Design and Delivery of Post-disaster Housing Resettlement Programs

CASE STUDIES FROM SRI LANKA AND INDIA

Judith Shaw and Iftekhar Ahmed

MONASH ASIA INSTITUTE
MONASH UNIVERSITY

REPORT 6
Design and delivery of post-disaster housing resettlement programs:
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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>DAT</td>
<td>Damage Assessment Team</td>
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<tr>
<td>DDC</td>
<td>District Donor Consortium</td>
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<tr>
<td>FoG</td>
<td>Foundation of Goodness</td>
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<tr>
<td>GoSL</td>
<td>Government of Sri Lanka</td>
</tr>
<tr>
<td>INGO</td>
<td>International NGO</td>
</tr>
<tr>
<td>NHDA</td>
<td>National Housing Development Authority</td>
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<tr>
<td>ODP</td>
<td>Owner-driven Program</td>
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<tr>
<td>RADA</td>
<td>Reconstruction and Development Authority</td>
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<tr>
<td>RHP</td>
<td>Resettlement Housing Program</td>
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<tr>
<td>TAFREN</td>
<td>Task Force for Rebuilding the Nation</td>
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<tr>
<td>THRU</td>
<td>Tsunami Housing Reconstruction Unit</td>
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<tr>
<td>TNSCB</td>
<td>Tamil Nadu Slum Clearance Board</td>
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<tr>
<td>UDA</td>
<td>Urban Development Authority</td>
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1. Introduction

Post-disaster housing delivery can be classified broadly into two modes: provision of assistance to rebuild original dwellings, often with the active participation of householders in the building process; and permanent relocation to resettlement schemes. The advantages of reconstructing dwellings on their original sites include provision of greater control of the design and construction process to householder, and minimisation of disruption to community networks and livelihoods. Moreover, it avoids the costs and complexities associated with acquiring suitable resettlement sites. Therefore, disaster management studies generally agree that whereas in situ rebuilding is the preferred default option in the absence of compelling countervailing circumstances, resettlement may be required to mitigate future hazards or implement alternative land use policies (Cernea 1999). The governments of Sri Lanka and Tamil Nadu saw the tsunami as an opportunity to implement pre-existing land use and slum clearance policies which had not previously been enforced. While the majority of tsunami-affected families in both countries were outside the scope of government land-use plans and received assistance to rebuild on their own land, thousands of coastal dwellers were relocated to newly constructed housing settlements. Four years after the tsunami, these resettlement projects provide useful lessons on which aspects of design and delivery should be encouraged, or avoided, in post-disaster resettlement programmes.

This report reviews the design and delivery of resettlement housing projects. It highlights achievements made in the context of a highly constrained post-disaster situation and also identifies aspects that required more careful attention. Above all, it underscores the resilience and capacity for adaptation of the communities living in the settlements and indicates the necessity of involving communities in all stages of planning, design and implementation. The urban coastal shanty communities targeted for resettlement in the two Indian case studies examined in this research came under the mandate of the Tamil Nadu Slum Clearance Board (TNSCB), a state government agency which received funding from the government of India and the World Bank's Emergency Tsunami Reconstruction Program facility to build several apartment complexes in Chennai to resettle tsunami-affected shanty communities. The TNSCB had sole responsibility for all project stages from preliminary planning, occupant selection, land acquisition and building design to construction, community development and post-occupancy repairs and maintenance. These processes were managed according to the TNSCB's standard pre-existing principles for resettlement of households affected by slum clearance programs, with minimal operational involvement from donors or other state and national government agencies.

Unlike Chennai, Sri Lanka had no pre-existing policy or institutional framework that could be readily adapted for the management of large-scale resettlement programs, and had to develop one from scratch. Moreover, the impact of the tsunami on social and economic infrastructure and government capacity was far more severe than in India. Primarily for these reasons, resettlement construction in Sri Lanka was contracted to local and international donors, with the government retaining responsibility for policy development, coordination and supervision. In the housing sector, challenges arose from limited state capacity and endemic governance weaknesses which were escalated by the massive post-tsunami influx of resources and international agencies. The reconstruction
process operated in a highly politicised context, hampering consistency and transparency in local program delivery and aid allocation, while at the central level, political factors were evident in significant regional disparities in resource distribution. Tensions in the new working relationships between central and regional agencies and with the non-government sector were exacerbated by the reluctance of the highly centralised government to devolve powers to deal with acute regional problems. For their part, too many international agencies lacked technical expertise, local knowledge and skill in managing their relations with government. Tensions were particularly acute in Sri Lanka’s northeast, where the long-standing civil conflict compounded the complexities of managing reconstruction.

Among developing country settings, the state of Tamil Nadu was unusual in having sufficient public sector capacity, expertise and institutional arrangements to enable the relatively smooth incorporation of post-emergency urban construction into its operations with little or no external support other than financial assistance. (Even in India, however, this capacity did not extend to rural Tamil Nadu and other states, where responsibility for post-tsunami housing reconstruction fell largely on international donors). Far more typical of post-disaster developing countries is the situation in which Sri Lanka found itself, requiring international assistance not only in funding but also in implementing a housing program. For the international development community, the most important lessons that our research generates relate to the challenges of devising appropriate policies, processes and coordination arrangements to deal with a multiplicity of actors working on an immense and unprecedented task in a problematic governance environment. The main focus of this report therefore is on the Sri Lankan experience, drawing where appropriate on the Indian case studies.

2. Methodology

Field investigations were carried out in 2008 and 2009 in four locations where post-tsunami resettlement programs were implemented: Hambantota, Seenigama and Thirrupukkudai in Sri Lanka and Chennai in India (see Map 1). Data was collected through observations at the survey sites and interviews with occupant households, senior officials from local and national government agencies, and representatives from the aid agencies responsible for constructing the houses. Between 20 and 30 randomly selected households were surveyed at each site (see Table 1 for details of sample size). The survey process consisted of physical inspections and semi-structured interviews in which respondents discussed their experiences of acquiring and living in their new houses. Several issues were explored, including occupant selection processes, levels of satisfaction with housing design and construction and the quality and accessibility of local infrastructure and services. Local communities in both India and Sri Lanka took a keen interest in the research process, and when conducting household interviews, it was common for neighbours to be present and participate. Where several neighbours were present, household interviews took the form of focus groups or even community meetings with extended discussions of key concerns, thereby broadening the range of viewpoints available to the researchers.
Map 1: Outline map of the case study area

[Map showing outlines of India and Sri Lanka with key locations marked: Chennai, Colombo, Thirukovil, Seenigama, Hambanota]
Table 1: Overview of the case study locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Implementing Agency</th>
<th>No. of dwelling units</th>
<th>Sample size</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Town, Hambantota District</td>
<td>Various*</td>
<td>2330</td>
<td>29</td>
<td>Mostly single storey dwellings on 506m² lots built by various agencies on new resettlement site as part of larger urban development plan. Brick walls and clay tile on timber frame roofing.</td>
</tr>
<tr>
<td>Hambantota town</td>
<td>World Vision (International NGO)</td>
<td>40</td>
<td>4</td>
<td>Three four-storey blocks, two with 16 apartments each and one with eight apartments within a walled compound in the old Hambantota town centre</td>
</tr>
<tr>
<td>Victoria Gardens Village, Seenigama, Galle District</td>
<td>Foundation of Goodness (FOG) (Local NGO) Funded by the Victorian Government of Australia</td>
<td>84</td>
<td>13</td>
<td>Two-storey townhouses each with two units around a central open space with community facilities within a walled compound; single storey houses on 151.8 m² lots within a walled compound</td>
</tr>
<tr>
<td>VOC Nagar and Thilagar Nagar, Chennai, India</td>
<td>Tamil Nadu Slum Clearance Board</td>
<td>VOC Nagar: 960 Thilagar Nagar: 432</td>
<td>20</td>
<td>Four-storey apartment blocks each with 24 apartments (six per floor), concrete construction, within walled compounds in urban location</td>
</tr>
<tr>
<td>Kudilnilam and Mandanai, Thirrukovil</td>
<td>Various NGOs**</td>
<td>Kudilnilam: 164 Mandanai: 265</td>
<td>20</td>
<td>Single-storey houses on 500m² blocks. Concrete block walls; clay tile on timber frame roofing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>3766 62</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* Our sample included houses built by seven of the 19 agencies which undertook housing construction in Siribopura and Hambantota town: three international NGOs, one Sri Lankan NGO, a bilateral agency, one Sri Lankan corporation and one private individual.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>** Two Sri Lankan NGOs, one Sri Lankan corporation and one international NGOs undertook construction in Mandanai. A Sri Lankan church-based agency undertook construction in Kudilnilam in partnership with a local NGO.</td>
<td></td>
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3. Policy and institutional frameworks

