

An integrated social response to disasters: the case of the Indian Ocean tsunami in Sri Lanka

IOT in
Sri Lanka

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Abstract

Purpose – The impact of disasters caused by natural hazards on people in affected communities is mediated by a whole range of circumstances such as the intensity of the disaster, type and nature of the community affected and the nature of loss and displacement. The purpose of this paper is to demonstrate the need to adopt a holistic or integrated approach to assessment of the process of disaster recovery, and to develop a multidimensional assessment framework.

Design/methodology/approach – The study is designed as a novel qualitative assessment of the recovery process using qualitative data collection techniques from a sample of communities affected by the Indian Ocean tsunami in Eastern and Southern Sri Lanka.

Findings – The outcomes of the interventions have varied widely depending on such factors as the nature of the community, the nature of the intervention and the mode of delivery for donor support. The surveyed communities are ranked in terms of the nature and extent of recovery.

Practical implications – The indices of recovery developed constitute a convenient tool of measurement of effectiveness and limitations of external interventions. The assessment used is multidimensional and socially inclusive.

Originality/value – The approach adopted is new to post-disaster recovery assessments and is useful for monitoring and evaluation of recovery processes. It also fits into the social accountability model as the assessment is based on community experience with the recovery process.

Keywords Long-term recovery, Post-disaster recovery, Recovery assessment, Tsunami ten years on, Tsunami 2004

Paper type Research paper

1. Introduction

National disasters often come with little prior warning and therefore, do not give much time to even prepare an emergency response that naturally involves emergency relief measures. On the other hand, long-term measures such as resettlement, livelihood development, social infrastructure provision and psycho-social support for affected persons and communities involve careful planning of interventions in an integrated fashion with the full participation of affected communities.

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



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interventions, both state and non-state, help or do not help affected communities to recover from the adverse effects of the disaster and what follows.

This is an account of a 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 (IOT), the study proposes a novel, multidimensional assessment framework for monitoring and evaluating recovery processes after a disaster.

2. Literature review

2.1 *Assessing long-term recovery after disaster*

Recovery may be thought of as an attempt to bring a post-disaster situation to a level of acceptability (Quarantelli, 1999) through the rectification of damage and disruption that has been inflicted upon an urban system's built environment (Haigh and Amaratunga, 2010), people and institutions (Alesch, 2004).

Recovery is understood to be a complex process that is non-linear and multidimensional (Chang, 2010; Tierney and Oliver-Smith, 2012). Changes are stimulated by disasters, which may be slow or rapid, linear or non-linear, planned or unplanned and may manifest in many aspects across society (Birkmann *et al.*, 2010). Recovery processes unfold over a long time and can last decades; yet most studies of recovery are of limited duration or represent points in time across the disaster recovery continuum (Smith and Birkland, 2012). In order to understand the processes at work studies of recovery need to be viewed over a much longer time scale (Cutter *et al.*, 2006).

Numerous studies have attempted to examine the short- and long-term impacts of interventions on settlements to pave the way for the improvement of recovery policy (Alexander, 2008). Duyn-Barenstein (2006), for instance, explores how the reconstruction of houses after the 2004 tsunami in Tamil Nadu paid less attention to the social-cultural and environmental conditions, destroying peoples' cultural identity and livelihood resources. Other authors have found that reconstruction policies adopted after disasters often neglect the variety of households and the diversity of their needs and desires, and fail to consider how they affect residents differently (Aldrich, 2012).

Despite such efforts, recovery is often cited as the most poorly understood phase of the disaster cycle (e.g. Haas *et al.*, 1977; Mileti, 1999). After examining the state of the art in long-term recovery over 30 years, Rubin (2009) concludes that the research and knowledge base in the realm of long-term recovery is seriously inadequate.

The first step in understanding disaster recovery is to define and measure it. A clear definition of the concept can provide a suitable basis for discussion and enable systematic, transparent determination of the extent to which and ways in which a community has recovered, and how that assessment changes over time.

Unfortunately, no such wide ranging, inclusive and well-accepted method of measuring recovery at the community scale currently exists. This may in part be due to the many and substantial challenges involved in creating such a method. First, there is not a widely accepted definition as to when the recovery process is complete. Some of the discourse suggests recovery ends when the community has returned to its original state or to a level where it would have been without the disaster (e.g. Schwab *et al.*, 1998). Others advocate a definition of recovery in which the community achieves a stable state which may or may not be the same as the pre-disaster state (e.g. Quarantelli, 1999). Without a clearly defined end goal, it is difficult to determine how far along a recovery has progressed.

A further challenge is the extensive, multidimensional nature of community recovery (Tierney and Oliver-Smith, 2012). Some previous studies suggest using indicators to measure the sectors of recovery (e.g. Comerio, 2004; Chang, 2010). Indicators are usually recognized as beneficial for developing a knowledge base, testing hypotheses, validating models and informing policy (Chang, 2010). However, the recovery process involves many aspects of community life, including the built environment, natural environment, economy, education and health care. Recovery outcomes are therefore not easily captured by a few accessible metrics. There is also a need for the measure to be applicable across many communities and a relatively long-time frame, and perhaps across a large geographic region and different disaster types introduces challenges as well. Many types of data are not available in a consistent form and at consistent levels of reliability across jurisdictions and time frames. It is therefore recognized 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 (2010) suggests the need for a more systematic, holistic framework that can be used to measure disaster recovery at the community scale.

