since the study involves a series of community level assessments, qualitative methods were considered to be more appropriate to collect data on various aspects of disaster recovery. Key informant interviews, focus group discussions, case studies, brief household surveys and field observations are the key techniques used to collect data not only from disaster affected families but also from other informants such as public officials, civil society activists, teachers, women, youth and the elderly.

Some of the data collected is of a qualitative nature. Field observations and informal discussions with informants are a vital source of qualitative information on a range of phenomena such as quality of housing, nature and type of social infrastructure, intra- community and inter- community social relations. On the other hand, factual information regarding household composition, availability and accessibility of social infrastructure services, type and place of employment, is derived from household interviews conducted using interview schedules. Field observations and interviews were conducted by trained research assistants which enabled them to make their own qualitative assessments of the social, economic, physical and environmental conditions at household and community levels. The nature and extent of recovery at both household and community level could only be determined after careful consideration of data from multiple sources. For instance, subjective assessments of informants are verified with the help of field observations and information from other sources. So, the final determination of the level of recovery with respect to different aspects is not based on a simple statistical calculation. It is done following careful consideration of both household data and qualitative information derived from multiple sources.

Table 1. Profile of field sites.

District	Community	Distance to nearest town (km)	Distance from original village (km)	Ethnic group	No. of households
Matara, Southern Province	Labeemwatta	4	4-6	Sinhalese	99
	Pangiriwatta	5	7-15	Sinhalese	119
	Naotunna	7	8-11	Sinhalese	72
	Loardstar village	7	7-13	Sinhalese	56
	Turkey village	1	7-11	Sinhalese	450
Batticaloa, Eastern Province	Palamunai	3	Same village	Muslim	71
	Onthachimadam	1	Same village	Tamil	36
	Kalkudah	2	4	Tamil	121
Trincomalee, Eastern Province	Naduvuthu	2	12	Muslim	160
	Sudaikudha	20	2	Tamil	108

3. Results

Qualitative assessment of the recovery process in each of the settlements investigated is presented by way of a set of indicators that measure recovery on a scale of 1 to 5. While 1 indicates the lowest level of satisfaction, 5 represents the highest level.

The above indicators can be used either singly or together as a composite indicator covering all aspects. The latter is indicative of the level of overall recovery at a community level. On the other hand, each individual indicator can be used to assess recovery across communities, find out the relative standing of different dimensions at a macro level covering all communities in the analysis. The results of the analysis are presented below and the findings are discussed against the overall objective of the study.

As the results of the data analysis on different indicators show, there are significant differences both within and across communities with respect to settlers' satisfaction on different indicators. While no community has done well with all ten indicators, there are no communities that have done badly on all indicators. Yet, some communities have done well on a majority of indicators, some have done poorly on a majority of indicators. In general, communities in southern Sri Lanka have performed better on a majority of indicators, while many in eastern Sri Lanka have not done as well. There are exceptions in both the south as well as in the east. A summary of each community's recovery against each of the ten recovery indices is given in Appendix B.