The buffer zone

Within weeks of the tsunami the GoSL announced the creation of a buffer zone with heavy restrictions on rebuilding within 100 meters of the high tide mark in the southwestern districts and 200 meters in the eastern district. No-build zones feature in the coastal management plans of many countries as a means of protecting coastal ecosystems, mitigating cyclone risk and adapting to sea-level rise (IPCC 2001), and Sri Lankan studies have supported the creation of coastal setbacks in preserving coastal vegetation and reducing erosion (Hettiarachchi et al. 2005). Although a plausible case for some form of coastal setback could have been made on environmental and hazard-reduction grounds, the government made little attempt to provide a convincing rationale for the proposal or rally public support behind it. This was a surprising omission given the difficulty of implementing controversial measures in Sri Lanka’s adversarial political culture, which in the event proved a major obstacle, with the mobilisation of community and business groups and the opposition parties against the plan.
The buffer zone policy was developed in haste, without a strong evidence base and with little attempt to consult with affected communities or engage the expert knowledge of regional planning authorities. The Coastal Conservation Department, the principal authority on coastal management, provided little input. With design flaws which could have been identified and addressed by a more carefully considered approach, the policy proved unworkable in practice.

A notable flaw was the failure to consider the social, spatial and economic implications of relocating several hundred thousand households. Nominally, the buffer zone relaxed the existing regulatory regime contained in the Coastal Conservation Act (CCA), enacted in 1981 but never enforced, which established a 300-metre no-build zone. In practice, little or no attempt had been made to enforce the CCA prior to the tsunami. With extensive unregulated development having proceeded unchecked in coastal towns and along the arterial road that follows the south western shoreline, population densities in many coastal regions were among the highest in the country (see Map 2). With high population concentrations within the setback limit and acute land shortages in most coastal regions, it was apparent that locating suitable resettlement sites would present a formidable challenge. The creation of alternative livelihood options for resettled households presented a further problem, given the importance of and the importance of the coast as a source of livelihoods in fisheries, tourism and trade and the concentration of infrastructure within 100 metres of the shoreline.

Arbitrary setback limits were imposed without reference to local topography, so that the ban applied not only to coastal plains but also to areas protected by sand dunes and elevated headlands. The inclusion of areas not subject to environmental or public safety risks led to criticisms that the plan’s application was too broad and lacked scientific rigor. Furthermore, the occupants of undamaged and slightly damaged houses were allowed to remain in the buffer zone, leading critics to point out that whether public safety or environmental rehabilitation was the rationale, it should be uniformly applied (Institute of Policy Studies 2006). The exemption of hotels from the ban on new building within the setback limit raised suspicions that its true purpose was the removal of poor fishing families to the invisible hinterland to serve an elite vision of coastal beautification and make way for tourism development (Uyangoda 2005). The legislation was widely criticised nationally and internationally, the Asian Development Bank noting that ‘While there is wide consensus that a buffer zone may be necessary to reduce potential coastal risks, there is no scientific and consultative basis for the proposed zones’ (Asian Development Bank 2005:16).

At the end of 2005 the mandatory 100 and 200 meter setbacks were abandoned in favour of a reversion to the provisions of an earlier Coastal Zone Management Plan (CZMP), proclaimed in 1990 but never enforced. The CZMP specifies area-specific setback zones ranging from 35 metres depending on local physical conditions, with coastal construction proposals decided on a case-by-case basis by local government authorities in consultation with the Coastal Conservation Department. The new regulations are generally agreed to be an improvement, providing the flexibility to accommodate planning requirements to local conditions.
Map 2: Sri Lanka population density

One dot represents 1000 people
The donor-driven and owner-driven housing programs

To accommodate the requirements of the buffer zone plan, two parallel housing assistance schemes were established soon after the tsunami, and remained in place after the revisions to the buffer zone plan at the end of 2005. Permission to rebuild dwellings inside the buffer zone was restricted to cases where the cost of repairs represented less than 40 per cent of the building’s estimated value. A grants program known as the ‘owner-driven program’ (ODP) provided funds directly to householders to repair or rebuild in situ, and applied to dwellings inside the buffer zone which had sustained minor damage, and to tsunami-affected dwellings outside the setback limit, irrespective of the level of damage.

The second scheme, which is the subject of this research, applied to residents of the buffer zone whose houses were severely damaged or destroyed. These households were to be relocated to purpose-built new housing projects built by donors under the ‘donor-driven’ resettlement housing program (RHP). Under the Implementation Guidelines for Donor Assisted Housing and Township Reconstruction drawn up by TAFREN, the GoSL contracted construction of resettlement housing to donors, retaining responsibility for land identification and acquisition, development of design regulations, planning approvals, inspection of building work, installation of power, water and sewage services up to settlement boundaries and authentication of occupant eligibility. Donors interested in constructing resettlement schemes were invited to register with the Task Force for Rebuilding the Nation (TAFREN) or its post-2005 successor the Reconstruction and Development Agency (RADA), and submit proposals stating the districts in which they proposed to operate and the number of houses they wished to build. Once a donor had agreed on a particular district the District Secretary, the chief local official, was responsible for allocating specific sites and coordinating donor activities, assisted by a District Donor Consortium (DDC) consisting of all RHP donors in the district. The Urban Development Authority (UDA) was responsible for identification of suitable land, and approval of layout and building plans.

Under the TAFREN guidelines beneficiary selection was to be a participatory tripartite process, conducted by local damage assessment teams (DATs) comprising the divisional secretary and donor and community representatives. The DATs were responsible for authenticating eligibility via inspections and document checks and assigning eligible households to the ODP or RHP depending on the extent of damage and their location with respect to the buffer zone boundary, as described above. There was a process for referring disputed assessments to district-level committees of donor and government representatives, and provision for a TAFREN-appointed panel of auditors to oversee occupant selection processes. To be eligible, claimants were required to demonstrate permanent residence in a tsunami-affected local government division with freehold title, long-term government leasehold or customary tenure of a dwelling which had been damaged in the tsunami. Private tenants, who comprised around 2 per cent of tsunami-affected households, were not eligible for housing assistance. Eligibility criteria were very broad, providing substantial discretion to DATs in such matters as assessment of the extent of damage (which in the buffer zone determined whether a households would be resettled or permitted to rebuild in situ), and the definition of ‘extended families’ for the purpose of determining the number of houses or housing grants to be allocated to claimants.
Unstable planning parameters

Policy shifts and a lack of reliable data led to several revisions in housing targets and reconstruction plans, creating costly planning confusion and construction delays. By mid-2005, the government had signed MoUs with various donors to construct 43,000 houses on 387 different sites under the RHP scheme. The revisions to the buffer zone, however, sharply reduced the RHP requirement: under revised targets issued by the GoSL in May 2006 the ODP, originally envisaged as a minor adjunct to the RHP scheme, became the major vehicle for housing delivery, representing 70 per cent of the planned requirement.

As a result of the amendments, which as noted above reduced the setback limit from 100 to 35 meters in most areas, approximately 24,000 eligible households inside the original buffer zone were now outside it (MHP 2006). Although these households had been allocated new houses in the resettlement projects, some of which were complete or nearing completion, they were now given the option of either resettling under the RHP scheme or returning to their land to rebuild in situ. In the event, many opted to return to their original land, leaving an excess of new construction in many resettlement schemes. From mid-2005 public uncertainty regarding the future of the buffer zone created considerable confusion, as occupants, anticipating the repeal of the legislation, planned to reoccupy their original land rather than moving to houses allocated to them in the resettlement schemes. Some implementing agencies halted work while the new policy was clarified and finalised. The GoSL estimates that the repeal of the buffer zone legislation delayed the housing program by at least six months (MFP 2006).