2.2 Recovery in Sri Lanka following the 2004 IOT

As is well known, the IOT of 2004 is the most devastating disaster caused by natural hazards in the region in recent times. Its scale and intensity has been unprecedented. Its impact on Sri Lanka was enormous and led to the death of over 40,000 persons (Department of Census and Statistics Sri Lanka, 2006), displacement of over 100,000 families and destruction of housing social and economic infrastructure and individual household assets (Ministry of Finance and Planning, 2006). Nearly two-thirds of the country's coastline was affected, creating a need for a massive effort to provide initial relief and gradually restore normal life for hundreds of thousands of individuals. On the other hand, the humanitarian response from within and without the country was equally unprecedented. The response to Sri Lanka's request for assistance met with an overwhelming response at a meeting of international donors held in Sri Lanka in May, 2005. A total of US\$2.2 billion was pledged over the next 2-3 years – around US\$700 million per year. US\$853 million was promised by NGO and other private sector organizations, and the remainder by multilateral donors and governments (Cooray, 2005).

Despite this influx of external assistance, concerns have been raised regarding the transparency, equity, communication and coordination between stakeholders involved in the Sri Lankan recovery, the effectiveness of monitoring and measuring progress, and the capacity of the implementing organizations of the recovery process (Ratnasooriya *et al.*, 2007).

The Sri Lankan state came under pressure to develop policies and principles to guide the process of resettlement and rehabilitation of displaced and partly affected persons and families. The Sri Lanka Government established a coordinating mechanism at the center to facilitate relief and rehabilitation activities undertaken by various state and non-state agencies and civil society groups. Yet, one weakness of the role of the central government was the marginalization of local authorities in the context of tsunami resettlement and rehabilitation process.

This is not unique to Sri Lanka. Telford and Cosgrave (2007) noted that the global response to the tsunami showed that the capacity to deliver fast and effective relief and to rebuild damaged infrastructure has improved, but the capacity to put affected communities "in the driving seat" of their own recovery has not (p. 27). Despite all the rhetoric about taking the opportunity to "build back better" in the wake of the tsunami,

familiar weaknesses were apparent in terms of inequitable distribution of aid, failure to attend to the special needs of women and children and a failure to ensure that all the people relocated into “temporary accommodation” were appropriately rehoused within a reasonable period of time (Mulligan, 2013).

The nature and extent of the impact of the tsunami was such that what was required was an integrated approach to resettlement and rehabilitation. While the central government mechanism in Sri Lanka was not able to facilitate a coordinated and integrated response at the local level, no effective local mechanism existed at local level either. As a result, much of what took place locally was not well coordinated across different sectors, such as housing, livelihoods, social infrastructure and psycho-social support.

What is attempted above is to provide a broad overview of the overall process of resettlement and rehabilitation following the tsunami. Field research conducted in some selected areas around 2005 pointed to some significant gaps and issues. Yet, most people affected or displaced adapted to the changing circumstances with or without external support. On the other hand, external intervention of varying quality helped most people affected by the tsunami to get on with the lives, despite various hardships (Hettige, 2007).

The 2004 IOT passed its tenth anniversary at the end of 2014. A decade is a long period and one could expect most of the affected individuals and families to have overcome most of their problems, with or without external help. On the other hand, the only reasonable way to determine the nature and extent of recovery is to do a field investigation to determine the present condition at a community level. This is the purpose of this study that coincides with the tenth anniversary of the tsunami.

3. Methodology and field work

The area affected by the tsunami is vast and it is an immense task to conduct a field study covering the whole area and its population. This qualitative study covers a number of resettled communities from the Eastern and Southern province (see Table I and Figure 1). Communities in Galle, Batticaloa and Ampara were selected as they were all severely affected by the 2004 tsunami and suffered displacement of people in large numbers that required large-scale resettlement. The three areas also covered different ethnic constituencies, thereby enabling comparison and to consider factors, such as social integration. Even though the communities covered do not represent the entire population, they nevertheless help to determine the general patterns that prevail in the affected areas. In other words, based on the field data, the study provides a view on the nature and extent of recovery and persisting issues ten years after the IOT.