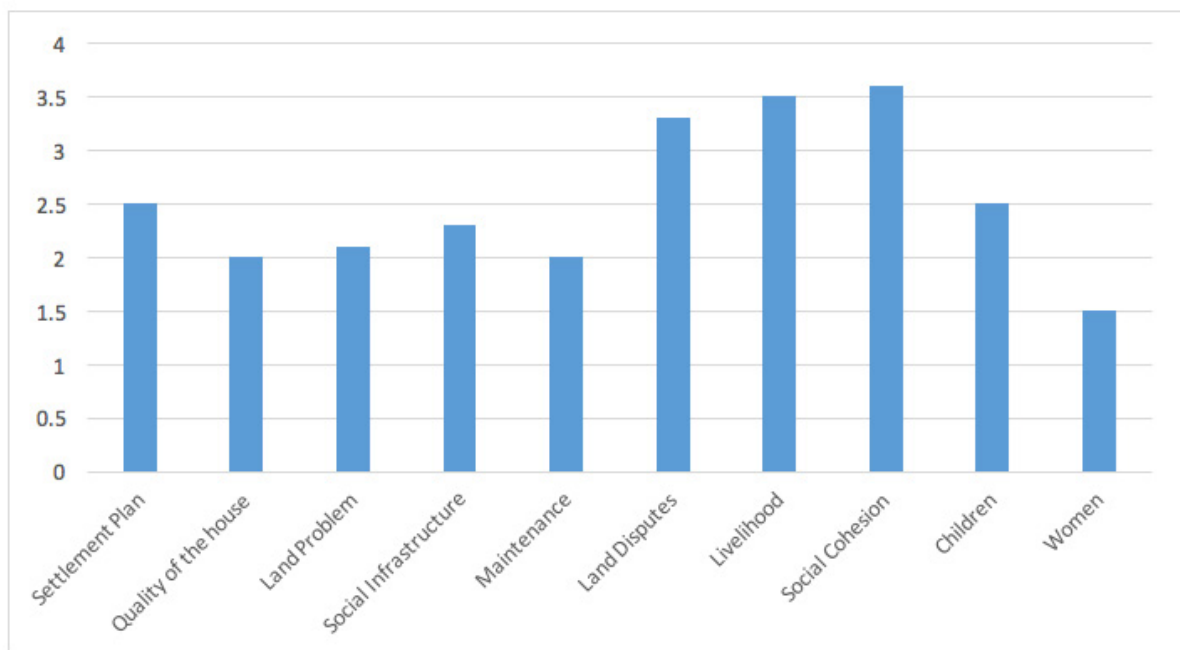


Figure 1: Overall satisfaction with recovery among communities

The differences among communities have been the result of a range of factors. First and foremost, the ethnic war in the north and east of Sri Lanka had already affected communities before the Tsunami in that region, making their situation worse. On the other hand, resettlement and related activities were supported by a whole range of agencies, both local and foreign and they did not have the same kind of involvement in the resettlement and reconstruction process. Recovery outcomes have been significantly influenced by the above differences. These agencies varied widely in terms of their financial technical and other capacities and the construction consultants and contractors they employed did not perform in an identical manner. For instance, quality of construction has varied considerably across the communities as a result. Moreover, the nature of involvement of state agencies in the resettlement process

has not been uniform everywhere in terms of providing guidelines, supervision and monitoring. Construction contractors have not maintained similar standards either. Many states agencies have not taken an active interest in following up on construction and rehabilitation plans and as a result, many issues persist and after the resettled families in numerous ways.

Figure 1 shows the relative standing of the resettled population covered by the study. It is significant that the status of women shows the lowest level of recovery while social cohesion, livelihoods and land disputes display an above average level of recovery. Other areas that are not satisfactory are quality of house construction, land rights, social infrastructure and maintenance of infrastructure.

Figure 2 provides a broad picture of the resettled communities in terms of recovery based on a composite indicator. As is evident, a majority of the communities have achieved an above average recovery level, while three communities remain at a below average level, namely below 2.5. It is noteworthy that all three of the latter category are in the East of the Sri Lanka. On the other hand, the highest level of recovery is evident in Palmunai, a community in the East.