In both Sri Lanka and India there were anomalies in initial housing needs assessments, estimated requirements and subsequent reporting of progress with construction, with confusing discrepancies and unexplained revisions in the statistics reported by different government authorities (Grewal 2006). From early 2005 there was an unstated policy of encouraging construction in New Town well in excess of targets indicated by Department of Census statistics on tsunami damage. At the national level, the Development Assistance Database (DAD) developed by the UNDP to track resources and monitor progress in four tsunami-affected countries was only partially effective in the Sri Lankan housing sector, as it relied on self-reporting by donors supplemented by data collected through site visits by THRU engineers and technical officers attached to District Secretariats. Self-reporting by INGOs and smaller donors including Sri Lankan NGOs and the private sector was erratic, while district officer site visits for data-gathering were irregular throughout 2005 and ceased altogether in 2006 with the closure of THRU offices in the districts.

In May 2006 further planning revisions were necessitated by a government decision to increase the total housing target by approximately 20,000. The evidence base for the expansion was not clear, as all damaged dwellings were included in the census data on which the original reconstruction targets were based. Although never fully explained by the GoSL, it appears that the expanded reconstruction target was a means of allocating the excess resettlement housing resulting from the buffer zone amendments.

Coordination and communication

In Sri Lanka, implementing agencies reported confusion with discontinuities in the machinery of government responsible for housing reconstruction, unclear demarcation of responsibilities and weak communication and coordination arrangements (see
Box 1). The process of signing MoUs and obtaining the necessary approvals to begin construction was unnecessarily complex, involving several different government agencies. While TAFREN and later RADA were responsible for coordinating the housing construction effort, their effectiveness was limited by inadequate organisational links and a lack of clarity regarding their policy-making powers vis-à-vis those of the various line ministries.

The long-standing propensity of incoming governments to establish new ministries on top of existing structures has led to a proliferation of government agencies with overlapping policy responsibilities, a pattern which persisted in the wake of the tsunami. With 105 ministers, the current government is the largest in Sri Lankan history (World Bank 2008). Several ministries established relief and reconstruction schemes with little or no consultation or coordination with other agencies. Inter-agency disagreements regarding the demarcation of responsibilities caused considerable confusion. District authorities complained of confusing and contradictory directives and decisions coming from various central agencies. One evaluation of the post-tsunami aid response noted that as many as four ministries were issuing various buffer zone regulations during 2005 (Centre for Policy Alternatives 2006).

In Hambantota, an additional layer of complexity was added by the establishment of a special ‘Helping Hambantota Office’ (HHO) early in 2005 outside the regular administrative channels set up to manage reconstruction and under the direct control of the Prime Minister (later the President), a move which fuelled perceptions that Hambantota had been targeted for special treatment for political reasons. The District Secretary’s office reported having little contact with the HHO, a ‘separate structure’ which reported directly to the President.

Local authorities responded strongly in the initial emergency phase but in the absence of effective command structures and communication channels, lacked guidance on matters that required centralised decision-making and were not sufficiently informed of government policy and policy changes, leading to the inconsistent application of regulations (see Box 2). Although the revisions to buffer zone setbacks were publicly announced in October 2005, it was several months before revised directives were issued to local authorities, and there were reports that some district authorities were continuing to apply the original legislation as late as March 2006 (Centre for Policy Alternatives 2006). Infrequent and inconsistent communications with the centre resulted in a paralysis in decision-making, especially when local authorities were not clear as to what decision-
making powers they were granted, and implementing agencies reported frustrations in dealing with local officials as decisions were constantly referred upwards.

Local government offices, many of which were under-resourced before the tsunami, were ill-equipped to cope with their massively increased workloads. A report by the Asian Development Bank identified significant capacity deficiencies at the local level despite a desire to take on more responsibility for directing the recovery effort (ADB 2006) (Box 3). The TAFREN guidelines required implementing agencies to submit housing plans to the UDA for approval. Throughout 2005, the staff complement at the Hambantota UDA office remained at 2004 levels, with only one qualified planner to manage the entire approval process for more than 2,000 new houses in New Town. By 2006, when the office took on five additional planners, most constructions projects were well underway. In practice, few donors sought planning approvals prior to commencement and the under-resourced UDA, faced with intense pressure to expedite construction, allowed building to commence without them. Subsequently, the absence of planning documentation caused a significant problem for householders, as the authority responsible for issuing occupancy permits refused to do so without evidence of planning approval. District-level UDA officials attempted to obtain housing plans from implementing agencies, but this was not always possible as many had left the country after handing over houses to occupants.

Box 2: Decentralisation: an incomplete process

Since a 1987 constitutional amendment that devolved several government functions to the provinces, Sri Lanka has had a three-tiered political system consisting of the central government, eight elected provincial councils and over 300 elected local councils. In practice, political and bureaucratic commitment to decentralisation has been lacking and regional authorities are circumscribed by political manoeuvring and inadequate budgets. As a result, decentralisation in Sri Lanka has not produced the desired results in terms of a more responsive and accountable system of government and effective delivery of public services. All three tiers of government have administrative structures which operate at the local level, but there are few organisational linkages between them, and provincial and local departments are usually subordinated to the parallel operations of central agencies. The central government presence at the local level includes, in addition to line ministries and statutory authorities, a system of district and divisional secretariats responsible for the regional coordination of government activities. These secretariats, together with the regional branches of central government agencies are the de facto providers of most public goods and services. Although they are better resourced than provincial and local government authorities, they are under-funded and poorly equipped to perform their tasks and have little input in policy-making.

Available sources of expertise were under-utilised in the highly centralised development of the buffer zone policy and dual-track housing assistance policy. National government agencies outside a small central group consisting of the Presidential Secretariat, the Ministry of Finance and Planning, TAFREN/RADA and the UDA were marginalised in the policy process. The exclusion of local and specialist authorities from reconstruction planning deprived policy-makers of essential local knowledge and contributed to unsuitable or impractical policies. As noted above, the Coastal Conservation Department was marginalised in the development of the initial buffer zone plan. In addition, the National Housing Development Authority (NHDA), a specialist government agency with expertise in post-disaster housing through its work in landslide and flood-affected areas, prepared a comprehensive set of guidelines for housing development and settlement planning in tsunami-affected coastal areas (NHDA 2005). However, the NHDA guidelines were overlooked in favour of less detailed specifications developed by the UDA, and the NHDA, despite its solid experience in the field, was sidelined in the resettlement planning process.
Box 3: Public sector capacity and human resources

A number of factors have reduced the quality and independence of the civil service, and while competent and dedicated public servants can be found at all levels of government, they are increasingly the exception rather than the rule. The education system is of generally poor quality and is not producing sufficient able graduates to stem the brain drain created by the emigration of much of Sri Lanka’s professional class between the 1960s and 1980s and the continuing preference of the most highly qualified people for work abroad. Since the 1970s a series of constitutional amendments have effectively transferred control of public service recruitment to politicians, resulting in appointments based on patronage rather than merit and an erosion of neutrality. The GoSL has declined to implement the 17th amendment to the Constitution, aimed at depoliticising senior appointments. Capacity weaknesses are exacerbated by relatively unattractive salaries at senior and professional levels (although at non-graduate levels public sector pay and conditions compare well with private sector alternatives) and a public sector work culture that deters the most able job seekers. As a consequence, positions requiring specialist skills are often filled by generalists.

Capacity constraints and pressure for fast results

Following the tsunami the number of international NGOs working in Sri Lanka increased from 50 prior to the tsunami to more than 150 (Centre for Policy Alternatives 2006). In addition, a large number of philanthropic individuals, corporate donors and other organisations with no previous experience in housing signed MoUs for resettlement construction. Government agencies were thus confronted with the task of managing an enormous influx of donors with varying levels of experience and resources, ranging from established INGOs with international track records to a plethora of newly constituted bodies, some of which had formed opportunistically in response to the presence of aid funds. There were concerns regarding the experience and competence of some NGOs and INGOs, with claims of competition for ‘clients’, duplication of activities, poorly-designed interventions, and allegations that some were pursuing religious proselytisation agendas.