Field work for the present study was conducted by three trained field assistants who were stationed in the field areas for a period of about three months. They collected information through household level interviews, key informant interviews, field observations and the collection of visual material. Detailed guidelines were developed

Table I.
Communities
surveyed in the
Eastern and
Southern Provinces

Eastern Province	Southern Province
1. Navaladi	1. Galagodawatta
2. Thiraimadu	2. Unawatuna
3. Thiraimadu	3. Kosgoda
4. Sainthamaruthu	4. Piyadigama
5. Mandanai	5. Kurunduwatta

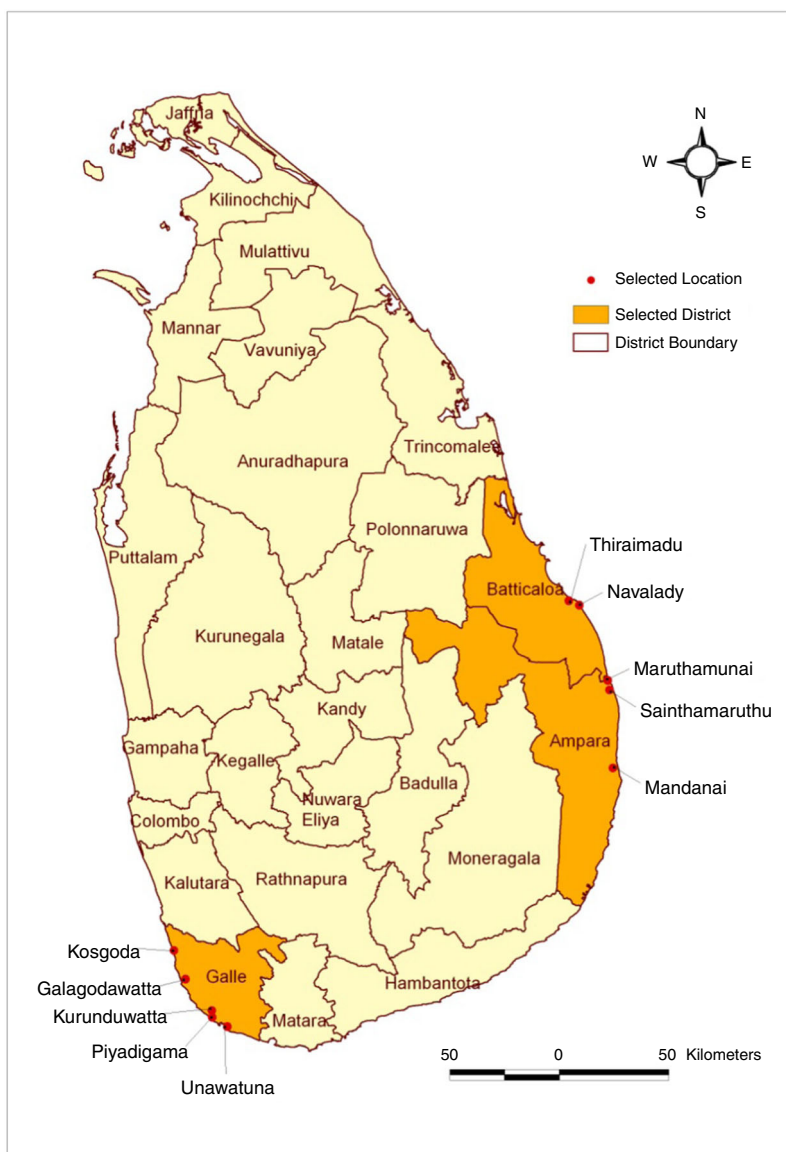


Figure 1.
Geographical
location of
communities
surveyed

and used to guide the collection, collation and recording the data. This way it was possible for the research assistants to determine the nature and extent of recovery in each of the components investigated, i.e. housing, land, livelihood, social infrastructure, etc.

The data collection by field assistants was facilitated by the senior members of the research team that comprised a senior researcher and two field coordinators, the latter having extensive field research experience. Though no effort is made to collect and analyze quantitative data through household censuses or a sample survey, qualitative data collected from the field has been analyzed using a five-point scale in order to

determine the nature and extent of recovery based on the actual experience of the household members in the selected ten communities in the two provinces. This way the study could determine the nature and level of recovery in relation to a series of components of the recovery process.

As is evident, most of the re-settlers have gone through a similar settlement process: temporary accommodation, temporary shelters and permanent housing. Some people have gone back to their former habitats for diverse reasons.

As one would expect, most people who were displaced by the tsunami ten years ago are already resettled, either in new settlements away from the coast or in the same settlement where they were living before the disaster. The latter constitute a minority. Most of the new settlements have been built either with the financial support or the direct involvement of numerous non-governmental organizations; state agencies have facilitated the process, often by allocating land for building purposes and providing infrastructure facilities such as electricity, water and access roads.

Newly established tsunami settlements vary widely in term of a range of criteria such as:

- (1) nature of settlement planning;
- (2) type and quality of dwelling units;
- (3) access to social infrastructure;
- (4) access to livelihoods;
- (5) the nature of community formation;
- (6) sense of security felt by community members;
- (7) overall satisfaction with the life in the new settlement;
- (8) integration of the community within the local institutional context;
- (9) the level of maintenance of the physical and social infrastructure;
- (10) integration with host communities;
- (11) disaster risk reduction;
- (12) new and persisting vulnerabilities; and
- (13) availability of various professional services for vulnerable groups such as the elders, children and mentally ill.