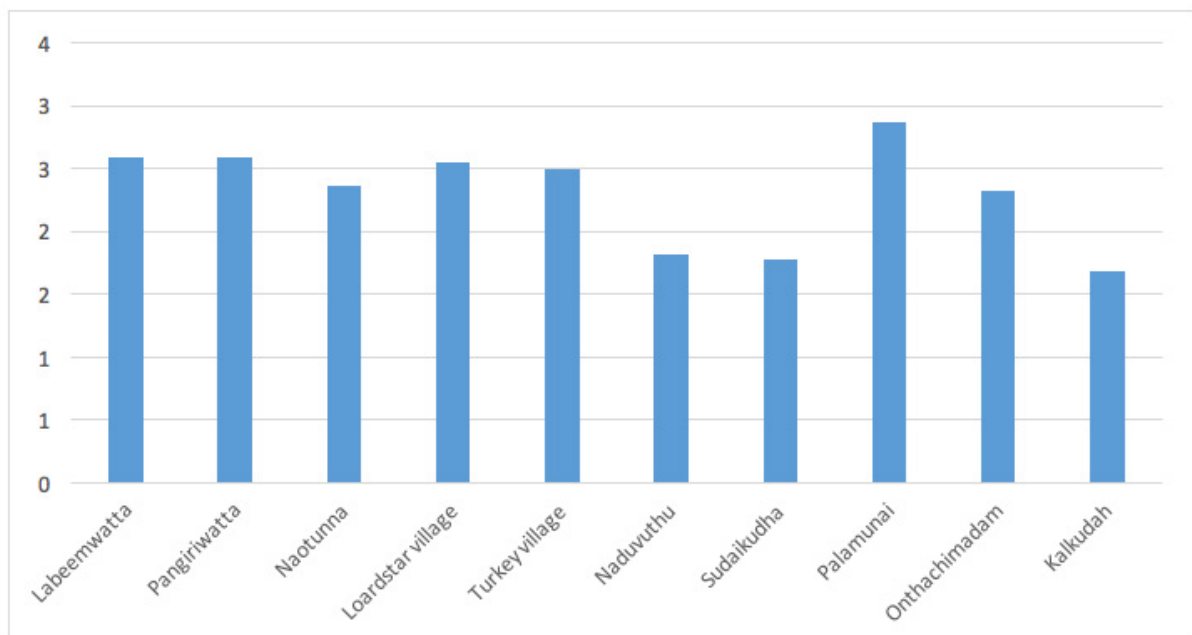


Figure 2: Composite index of recovery by location

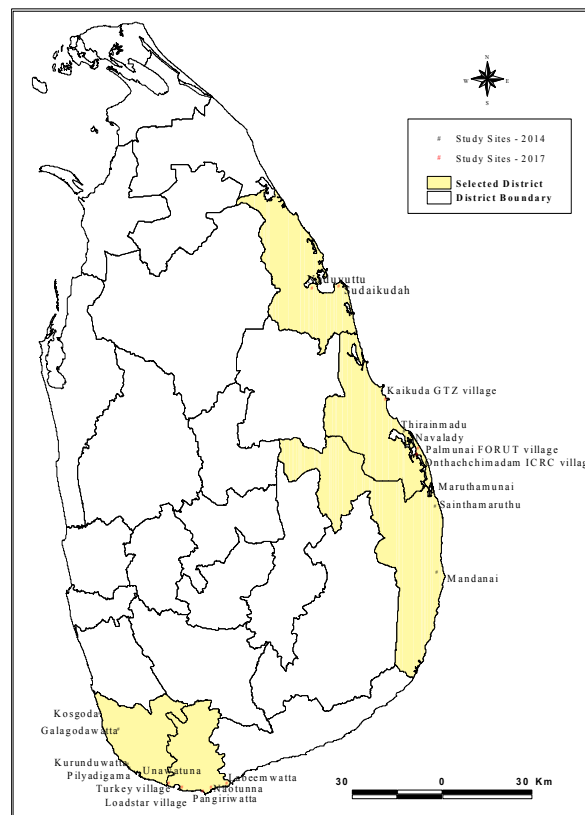
4. Discussion and conclusion

The study was conducted in a number of selected post-Tsunami resettled communities in the South and the East of Sri Lanka in order to develop a set of validated indicators to measure the nature and extent of long term recovery at a community level after a major natural disaster. The nature and extent of recovery depends on a whole range of factors such as the nature and the effects of the disaster itself, the nature and extent of state and other interventions following the disaster, and the capacity of the affected communities and individuals to adapt to the post-disaster situation. This study involved a qualitative approach to data collection and analysis that involved a range of data sources.