In Sri Lanka, a lack of expertise on the part of implementing agencies and pressures for quick results from the GoSL and international constituencies compromised design and construction quality and resulted in programming based on overly optimistic assessments by agencies of their capacity to deliver (Greenblott 2007). Some responded to ‘competitive pressures’ from others by entering hasty agreements without preliminary participatory needs assessments in target communities. Prominent international NGOs which lacked experience in housing were able to access funds based on their reputation in other sectors and began embarking on large housing reconstruction projects. On the other hand, organisations specialised in housing were generally small and less recognised, hence had access to much less funding. Of the 19 donors which signed MoUs for housing developments in New Town, ranging in number from 35 to 649 units, only three had previous experience in housing construction. Thus, during the early phases of the response, many donors lacked in-house experience with large capital projects, and had little understanding of key processes such as tendering, preparing construction drawings and technical specifications, procurement and supervision. While many agencies subsequently rectified early skills deficiencies, early unrealistic commitments made by staff who lacked the required operational experience impacted heavily on program design and led to tensions with the GoSL when NGOs tried to renegotiate early agreements (Greenblott 2007).
During the first 12 months, donors and local officials faced pressure for quick results from the central government, and in the case of international donors, from their constituencies at home. Adding to the pressure were frequent media reports drawing attention to the overcrowded camps in which most tsunami survivors were housed. Several donors reported pressure from the GoSL to begin construction before occupants had been identified, precluding opportunities for prior consultation. In August 2005 a group of implementing agencies complained to TAFREN of pressure to start immediate construction of houses, stating that high-level government officials had threatened to withdraw their MoUs, despite uncertainty regarding the future of the buffer zone and the identity and number of households to be relocated, and problems with land availability (Greenblott 2007). For its part, the GoSL held that many housing contractors failed to meet their commitments to deliver a specified quantity of housing by a specified date. In an atmosphere of mutual suspicion, considerable NGO resources were diverted to lobbying, negotiating and managing tensions in their relationships with governments.

4. Preliminary project programming

Site selection

The GoSL’s preference has been to site resettlement schemes on public land. Although the government owns more than 80 per cent of Sri Lanka’s land, most of it is unavailable for resettlement, being occupied by national parks and water catchment areas or given over to long-term agricultural leases. Land scarcity proved a significant obstacle in densely populated coastal regions in the southwest and also in the east, where lagoons and marshlands restrict the availability of coastal land suitable for resettlement. In Ampara, the District Secretary’s office was responsible for land allocation but lacked qualified engineering and surveying staff to check suitability. In some cases, lack of expertise in the responsible government agencies led to the siting of resettlement schemes in flood-prone or otherwise unsuitable areas, and some implementing agencies rejected sites allocated by the government after conducting independent risk assessments. Private acquisitions, the only option in areas where public land is limited, were associated with price inflation. Although the government was nominally responsible for private acquisitions, many implementing agencies engaged privately with landholders to minimise delays, or to procure alternative sites when land offered by the government was deemed unsuitable. On balance, site selection outcomes in the case study settlements have proved satisfactory. In line with established resettlement planning principles, the TAFREN guidelines for selection of resettlement sites emphasised proximity to original neighbourhoods and the importance of keeping communities intact. Importantly, the case study households in both Sri Lanka and India were relocated within or close to their former neighbourhoods, thereby minimising disruption to social networks and livelihoods. However, housing and settlement design in Seenigama has been constrained to some extent by land scarcity, while in the Thirrukovil settlements, geographic isolation has aggravated problems of poverty and lack of infrastructure.

The coastal town of Hambantota (pre-tsunami population 11,213) serves as an administrative and commercial hub for Hambantota district, a sparsely populated, remote region in Sri Lanka’s southeast. The New Town housing complex three kilometres north of Hambantota was established as the site for a major new residential development of 2,330 houses, the largest post-tsunami resettlement project in Sri Lanka. Nineteen donors, including philanthropic individuals, local community organisations,
corporations, local and international NGOs, and bilateral aid agencies, signed agreements with the government to construct houses in New Town, varying in number from 35 to 649 units. The majority of New Town residents were relocated from nearby coastal villages and the extensively damaged eastern side of Hambantota town, which after the tsunami was rezoned for commercial development under the Greater Hambantota plan (see Box 4). In addition, since housing construction in New Town exceeded relocation requirements under the RHP, a significant number of houses were allocated to families which had not been directly affected by the tsunami.

Box 4: The Greater Hambantota development: a regional city in the south

Several years earlier, the government had identified Hambantota as a site for a second port, commissioning a number of feasibility studies before eventually shelving the project due to lack of funds. In 2002 the Urban Development Authority (UDA), a government agency, recognising that the existing township lacked the population and facilities to support the proposed port development, produced the first draft of a town plan which set aside much of the residential area on the town's eastern side for commercial and industrial development, and created a new residential precinct north of the town. Prior to the tsunami, the legal, fiscal and political problems presented by the compulsory relocation of several hundred households had proved insurmountable obstacles to the proposal. After the tsunami, however, the partial destruction of the town, combined with the availability of a rich reservoir of donor-funded resources for rebuilding, created a rare window of opportunity for planners.

Although donors may not have realised it at the time, significant aid resources intended for post-tsunami housing reconstruction ended up supporting the residential component of the Greater Hambantota development. From the beginning, Hambantota attracted a disproportionate share of aid resources and by July 2007, new housing construction in the district exceeded the estimated requirement by 88 per cent, while lagging well behind in the more severely affected northern and eastern provinces (RADA 2007). During preliminary discussions in Colombo on the scope and location of assistance, several implementing agencies reported being ‘steered towards Hambantota’ by senior government figures, some having received invitations from the Prime Minister to do so. In the early months of 2005, several implementing agencies signed MoUs for New Town projects without knowledge of commitments made by other agencies, and thus had little prior indication of the potential for excess construction. Similarly, an officer from the Hambantota district office of the UDA stated that ‘Most of the MoUs were signed before anyone knew exactly how many houses were required. We were simply told to process all MoUs that were referred to us’.

Several factors contributed to the concentration of resources in the Hambantota region. In contrast with the acute land shortages which prevailed elsewhere in the Southern Province, the area north of Hambantota contained large tracts of undeveloped state-owned land suitable for residential development. In addition, the New Town resettlement schemes could be readily integrated with the residential component of the Greater Hambantota plan. Moreover, given the clientelistic character of Sri Lankan politics, the importance of the South as a vote bank for the ruling coalition and intense rivalry between high-profile national political figures with a particular interest in the
district, there is little doubt that politics was a factor in the skewing of resources towards Hambantota. 

Seenigama, a village of 380 families, is located on Sri Lanka’s southwestern coast, 90 kilometres south of Colombo and two kilometres north of the tourist resort of Hikkaduwa, in a densely populated peri-urban coastal belt linking Colombo with the district capital of Galle, Sri Lanka’s third largest city. In Galle district, the Hikkaduwa and Seenigama local government divisions were the hardest hit, accounting for 40 per cent of damage to the district’s housing stock. The tsunami caused extensive damage to Seenigama and the surrounding area, destroying most built structures within 100 meters of the coast and damaging building up to 300 meters inland.

The Foundation of Goodness, an NGO led by an influential local businessman, was the dominant presence in all aspects of post-tsunami reconstruction in Seenigama, including housing. Using funds from corporate and bilateral donors, the FoG purchased a number of privately owned coconut plantations within the village precincts and contracted with RADA to construct three housing projects: the Aviva Village (19 units) and the KPMG/LOLC village (50 units), and the Victoria Gardens village (84 units). In addition, the FoG obtained international funding to construct a range of community facilities including a health centre, computer training school, sports complex and swimming pool, and to implement livelihood and educational programs. The Aviva and KPMG houses were completed and occupied in April 2007, and the Victoria Gardens settlement was occupied in October 2007. In accordance with government policy, the resettlement houses were allocated to families whose houses within the 100m buffer zone had been destroyed. In addition, the FoG provided funds and technical assistance to families who opted to rebuild on their original sites, using government grants obtained under the ODP.