The listed above are key aspects of any resettlement program. The extent of success or failure of an intervention program can be effectively measured in terms of all of the above aspects. In this paper, an attempt is made to offer an assessment of the impact of various external interventions on the above components in the years following the 2004 IOT in Sri Lanka. In short, the question addressed here is: what is the present state of affairs at a community level after ten years since the mass displacement of inhabitants in coastal communities by the largest disaster caused by natural hazards in the region in recent years?

4. Results

As is well known, international humanitarian response to the disaster was unprecedented. Hundreds of non-governmental organizations and thousands of volunteers moved into the country offering diverse forms of assistance. Combined with the contribution of

local organizations and people, such external support helped Sri Lanka to resettle most of the survivors within a few years. While the government declared a buffer zone precluding resettlement of the displaced too close to the sea, the inhabitants falling within the limits of the buffer zone were resettled in new settlements established in the surrounding areas, some as far as ten kilometers from the coast. Since then the buffer zone policy has been revised to accommodate different local demands.

Once the people affected by the tsunami were resettled, most of the non-government organizations involved moved out, expecting local communities and local institutions to take over the responsibility of managing local affairs. There are some exceptions where the sponsoring agency did not leave but continued to manage the affairs of the community with the involvement of community members.

In order to make a qualitative assessment of the ground situation after ten years, we have done field observations and interviews with community members and key informants in the selected settlements in Eastern and Southern Sri Lanka, in the districts of Galle, Batticaloa and Ampara (see Figure 1). While the field work done during the course of present study is not extensive but more in-depth and qualitative, we have been able to gather considerable evidence to draw significant conclusions regarding the recovery process. In the next few pages of the paper, an attempt is made to make some observations on a number of important issues. These specifically pertain to the following: settlement planning; process and quality of construction; maintenance of infrastructure; social infrastructure provision; livelihoods; community formation and institutional context; management of local affairs; equity issues.

4.1 Settlement planning

Resettlement of thousands of families displaced by the tsunami has been a major challenge for the government as well as non-government organizations. Nevertheless, most of the affected people have been resettled within several years. Given the scale of the resettlement process, finding suitable resettlement sites has been a challenge. As a result, some of the new settlements are located far away from the old habitats of the new settlers, resulting in various issues related to livelihoods, access to transport, education and health facilities and social capital. There are also other issues in many new settlements pertaining to physical planning such as paved roads and maintenance of physical infrastructure.

4.2 Housing

The usual method adopted by state and non-government organizations has been to employ private construction contractors. Though some NGO's had kept a close eye at the work done by contractors, most had relied on the good will and integrity of contractors. In many cases, quality of construction has been much to be desired. People who are living in poorly constructed dwelling units that are already crumbling continue to suffer. Contractors often used poor quality construction material resulting in rapid deterioration of metal, masonry and timber work. While those who had the means have already repaired the damages, others with no resources continue to suffer. What should be noted here is that some of the problems are structural and cannot be attended to by inhabitants. This is particularly so in multi-story buildings. Leaking roofs, noise, seepage from toilets and flooding are some of the pressing problems that residents have not been able to solve. As a result settlers continue to suffer, though some have left the settlement after selling or renting out their dwelling units.

4.3 Maintenance of physical and social infrastructure

Many settlers have made an effort to improve their dwelling units over the years. Only the poor have not been able to do so. On the other hand, physical and social infrastructure facilities such as roads, drains, community halls, play grounds and children's parks have become the responsibility of community associations or local government institutions. In most settlements, such infrastructure remains badly neglected leading to rapid deterioration. In fact, some of the common facilities are already abandoned and have fallen into disuse.

As mentioned before, the non-governmental organizations that sponsored most of the new settlements have moved out once the displaced families were resettled, but in most cases, no central or local government institutions have taken full responsibility for the management of community infrastructure. Moreover, community-based organizations are either too weak or non-existent in most settlements and therefore, have not filled the void left by the sponsoring organizations.

4.4 Social infrastructure provision

Many organizations that sponsored new settlements for tsunami victims have included various social infrastructure facilities in the settlement plan. Such infrastructure has often included sports facilities, multi-purpose community buildings, medical centers and children's parks. In most settlements, such facilities have not been maintained and fallen into disuse over time.

4.5 Livelihoods

As is well known, many people living along the coast devastated by the tsunami relied on livelihoods related to such activities as fishing and tourism. When most of them were displaced and resettled away from the coast, they lost their sources of livelihood. This was particularly true for those whose new settlements are located many miles away from the coast. Re-settlers have responded to livelihood problems in diverse ways. While some have given up earlier economic activities and found new sources of livelihood, others continue to engage in the same activities from the new location. The settlers travel to coastal areas by using various transport modes though this means spending more time and money. Some families have moved back to their old habitats in order to engage in their traditional livelihood activities.

4.6 Community formation and institutional context

Most of the displaced families had come from diverse socio-economic backgrounds and different communities. When they are brought together into a single settlement where they are compelled to share the same space and facilities, certain issues are bound to rise. The formation of community-based organizations had often been considered by external donors and some community-oriented residents as a way to facilitate community mobilization around common needs. Yet in most settlements, such efforts have not resulted in the formation of sustainable and active community organizations due to various reasons.