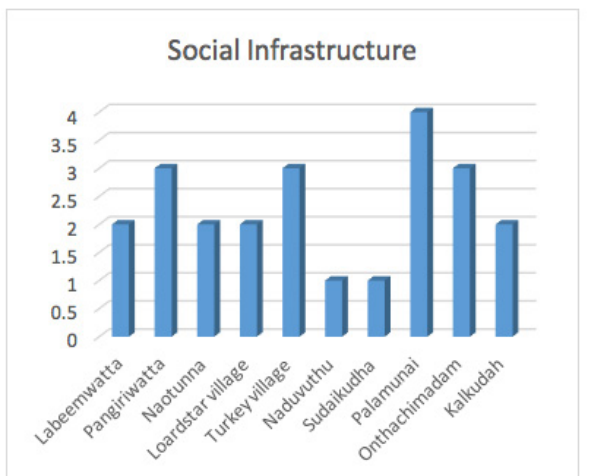
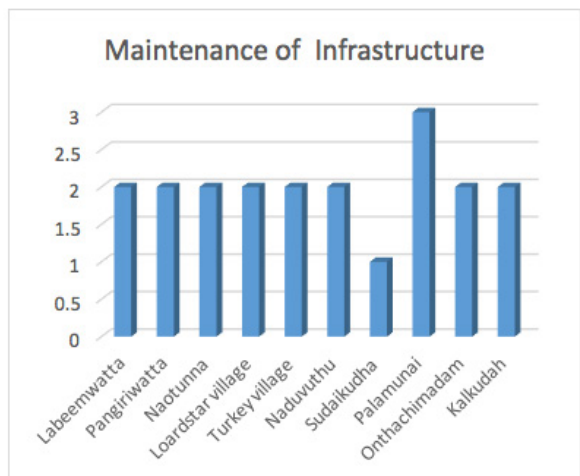
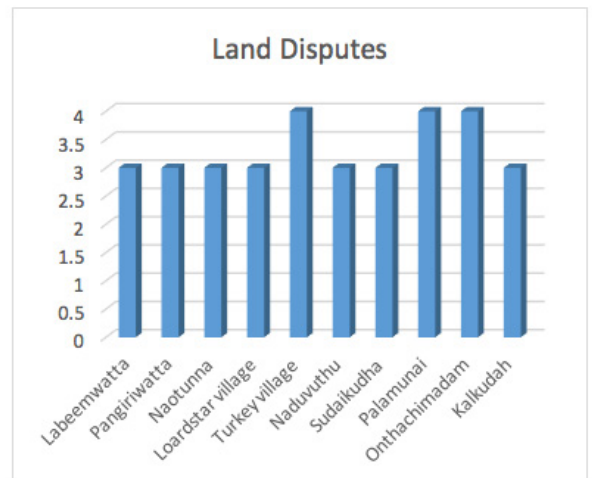
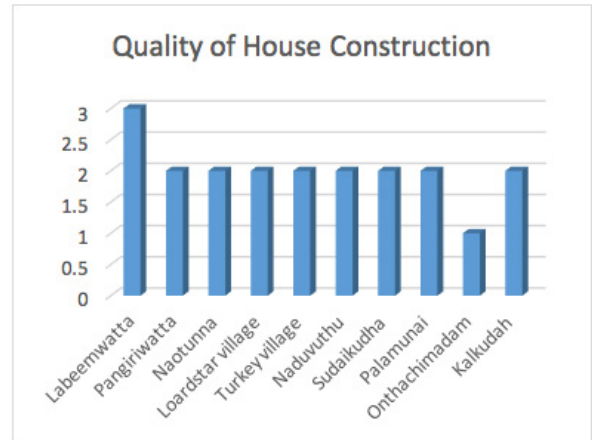
In the first phase of our research, significant similarities and variations were observed across settlements surveyed. What is significant is that, while such variations and similarities were observed between the earlier set of settlements on one hand and the new set of settlements on the other, the validity of the indicators that were used have selected remain robust across settlements and over time. Some of the indicators show consistently low or high