Thus, unlike the other resettlement schemes studied in this research, households resettled in the Seenigama resettlement schemes remained within their village, mostly within 200 meters of their former dwellings. Moreover, the schemes were situated in close proximity to dwellings that had survived the tsunami and others that had been rebuilt under the ODP. These factors minimised resettlement-associated disruption and provided a settled, ‘lived-in’ quality to the environment that was absent in other schemes, although limited land size proved a constraint on housing and settlement design, particularly in the Victoria Gardens project, restricting internal floor areas and open space around the houses.

The politically well-connected founder of the FoG actively sought to persuade government agencies to maintain an arm’s length distance, and throughout the planning, design and construction phases there was minimal government intervention in the Seenigama project. The land was acquired through a process of private negotiation between the FoG and landholders, eliminating the need for government involvement.

Implementing agencies in the Thirrukovil schemes were limited in their choice of locations, a problem throughout the Eastern Province due to a shortage of land near the coast suitable for residential development. Elsewhere in Ampara district many

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1 The current president is from a well-established land-owning family in the district, and with three of his brothers, who also occupy senior government positions, commands extensive local patronage networks. The UNP, the major opposition party, is represented locally by Sajith Premadasa, the high-profile son of a former president who is widely seen as a future party leader and has a substantial local support base. In addition, Hambantota district was the traditional power base of the JVP during its revolutionary phase in the 1970s and 1980s and although its local influence has declined somewhat since then, the only JVP-controlled local council in the country is located near Hambantota town.
resettlement schemes were subject to long delays due to the difficulty of finding suitable land, and in some cases, the refusal of occupants to move to settlements constructed in remote areas. In the Thirrukovil schemes however the land was acquired within a few months and the completed houses were occupied early in 2006. Mandanai is situated on government-owned land. The implementing agency in Kudilnilam rejected the government's initial offer of a government-owned land site in the remote interior, instead purchasing land from a group of local farmers. The Kudilnilam and Mandanai schemes are located three kilometres inland from the coastal township of Thirrukovil, one of Sri Lanka's poorest and most remote regions, where economic underdevelopment has been aggravated by the civil conflict. Geographic isolation and deficiencies in local infrastructure have led to long delays in connecting the settlements to power and water supplies.

**Beneficiary selection**

In practice none of the case study communities complied with the TAFREN guidelines on beneficiary selection. The *de facto* preparation of beneficiary lists fell to the *Grama Sevaka*, a government-appointed village administrator. Lists compiled by the *Grama Sevaka*, ostensibly through individual assessments of tsunami victims in temporary shelters, were submitted to the local Divisional Secretary's office, which then matched beneficiaries to donors. Eligibility criteria for housing assistance were very broad and provided substantial discretion to local officials, leaving them vulnerable to pressure from politicians and creating inconsistencies in interpretation and opportunities for graft. At the local level, the use of state resources to reward political support has long been a feature of Sri Lankan politics, and political interference and petty corruption are endemic in the delivery of welfare goods and services, a process encouraged by the replacement of merit-based public sector recruitment with patronage-based appointments: the competitive examination for entry to the *Grama Sevaka* Service was abolished in the 1970s, and replaced with appointments based on the recommendation of local MPs. Local officials were subjected to intense pressure from politicians and there was considerable evidence of misallocation of housing benefits, including the taking of bribes and political partisanship in the compilation of occupant lists, a finding consistent with those of several other studies (see also Institute of Policy Studies, 2006; Transparency International 2007, Auditor-General 2005).

Most implementing agencies reported that beneficiary lists were not made available until construction was well advanced or even completed, thereby precluding verification of the number and identity of occupants, and preventing them from undertaking preliminary needs assessments and community consultations. Delays in obtaining beneficiary lists were cited by New Town donors as a key reason for reducing their construction commitments from levels specified in MoUs. When lists were finally made available, donors found them unreliable and initiated a verification process of visits to individual occupants, leading to further delays. Following verification processes several New Town donors disqualified a number of households on official lists, leading to tensions with the Divisional Secretary.

The tripartite beneficiary selection process was not implemented, due in part to the failure to establish effective coordination arrangements between donors and government agencies through DDCs. Many INGOs with a substantial local presence were formally DDC members but their participation was limited, especially when their head offices were located outside the district. Other implementing agencies such as private companies
and individual benefactors, were not members. Although participants in the DDCs shared occupant lists, their efficacy was limited by the lack of information-sharing with non-participant agencies. In addition, weak central systems for verification of occupants encouraged the duplication of assistance. The following instances of mismanagement were reported by implementing agencies participating in our research:

- Several donors reported disqualifying households after cross-checking and finding they were on the lists of other donors. Despite this however some individuals obtained two or three houses from different donors.

- Some families in temporary accommodation had been allocated a house but were delaying relocation in the hope that some other donor would offer them another house.

- Families which had previously occupied a single dwelling were allocated multiple dwellings.

- Individuals whose primary residence was elsewhere were allocated RHP houses which they rented out.

- An individual was allocated an RHP house while other family members continued to occupy their pre-existing dwelling in the buffer zone, which had sustained very little damage.

- An individual whose primary residence, outside the buffer zone, was unaffected by the tsunami was allocated an RHP house because he owned a land parcel with an unoccupied shack in the buffer zone.

- Individuals who were allocated RHP houses also received grants to rebuild houses on pre-existing sites.

- A well-off family which owned two houses which sustained minor damage had both houses assessed for grant purposes as ‘fully damaged’, and was also allocated an RHP house.

- A group of low-income farmers in the Hambantota area who were not affected by the tsunami were promised land grants and houses in 2003 by a prominent local politician. In 2008 they were issued with RHP houses in New Town.

In the southern and western districts, the majority of claimants who were eligible under the original TAFREN guidelines had been allocated either a house or a grant to rebuild in situ by mid-2006. Donors reported that following the expansion of the reconstruction target in May 2006, the use of eligibility criteria to allocate housing under the RHP was effectively abandoned. While donors were expected to accommodate the new households added to lists which continued to be provided by Divisional Secretaries, they were also given a free hand in independently identifying occupants for their excess houses. Thus, there were many instances of house allocation to those who were ineligible under the original TAFREN guidelines, including some who had experienced little or no direct impact from the tsunami. In the Victoria Gardens project in Seenigama, over a quarter of the intended occupants had either reclaimed their houses in the buffer zone or obtained houses elsewhere by the time the houses were completed. The excess houses were allocated to families which had been private tenants in the former buffer zone, a group explicitly excluded by the original guidelines.
Many implementing agencies were uncomfortable with the practice of allocating houses to individuals who had at best a remote connection with the tsunami, especially when it conflicted with their in-house targeting criteria. This was a particular concern of INGOs which were accountable to their head offices abroad for funds raised via public appeals and contributions from western governments, since the conditions associated with such donations often specified that recipients of housing assistance had to have lost their primary dwelling in the tsunami. Some reduced the number of houses stipulated in their initial contracts on finding that there were fewer than expected eligible occupants. Some donors disqualified applicants after conducting independent checks of lists handed to them by the DS, and one decided to forego plans for a second phase of housing construction, but for the most part, rather than exacerbating tensions with local government agencies, they reluctantly accepted the lists that were handed to them.

5. House and settlement design

In Sri Lanka, the UDA developed a set of principles for housing construction, with mandatory specifications relating to size and setbacks, and non-mandatory guidelines relating to construction methods and materials (see Table 2). Our research found that the mandatory guidelines were generally observed, although a small number of plots in New Town and Mandanai were found to be below the stipulated minimum size.