Newly established communities are often not well integrated into the wider institutional context. For instance, local government institutions and central government agencies in the area often do not play a significant role in addressing infrastructure issues that have arisen in new settlements. Settlers continue to suffer due to unresolved issues but remain helpless.

4.7 *Management of local affairs*

The weak wider institutional set up around new settlements has led to a neglect of local issues. Weak community-based organizations and various divisions within new settlements have not helped either. Some of the public order issues such as thefts, sense of insecurity, drug and alcohol abuse, intra-community disputes and vandalism affect the quality of life of many settlers but law enforcement agencies often have not come forward to address such issues. Similarly, unresolved land disputes continue create problems for many settlers, often leading to heated arguments and verbal abuse, threatening peaceful co-existence among families involved. No authorities have intervened to resolve these issues and many people do not see an end to such lingering disputes.

4.8 *Equality issues*

As mentioned before, the IOT devastated whole communities in many areas, destroying property and lives of many in these communities. While new settlements were built to accommodate those who were living in villages that fell within the newly declared buffer zone, others were compensated depending on the extent of damage caused to their houses and productive assets. In the new settlements, each displaced family was given a dwelling unit. While the size of the dwelling unit has been broadly uniform, some inequities have risen due to various factors such as the quality of construction and different modes of operation and varying standards adopted by sponsoring agencies. In some cases, within the same settlement, different types of housing units have been constructed, i.e. multi-story apartments vs individual housing units on separate plots of land. Moreover, the size of land plots has varied widely, some just enough for the house, while others have ample home garden space. Some settlements are provided with many common amenities while others comprise housing units only. These and other variations have given rise to significant inequities both within and across settlements. It is difficult to see how these issues could be addressed today as it is difficult to imagine how such inequities can be reduced today.

The observations made above are based on qualitative field work done in the ten communities surveyed as part of the present study on the extent and nature of recovery of people affected by the 2004 tsunami. The diversity displayed by the communities, families and individuals in the above regard can be measured and explained in terms of a series of dependent and independent variables. While the dependent variables relate to various components of resettlement and recovery such as settlement planning, housing, livelihoods, psycho-social well-being, community formation, etc., independent variables relate to the nature of the management of the resettlement process, community mobilization, local institutional set up, etc.

4.9 *Indicators of recovery*

It is almost natural for diverse segments of a population affected by a disaster to have different experiences and outcomes with regard to disaster recovery. This is due to both their initial condition as their differential capacities to cope with the effects of the disaster. This is the reason why there are significant differences among individuals and families with regard to their experience and recovery. On the other hand, there are highly significant differences among communities in the above regard. Both types of differences are important from an interventionist point of view. While individual

differences can be addressed through interventions that target individuals and families, inter-community differences can be dealt with only via institutional interventions. In the remainder of this paper, we focus attention on inter-community variations in terms of some selected indicators. These indicators are related to the nature and extent of recovery. The method that we have used to develop the indicators is the qualitative assessment of the degree of satisfaction of community members with respect to each of the components of recovery investigated. The degree of satisfaction is measured on a five-point scale ranging from highly satisfactory to highly unsatisfactory. Each community is placed along the above continuum based on a combination of assessment by community members and field observations of the field researchers. The following figures provide three types of qualitative assessment. They are as follows: ranking of communities based on a single indicator at a time; overall assessment of communities based on a composite index which combines all individual indicators; overall assessment of a particular component of recovery across all communities.

The results of the above assessments are presented and discussed below.

Figure 2 provides the ranking of the ten communities surveyed in terms of ten different indicators that represent different aspects of recovery. Figure 3 shows how different communities are placed in terms of the overall composite index that groups the ten components of recovery, while Figure 4 provides a useful measure of the nature and extent of recovery following the IOT with respect to the ten indicators of recovery.

Large-scale disasters caused by natural hazards like the 2004 IOT often result in the displacement of people in large numbers requiring large-scale resettlement, often in entirely new settlements, mostly away from the original habitats of the displaced. Creating new settlements is a task that involves not only providing suitable permanent housing but also addressing a myriad of other issues such as livelihoods, social infrastructure and social integration. So, what is required is integrated settlement planning. This naturally demands inter-sectoral coordination at different levels. Where there is no such coordination, certain important issues may not receive the kind of attention they deserve, resulting in major gaps in the recovery process. This is what came to light from the qualitative assessment that we have done in the selected communities. Such assessments in turn can provide an invaluable feedback to governments, implementing agencies, NGO's and local institutions like local government authorities, so that they can do follow up with remedial measures that can improve the life chances of the people concerned.

5. Conclusions

The paper has presented the results of a qualitative assessment of the recovery process after ten years since the 2004 IOT in the light of data collected from ten communities in Eastern and Southern Sri Lanka. Based on the data collected using qualitative techniques, three types of indices were developed to measure the nature and extent of recovery. The indices used indicate where different communities stand today in terms of diverse aspects of recovery. The key finding of the study is that the outcome of the interventions, in terms of the nature and extent of recovery, has varied widely depending on such factors as the nature of the community, nature of the intervention and mode of delivery of donor support.