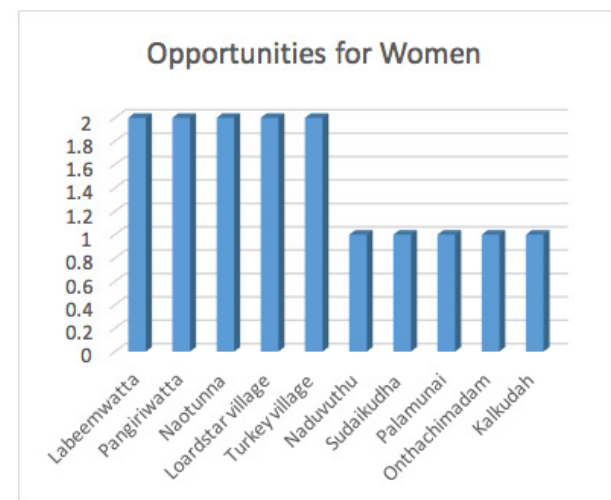
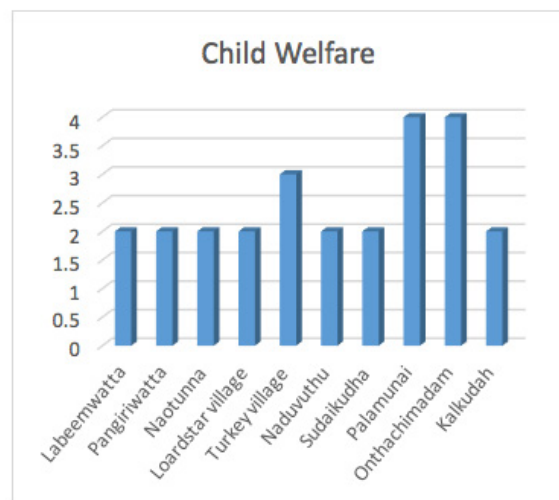
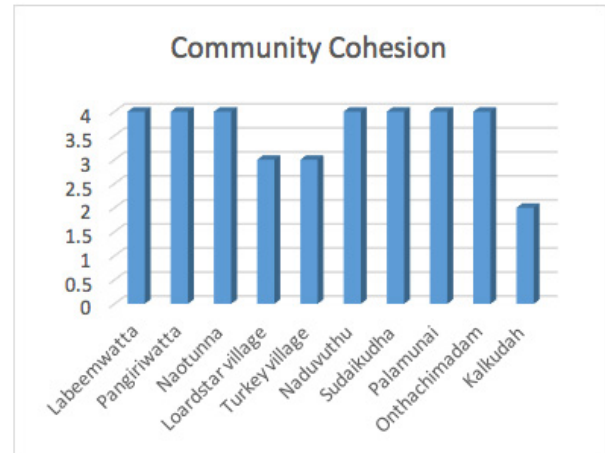
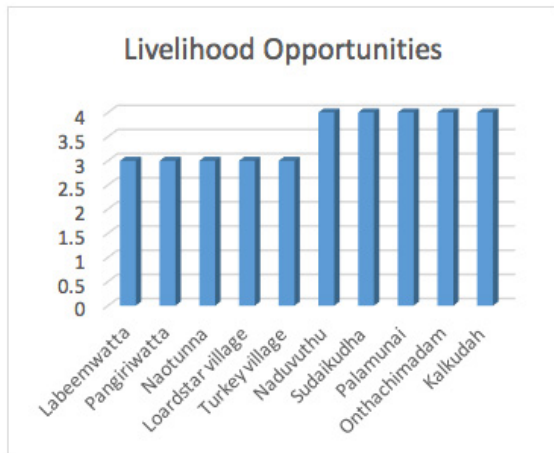
The results also suggest that since post disaster recovery usually involves a process of resettlement of affected families and individuals, more attention needs to be paid to more vulnerable groups such as children and women as well important aspects of well- being such as livelihoods, housing, social infrastructure and long-term maintenance of infrastructure. The framework indicators capture these aspects but also the determinants of the nature and level of recovery, indicating the possible precautionary measures that could be taken to avoid significant shortfalls in recovery in the long term.

Appendix A. Location of study sites in Sri Lanka



Appendix B. Community indicators





References

- [1] S. Hettige, R. Haigh, An integrated social response to disasters: the case of the Indian Ocean tsunami in Sri Lanka, *Disaster Prevention and Management: An International Journal*, Vol. 25 (2016), Issue: 5, pp.595-610, <https://doi.org/10.1108/DPM-11-2015-0263>
- [2] S. E. Chang, Urban disaster recovery: a measurement framework and its application to the 1995 Kobe earthquake, *Disasters*, Vol. 34 (2010) No. 2, pp. 303–327.
- [3] D. Alexander, *Mainstreaming disaster risk management*, *Hazards and the Built Environment: Attaining built in resilience*. Londres: Taylor & Francis, pp. 20-36, 2008.
- [4] J. E. Haas, R. W. Kates, M. J. Bowden, *Reconstruction Following Disaster*, MIT Press, Cambridge, 1977.
- [5] D. Mileti, *Disasters by Design: A Reassessment of Natural Hazards in the United States*, National Academies Press, Washington, DC, 1999.
- [6] Department of Census and Statistics Sri Lanka, *Socio-economic data 2006*, available at: www.statistics.gov.lk/ (accessed March 10, 2016).
- [7] H. Ratnasooriya, S. Samarawickrama, and F. Imamura, Post tsunami recovery process in Sri Lanka, *Journal of Natural Disaster Science*, Vol. 29 (2007) No. 1, pp. 21-28.