Table 2: Mandatory elements of UDA housing guidelines

<table>
<thead>
<tr>
<th>Item</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>House size</td>
<td>46.5m² (min)</td>
</tr>
<tr>
<td>Plot size</td>
<td>506m² in areas without piped water supply and sewerage; 152m²; in areas with piped water supply and sewerage.</td>
</tr>
<tr>
<td>Minimum room requirement</td>
<td>Two bedrooms, living room, internal kitchen, internal bathroom with latrine</td>
</tr>
<tr>
<td>Minimum room sizes</td>
<td>Bedroom 8m²; Kitchen 5m²; Store/Utility 2.5m²; Lavatory 1.36m² (for pedestal WC), 1.04m² (for latrine), 1.62m²</td>
</tr>
<tr>
<td>Minimum room heights</td>
<td>Living, Bedroom and Kitchen 2.8m; Bathroom, Lavatory, Porch, Balcony, Terrace and Garage 2.2m</td>
</tr>
<tr>
<td>Land coverage</td>
<td>Housing 65% (max); Common area 10% (min); Roads, drains, etc 20% (min); Social infrastructure 5% (min)</td>
</tr>
<tr>
<td>Setbacks</td>
<td>1m in front, 2.3m at rear for one-two storey houses; 1m in front, 3m at rear for three storey houses; For three+ storey houses rear setback determined by 63.50 angle between bottom of rear wall and window top level on top floor; Applicable for minimum road width of 3m in front</td>
</tr>
<tr>
<td>Roads</td>
<td>For four lots 3m road width (min) with drain on one side For eight lots 4.5m road (min) with drain on one side For 20 lots 6.0m road (min) with drain on one side with pavement For &gt;20 lots 9.0m road (min) with drains and pavements on both sides (Max length of road 50-100m; minimum setback in front of house 1m; Internal path should be provided after four adjacent lots)</td>
</tr>
<tr>
<td>Parking</td>
<td>Parking space 2.4x4.8” (min); 1 parking space for each housing unit for houses &gt;200m²; Parking requirements vary according to the size of apartment blocks, eg. up to 50m² apartments one parking space for three apartments; For &gt;200m² apartments one parking for each apartment or three for two apartments</td>
</tr>
</tbody>
</table>
Two minimum plot sizes were specified: 152 and 506 square meters respectively for plots with and without mains water and sewerage connections. As provision of mains water and sewerage is a statutory requirement within municipal and urban council boundaries, the lower plot size was generally applied in urban and peri-urban areas. The larger plot size, which applies in rural areas, is intended to allow the installation of a septic tank and tube well for each household. The application of the plot size guideline in the case study settlements has been somewhat arbitrary, and appears to be linked to land scarcity rather than access to infrastructure. In the event, the larger plot size was applied in the New Town and Thirrupukolil schemes, where land was relatively abundant. Under the Greater Hambantota Plan, New Town was scheduled for inclusion within the Urban Council boundary, necessitating the extension of mains water and sewerage. However, during 2005 and 2006 when New Town was under construction, the details of the Greater Hambantota Plan were yet to be finalised, and houses were therefore allocated the larger plot size. In that regard, the inhabitants of New Town will have gained an inadvertent benefit if their household septic tanks are replaced with mains sewerage.

By contrast, households in Seenigama, where land was scarce, were allocated the smaller plot size, although like the other locations Seenigama lacked mains sewerage. In rural Sri Lanka, where the outdoor frontal area serves as an extension for work, socialising and subsistence food production, the lack of private open space was a significant source of complaint among the Seenigama respondents. The small size of land plots necessitated the placing of septic tanks close to houses, an additional source of complaint.

All sample houses met the stipulated minimum floor area requirement, and some exceeded it, although in most cases implementing agencies interpreted the specified minimum floor area as a standard. Nearly all agencies used a standard design blueprint which did not take account of variations in household size or occupant needs. At 46.5 square metres, the stipulated minimum floor area in Sri Lanka accommodates a small family with a reasonable degree of comfort according to prevailing local standards, but provides cramped living conditions for larger households. The Chennai apartments were significantly smaller, with a total floor area of 22 square meters comprising a single room of 15 square meters with a kitchen and bathroom. Because of the small size of apartments in Chennai, many household members sleep outside. With a tradition of extended family cohabitation it is common for households in coastal areas in both countries to include up to 12 members, typically in small compounds comprising three or four separate dwellings. After the tsunami the co-location of extended families became an important survival strategy for children, women and elderly people who had lost a breadwinner. The unsuitability of the houses for large families was offset to some extent by policies, adopted by most donors, of co-locating relatives in neighbouring houses where possible. Where this could not be accomplished, some occupants resorted to informal housing swaps or lease arrangements in order to co-locate their families.

All houses included an internal kitchen and latrine as specified in the UDA guidelines, although guidelines on room size and wall height were not always complied with. Kitchens did not provide ventilation systems for the biomass cooking fuels used by most households, as discussed below, and were generally used as store rooms or additional bedrooms. The guideline regarding parking spaces, which was generally not observed, is arguably superfluous in rural Sri Lanka, where fewer than 5 per cent of households own a motorised vehicle other than a motorcycle.
Cultural appropriateness

Internationally, studies of housing projects provide extensive evidence of inappropriate designs resulting from a poor understanding of local needs (Barenstein 2008, Boen and Jigyasu 2005, Ganapati and Ganapati 2009, Russell et al. 2008). Termed as the ‘tyranny of the urgent’ (Delaney and Shrader 2000), occupant participation in rapid reconstruction programs is precluded or considered unnecessarily time-consuming, resulting in housing that fails to match the needs, culture and aspirations of occupants. The intended occupants respond in a variety of ways, refusing to inhabit a house, attempting to modifying it or dismantling it and selling its components (Barakat 2003; Chisholm 1979).

Several factors operated to reduce the time spent on preliminary needs assessments, community consultations and program design, as noted above. Most donors claimed to recognise the importance of consultative principles in their operations, including the participation of affected communities in needs assessment. However, many reported that in practice, pressures for quick results compromised the quality and extent of community consultative processes. In some cases, construction commenced before occupant lists were made available to NGOs, short-circuiting the possibility for community participation in needs assessment, planning and design. A lack of consultation with communities and local experts was apparent in planning and design rules which were drawn up in Colombo with little regard for local family arrangements and housing practices. Site layouts and housing designs vary significantly in terms of attractiveness, building quality and sensitivity to community practices.

The FoG invested considerable effort in prior community consultation in Victoria Gardens, where the proposed two-storey houses were an unfamiliar design form, and a model house was built for inspection and feedback from the prospective occupants before further construction proceeded. The initial response was positive: in particular, beneficiaries liked the idea of an upper storey because they thought it would provide protection from a future tsunami. However, upon moving in, occupants complained of problems which they had not previously identified, such as the inadequacy of kitchens for bio-fuel cooking, difficulty of stairs for elderly people and lack of outdoor space. Other problems, such as excess heat in the upper rooms (discussed below), could not have been easily anticipated by beneficiaries before moving in, although they should have been identified by the builders. The experience of the FoG suggests that rather than presenting a design and leaving it to occupants to provide feedback, a more proactive approach is required in which agency staff identify and explore potential future issues with beneficiaries.

Elsewhere, shortcomings in consultation processes were noted:

- In some cases consultations took the form of large community meetings attended by both men and women. Such processes took little account of gender issues and were not an appropriate means of obtaining women’s views, as Sri Lankan women are socialised to remain silent in public gatherings where men are present.
- Some respondents reported that although they had concerns about some of the design features, they were reluctant to speak up for fear of jeopardising their entitlement to a house.
- In the Mandanai schemes, houses were built according to the non-mandatory UDA specifications. No prior community consultation occurred.
In the Chennai schemes, in the front set of apartments on each floor the kitchen and toilet are adjacent and the toilet door is next to the kitchen (see Figure 1). As this is considered a polluting and unhygienic arrangement, some households have moved the door along the wall. In an internal layout configuration widely used in Seenigama, three internal doors are aligned facing each other. As this is locally considered to bring bad luck, many residents have changed the position of at least one door. Such modifications, often made with meagre household resources, could easily have been avoided through more careful consultative processes during the design phase.