The main limitation of the study is its limited geographical coverage. However, the indices of recovery developed constitute a convenient tool of measurement of effectiveness

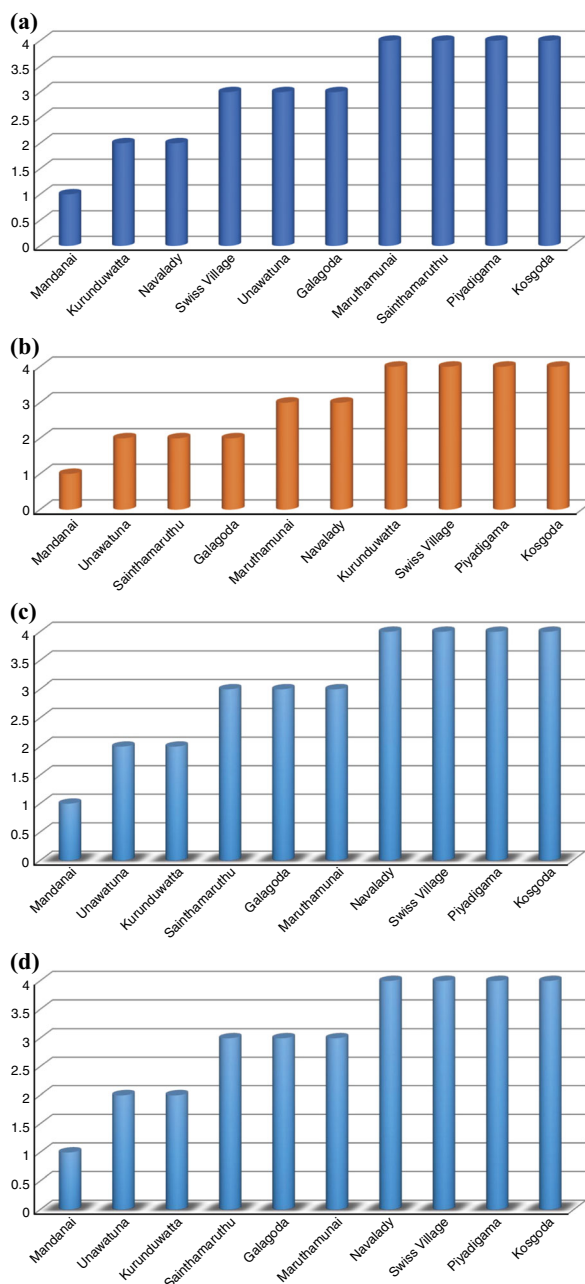


Figure 2.
Ranking of the ten
communities using
ten indicators that
represent different
aspects of recovery

(continued)

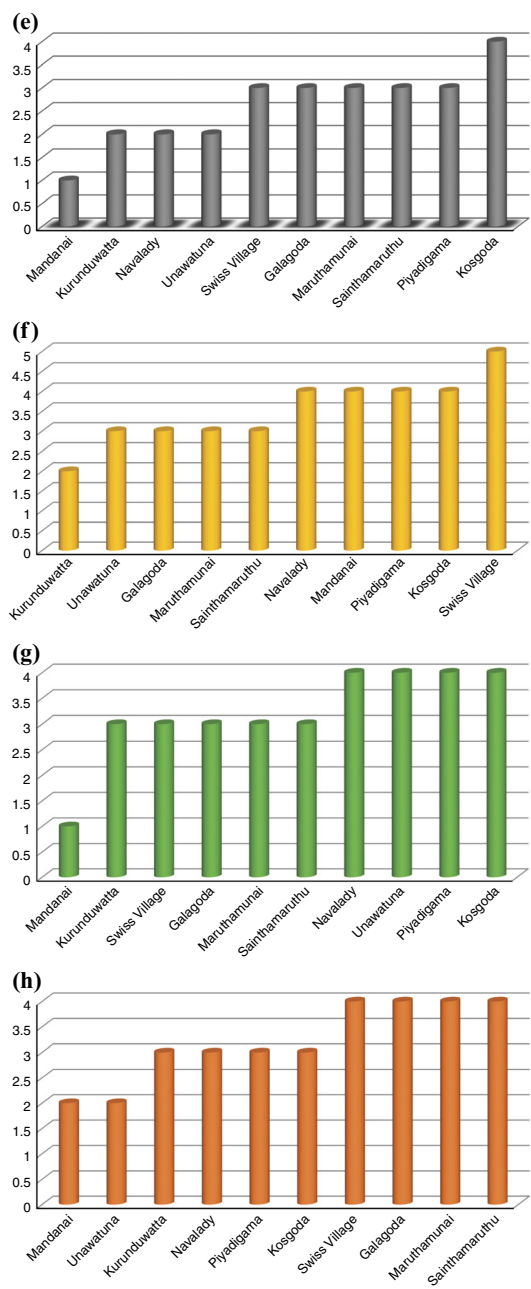
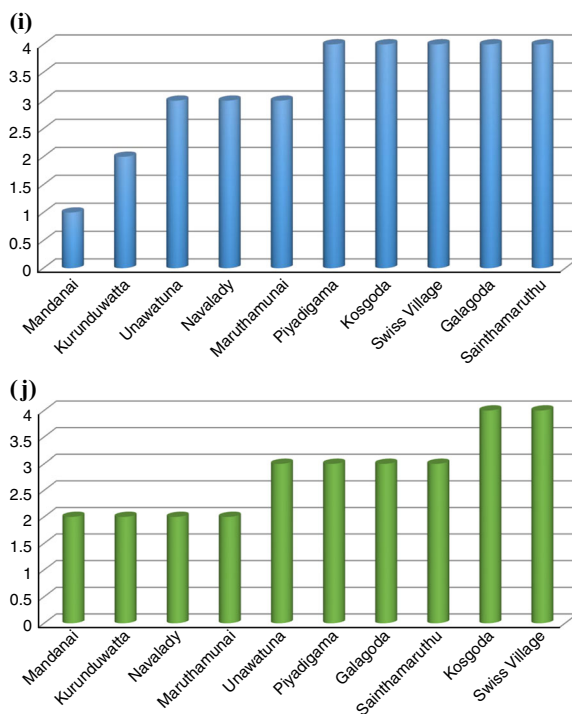