Figure 1: Floor plans, VOC Nagar and Thilagar Nagar resettlement schemes
(Source: Tamil Nadu Slum Clearance Board, Chennai)

Box 5: Bio-mass fuel and the environment

Related to the use of bio-mass fuel for cooking is the issue of the sustainability of natural resources such as timber. The supply of timber for fuel is obtained from nearby woodlands. Women are the main collectors of firewood, often waking up early in the morning to walk to the woods. It was reported that whole trees are seldom cut, only branches and twigs. Respondents demonstrated little understanding of sustainability issues, with a widespread perception that the supply is unlimited. Various consequences can be predicted. Firstly, women will need to walk further to collect supply as the edges of forests become depleted, adding to their workloads. Secondly, authorities may begin restricting uncontrolled harvesting of common property resources, resulting in fines, and perversely, bribery, both of which the poor can ill afford. Finally, gradual deforestation can impact on the local ecosystem and micro-climate.
Kitchens

Housing designs in all of the Sri Lankan survey sites have incorporated internal kitchens as required by the UDA guidelines. However, most have inadequate ventilation systems, based on the assumption that gas fuel would be used for cooking. In some cases a chimney was included above the kitchen for cooking with bio-mass fuel; however, since most houses were not fitted with interior ceilings, walls do not go all the way to the top and smoke flows into the other rooms, creating an unpleasant and unhealthy environment. In this situation, most occupant households have built an external kitchen to cook with bio-mass fuel on earthen stoves, often in a lean-to structure against the back wall (see Figure 2). The original kitchen is mostly used as a storeroom, pantry or converted for other functions such as children’s study or a small bedroom. Indeed, the fact that the room was originally intended for a kitchen was widely not recognised; when asked why they built an extra kitchen, many respondents replied, ‘There is no kitchen in the house.’

At a cost of AUD30 per month in a standard household — approximately a quarter of household income at the poverty line — gas fuel is well beyond the reach of most households in the resettlement programs. Hence, an estimated 75 per cent of households in affected districts use biomass fuels such as wood and paddy husks which can be collected locally, outside the cash economy (Institute of Policy Studies 2005). In Sri Lanka, as in other developing countries, there is often a vast gulf of understanding between well-intentioned urban professionals and the economic realities faced by the rural poor. An NGO worker in Seenigama said, ‘We wanted to elevate their living standards.’ A RADA official, asked about the lack of design provision for biomass fuels, responded, ‘They cannot forever remain like that; they have to improve themselves and learn to use a modern kitchen.’

One scheme in New Town should be highlighted because of its better understanding of the kitchen issue. While fulfilling the UDA’s requirement for an indoor kitchen, it was understood that occupants would in time build an external kitchen; therefore when houses were built, a steel and wire mesh structure was attached at the rear so that households would be able to utilise it for building a kitchen (see Figure 4). Such an approach indicates awareness of cultural appropriateness and the needs of occupants, while at the same time conforming to regulations and thereby avoiding potential conflicts with local authorities.
Site planning

There were no guidelines for the nature and proportion of communal areas such as playgrounds, parks and community meeting centres. It was up to individual implementing agencies to incorporate these elements into the master plans of their schemes. The majority invested their efforts primarily in house construction, with relatively little attention to public areas. Some schemes had little or no communal space; in others, spaces had been allocated but were not functional; while a few had invested significant care in developing such spaces. The site layout in Mandanai and Kudilnilam included several large open areas, but in most cases little attempt had been made to adapt them for human use by planting shade trees or installing seats or play equipment, and they were used mainly for cattle grazing. Instead of establishing and linking a variety of communal spaces of different scales to create an interesting outdoor living environment, unimaginative barracks-type layouts were implemented in most of the schemes (see Figure 5). A notable exception was the Sri Lanka Solidarity housing scheme in New Town, where care was taken to align houses and roads along existing site contours and to create variety in the design and layout of houses, communal areas and open spaces (see Figure 6).

In perhaps the most notable example of successful public open space design, a central rectangular communal area in Victoria Gardens, Seenigama, is used as a children’s playground and for communal meetings and festivals (see Figure 7). In providing shade, visual variety and a play area in which children can be observed from neighbouring houses, the Seenigama area conforms to key principles of open space design: accessibility, safety, proximity, functionality and attractiveness. By contrast, spaces allocated for communal parks and playgrounds in the Chennai schemes were remarkably uninviting areas, devoid of vegetation, surrounded by a fence and lacking any features that could convey a sense of common property or linkage with the surrounding dwellings. No attempts had been made by the TNSCB or other NGOs to promote a sense of community ownership and responsibility for these spaces. Not surprisingly, they were rarely visited, quickly became neglected and were used primarily for dumping garbage and keeping cattle at night (see Figure 8).
TNSCB staff tended to adopt a ‘top-down’ approach in their relations with the community, and several instances were noted in which poor communication contributed to inappropriate decision-making. When some residents planted fruit trees TNSCB staff uprooted them and instead planted ornamental ‘avenue’ trees, which nobody cared for and which eventually perished. It was noted that occupants made extensive use of the stairwells and thoroughfares in front of apartment blocks for socialising, playing, cooking and operating street stalls (see Figure 9). While the concept of a formally designated open space such as a park is unfamiliar to the Chennai community, their ready adaptation of the street as an informal communal space preserves a mode of urban village habitation familiar from their earlier shanty settlement dwellings, in which the outdoor neighbourhood played a central role in daily life.

There is a lack of clarity regarding responsibility for the maintenance of communal spaces, due in part to weaknesses in the coordination and management of relationships between implementing agencies, central government agencies and local councils. In Sri Lanka, local village and town councils have statutory responsibility for upkeep of parks and communal spaces. In New Town, several infrastructure maintenance tasks have been deferred pending the resolution of a jurisdictional dispute between the Hambantota urban council and the rural council (Pradeshiya Sabha) responsible for the New Town area, and at the time of the survey neither authority was prepared to take responsibility for park maintenance.

Elsewhere, local council officials were generally reluctant to assume park maintenance responsibilities in the resettlement projects. It was generally seen as a low priority relative to other tasks such as road maintenance, and represented an additional pressure on their highly constrained resources, as the central government had allocated no additional funds for this purpose. Moreover, local government authorities had limited involvement in post-tsunami construction programs within their jurisdictions, and in most cases no formal arrangements were made to transfer responsibility following the completion of construction and departure of the implementing agency. Some felt they should have been more extensively consulted, pointing out that having been sidelined in the planning...
process, they were now expected to take responsibility for projects they had not approved or budgeted for. One local council official commented, ‘The [name of NGO] built it, let them look after it’.

The experiences of the case study communities demonstrate that participatory community management of public open spaces is a viable alternative where resource-constrained local authorities are reluctant to assume additional responsibilities. Without community ownership, these areas are likely to become dysfunctional. In Seenigama and Kudilnilam, where implementing agencies have maintained a presence, they have provided funds and promoted community participation in the upkeep of communal facilities. Where the implementing agency plans to withdraw following completion of construction, intensive community development programs, preferably with participatory involvement from the site planning stage, are needed to promote a collective sense of responsibility for communal facilities.

As an example, a communal park and playground area in Hambantota was initially ignored by occupants and became overgrown. However, with the support of a local community development agency local ownership was fostered, leading to voluntary community initiatives to begin clearing the area and improving it. Residents began viewing upkeep as a community responsibility rather than the job of an external agency. At the time of the survey, children were beginning to use the playground and a sense of community ownership was gradually being established (see Figure 10). Similarly, a CBO in Mandanai had developed a plan to convert an unused open area into a communal vegetable garden. Having consulted with households in the vicinity of the site and obtained their agreement, they were seeking assistance from the Department of Agriculture to obtain fertiliser and seedlings.

Environmental and climatic responsiveness

Heat

In the hot-humid climate of Sri Lanka and southern India, natural ventilation and passive cooling is necessary for basic thermal comfort. Ceiling and stand fans are commonly used, but air-conditioning is generally unaffordable. To maximise thermal comfort, the house should be oriented towards the prevailing southerly wind direction so that the main living spaces are ventilated, and should have minimal exposure to the west to avoid heat gain from the afternoon sun. If the site configuration
Box 6: Climate-insensitive design

In the Victoria Gardens project in Seenigama, two-storey townhouses, all of the same design, have been arranged facing four sides of a central rectangular open area. While the houses facing south enjoyed ventilation from the prevailing breeze, in the houses on the opposite side the breeze was blocked off from the main living room by the kitchen and latrine at the rear. In addition, the bedrooms on the first floor became very hot because of low height, lack of vegetation cover and heat gain from the roof. The internal stairwell had a large glass window that was too high to be reached and thus remained closed, creating a sauna effect. The west-facing houses were the worst; one resident described his bedroom on warm days as feeling ‘like hell’.

constrains ideal orientation, specific passive cooling devices, for example cavity walls, extended eaves and special design of openings to maximise wind flow and block heat gain from solar radiation can be incorporated into the design of buildings. Orientation and passive thermal design features were not taken into account in most of the schemes, which typically employed identical house designs regardless of the direction (see Figure 11). Those living in houses facing the south were fortunate, while others, particularly in west-facing houses, were less comfortable (Box 6). The heat problem is exacerbated by the need to keep windows closed to prevent entry of wind-blown dust, insects and rain (see Figure 12).