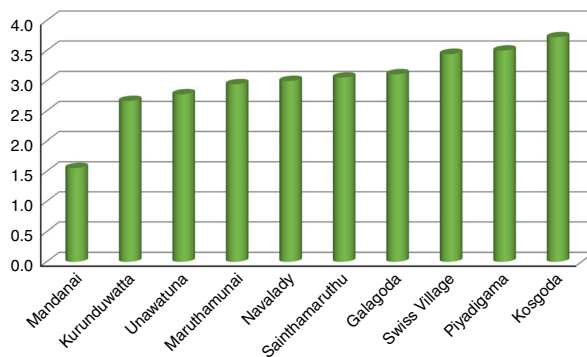
Figure 2.

(continued)



Notes: (a) Satisfaction with social infrastructure; (b) satisfaction with settlement plan by location; (c) satisfaction on quality of construction; (d) satisfaction with respect to land; (e) satisfaction with maintenance of infrastructure; (f) satisfaction with land ownership; (g) satisfaction with livelihood restoration; (h) satisfaction with respect to social cohesion; (i) satisfaction with children's services; (j) satisfaction with support for women

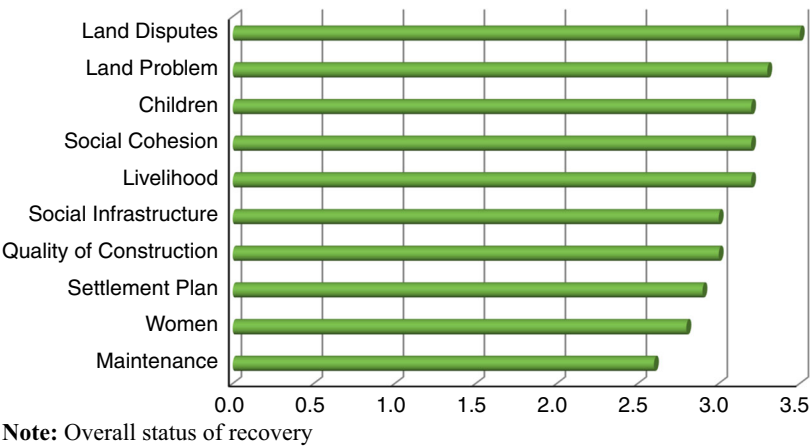
Figure 2.



Note: Composite index of recovery by location

Figure 3.
Ranking of the ten communities using an overall composite index that groups the ten components of recovery

Figure 4.
Nature and extent of
recovery following the
Indian Ocean tsunami
with respect to the ten
indicators of recovery



and limitations of external interventions. The assessment used is multidimensional and socially inclusive. The kind of qualitative assessment that we have done can provide a sound basis for governments, sectoral agencies and local institutions including NGO's to plan and implement remedial measures in communities that indicate a low level of recovery in general and in certain aspects of recovery in particular. These qualitative assessments can also provide valuable insights to planners and implementing agencies to design disaster recovery plans in the future.

The approach adopted is new to post-disaster recovery assessments and is useful for monitoring and evaluation of recovery processes. It also fits into the social accountability model as the assessment is based on community experience with the recovery process.

References

- Aldrich, D.P. (2012), *Building Resilience: Social Capital in Post-Disaster Recovery*, University of Chicago Press, Chicago, IL.
- Alesch, D.J. (2004), "Complex urban systems and extreme events: towards a theory of disaster recovery", *1st International Conference of Urban Disaster Reduction, Kobe, January 19*.
- Alexander, D. (2008), "Mainstreaming disaster risk management", in Bosher, L. (Ed.), *Hazards and the Built Environment: Attaining Built in Resilience*, Taylor & Francis, Londres, pp. 20-36.
- Birkmann, J., Buckle, P., Jaeger, J., Pelling, M., Setiadi, N., Garschagen, M. and Kropp, J. (2010), "Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters", *Natural Hazards*, Vol. 55 No. 3, pp. 637-655.
- Chang, S.E. (2010), "Urban disaster recovery: a measurement framework and its application to the 1995 Kobe earthquake", *Disasters*, Vol. 34 No. 2, pp. 303-327.
- Comerio, M.C. (2004), "Key elements in a comprehensive theory of disaster recovery", *1st International Conference of Urban Disaster Reduction, Kobe, January 19*.
- Cooray, S. (2005), "Donor support, pledges, commitments and expenditure", Background Papers, Sri Lanka Development Forum.

- Cutter, S.L., Emrich, C.T., Mitchell, T., Boruff, B.J., Gall, M., Schmidlein, M.C. and Melton, G. (2006), "The long road home: race, class, and recovery from Hurricane Katrina", *Environment*, Vol. 48 No. 2, pp. 10-21.
- Department of Census and Statistics Sri Lanka (2006), "Socio-economic data", available at: www.statistics.gov.lk/ (accessed March 10, 2016).
- Duyne-Barenstein, J. (2006), "Challenges and risks in post-tsunami housing reconstruction in Tamil Nadu", *Humanitarian Exchange*, No. 33, pp. 38-39.
- Haas, J.E., Kates, R.W. and Bowden, M.J. (1977), *Reconstruction Following Disaster*, MIT Press, Cambridge.
- Haigh, R. and Amaratunga, D. (2010), "An integrative review of the built environment discipline's role in the development of society's resilience to disasters", *International Journal of Disaster Resilience in the Built Environment*, Vol. 1 No. 1, pp. 11-24.
- Hettige, S.T. (2007), *Tsunami Recovery in Sri Lanka*, SPARC, University of Colombo and Action Aid International, Colombo.
- Mileti, D. (1999), *Disasters by Design: A Reassessment of Natural Hazards in the United States*, National Academies Press, Washington, DC.
- Ministry of Finance and Planning (2006), "Post tsunami recovery and reconstruction", report, MoFP and the Reconstruction and Development Agency (RADA), Colombo, December.
- Mulligan, M. (2013), "Rebuilding communities after disasters: lessons from the Tsunami disaster in Sri Lanka", *Global Policy*, Vol. 4 No. 3, pp. 278-287.
- Quarantelli, E.L. (1999), "The disaster recovery process: what we know and do not know from research", preliminary paper, University of Delaware, DE.
- Ratnasooriya, H., Samarawickrama, S. and Imamura, F. (2007), "Post tsunami recovery process in Sri Lanka", *Journal of Natural Disaster Science*, Vol. 29 No. 1, pp. 21-28.
- Rubin, C.B. (2009), "Long term recovery from disasters – the neglected component of emergency management", *Journal of Homeland Security and Emergency Management*, Vol. 6 No. 1, doi: 10.2202/1547-7355.1616.
- Schwab, J., Topping, K., Eadie, C., Deyle, R. and Smith, R. (1998), "Planning for post-disaster recovery and reconstruction", PAS Report No. 483/484, American Planning Association, Chicago, IL.
- Smith, G. and Birkland, T. (2012), "Building a theory of recovery: institutional dimensions", *International Journal of Mass Emergencies and Disasters*, Vol. 30 No. 2, pp. 147-170.
- Telford, J. and Cosgrave, J. (2007), "The international humanitarian system and the 2004 Indian Ocean earthquake and tsunamis", *Disasters*, Vol. 31 No. 1, pp. 1-28.
- Tierney, K. and Oliver-Smith, A. (2012), "Social dimensions of disaster recovery", *International Journal of Mass Emergencies and Disasters*, Vol. 30 No. 2, pp. 123-146.

Further reading

- Birkmann, J. (2006), "Indicators and criteria for measuring vulnerability, theoretical bases and requirements", in Birkmann, J. (Ed.), *Measuring Vulnerability to Natural Hazards*, United Nations University, Tokyo, pp 55-77.
- Birkmann, J., Fernando, N. and Hettige, S. (2006), "Measuring vulnerability at the local level", in Birkmann, J. (Ed.), *Measuring Vulnerability to Natural Hazards*, United Nations University, Tokyo, pp 300-315.

De Leon, J.C.V. (2006), "Vulnerability assessment; the sectoral level", in Birkmann, J. (Ed.), *Measuring Vulnerability to Natural Hazards*, United Nations University, Tokyo, pp. 300-315.

Dominoes, M. (2006), *After the Tsunami: Relief and Rehabilitation in Sri Lanka*, Mosaic Books, New Delhi.

Von Braunmuhl, C., Bolz, R., Jayatilake, L., Noble, K. and Saroor, S. (2006), *Tsunami: A Study on Disaster Response in Sri Lanka*, Heinrich Boll Stiftung, Berlin.

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