Large shade trees can contribute to protection from heat. In most of the New Town schemes, there was excessive clearing of woodlands to make way for houses, resulting in an appearance of barrenness and exposure to the sun’s heat. Although many residents have planted trees in their front gardens, it will be some time before they provide an adequate measure of shade. In one scheme in New Town, the implementing agency took care to limit unnecessary tree-felling, creating a shaded landscape with comfortable micro-climatic conditions (see Figure 13). Many residents of this scheme praised this environment and mentioned their satisfaction in living there. However, as timber is in demand as a cooking fuel, some residents cut branches from the trees—a source of conflict within the community, and between some community members and the implementing agency, which remains intent preserving the trees to maintain the quality of the environment. Collective action at the local level is needed to establish and implement community policy on environmental protection.
Rain
Although both countries are subject to strong monsoonal rains, little attention was given to design features that would mitigate water damage. In several locations, poor workmanship in laying roof tiles was observed to allow water to leak into the house during heavy rain. Adding to that is the nuisance of wild monkeys that dislodge and damage roof tiles. In Chennai, inappropriate design of openings in the stairwell wall and roof, without glazing, shuttering or other rain-protection devices (see Figure 14), allow rainwater to enter the stairwells and internal corridors, creating a safety hazard and hastening deterioration. Small thresholds have been built at the apartment doorways, preventing the water from flowing into the apartments unless rains are particularly heavy.

6. Construction
The scale of the post-tsunami housing requirement presented a major challenge to the Sri Lankan construction industry. More than 100,000 houses had to be repaired or rebuilt, five times as many as the 20,000 houses constructed in an average year (Institute of Policy Studies 2006). At the time of the tsunami the industry consisted of a small group of formal sector construction companies which worked primarily on large-scale urban commercial and residential developments, and a much larger group of small-scale informal sector contractors, who employ a small workforce of labourers. Residential construction in rural areas remains overwhelmingly dominated by the latter group. In the higher-level building trades such as the electrical and plumbing trades, formal training is becoming increasingly common, but for the most part, skills are learned on the job. Knowledge of modern construction technologies is limited and production processes are based on traditional techniques and locally sourced materials which are generally of poor quality. In Sri Lanka, most implementing agencies sub-contracted construction to local contractors. A TAFREN requirement that contractors be registered with the Sri Lankan Institute of Construction Technology and Development (ICTAD) was unrealistic, given the overwhelmingly informal character of the rural construction industry, and was widely ignored.

Shortages of land, labour and materials created a significant escalation in construction costs from early 2005. Several agencies participating in our research reported that the inflation problem was exacerbated by inexperienced providers who lacked knowledge of appropriate costs and were bidding up the prices of material and labour. A recent survey of implementing
agencies found that costs rose by 30 to 50 per cent between January and August 2005, and by September 2006, had increased over initial estimates by 60 to 80 per cent or more (Weerakoon et al. 2007). The cost increases were driven primarily by wages, particularly for skilled workers such as carpenters, painters, and masons, whose wages doubled in some locations. The same report also noted sharp increases in the cost of locally procured materials such as bricks and sand, but smaller increases for importable materials such as cement and sanitary ware, indicating that the use of imported materials may be effective in reducing cost inflation during post-disaster construction booms (Weerakoon et al. 2007).

Some of the implementing agencies participating in our research obtained additional funds from donors to accommodate cost increases; others reduced the number of houses they planned to build. Some claimed that the UDA specifications were in excess of what was necessary, and contributed to cost inflation. As the UDA guidelines were mandatory only with respect to size specifications but not construction methods or materials, agencies had considerable flexibility in adapting their methods in accordance with budget constraints. UDA staff reported that a large number of agencies did not apply the non-mandatory components. It is likely that some agencies reduced the quality or quantity of materials or labour in response to cost increases, although not surprisingly none reported doing so.

The single-storey bungalow type houses in Seenigama, Thirrukovil and New Town employed masonry construction. In most cases walls were built with clay bricks or concrete blocks; a small number of agencies experimented with cement stabilised earth blocks (Box 7). In some cases, reinforced concrete posts were incorporated into the walls for strength. Rubble or reinforced concrete foundations typically supported a reinforced concrete floor, usually with a cement concrete finish on top of the floor. In the multi-storey and two-storey examples, reinforced concrete intermediate floors were constructed with a cement concrete finish. Construction with concrete requires a high level of competent supervision, which was lacking in many cases. Hence, concrete work in floor and roof slabs, stairs, mortar, plastering, built-in shelves, and mouldings was generally found to be of low quality. Contributing factors included low cement content in the concrete mix, insufficient steel reinforcing, insufficient curing of concrete, inadequate manual mixing and casting, and poor shuttering and formwork which allowed moisture to escape, resulting in rapid drying and shrinkage.

Figure 12: Windows are kept closed and fanlights are blocked with paper and plastic sheet to keep the dust out of this house.

Figure 13: Large trees retained on the site create a cool and comfortable environment.
In the Chennai apartment buildings, the roof was of reinforced concrete. In Sri Lanka, roofing materials in the majority of housing schemes consisted of clay tiles on a timber frame structure. In some cases untreated timber roof beams were used, hastening deterioration, and softwood was inappropriately used for load-bearing purposes. One implementing agency used concrete rather than timber rafters in order to minimise deforestation and avoid termites. Interior ceilings were seldom used; only in one of the case study schemes in Hambantota and one in Seenigama had plywood ceilings under a tiled roof. Poor workmanship in laying roof tiles was widespread. Many tiled roofs leaked and residents complained of ‘drizzle’ inside the house during heavy rain outside. Laying clay tiles is a skilful and time-consuming process. After laying tiles, identified gaps need to be filled with cement, but there is little evidence of that being done. Additionally, clay tiles should be tied to the rafters or battens to prevent uplift or dislocation in strong wind, but as that has not been done, the tiles have shifted in position, creating gaps and allowing water penetration.

The use of asbestos roofing, while not widespread, was noted. Asbestos sheeting presents a major health hazard when cut, badly weathered or damaged by storms or cyclones, and has been banned as a roofing material in most industrialised countries. During the course of the survey some agency staff expressed a preference for asbestos over clay tiles, on the grounds that it is easier to install and provides better rain protection. Although well known in developed countries, the health risks of asbestos are poorly understood by Sri Lankan householders and construction workers, and its continued use is a matter of serious concern.

The cracking of concrete floor slabs was widely noted (see Figure 16). Soil in Sri Lanka’s coastal regions is generally loose and sandy, composed of large grains. In order to build upon it, it has to compacted thoroughly to prevent subsequent settlement. Often for very loose, non-cohesive
sandy soils, an extra measure of stabilising with lime or cement might be necessary. Additionally, a grade beam should be used to prevent spread of the foundation footings. As with all concrete products in a tropical context where cement without any fast-setting agent is commonly used, the floor slab needs to be cured by keeping moist for 3 to 4 weeks. These measures do not seem to have been followed. The UDA guidelines suggest including a grade beam, and although it is reported that UDA and RADA officials insisted on incorporating it during site visits, it is not certain how many agencies actually paid heed.

Variations in budgets led to significant disparities in quality. Staffers from one implementing agency in New Town were highly critical of some of the foreign donors who funded its projects, complaining that they did not understand local conditions, took no account of cost escalation, and demanded the lowest cost product regardless of quality. At the same time, this agency had partnerships with other donors who were willing to fund high quality houses with additional features such as solar panels and water tanks. Discrepancies between donors led to substantial quality variations between the houses in this scheme, creating some tensions between occupants when the houses were allocated.

In a further indication of the importance of adequate budgets, the primary implementing agency in the Kudilnilam scheme, a church-based organisation with ample funds but limited construction experience, formed a partnership with a Sri Lankan NGO which specialised in housing. The same NGO was engaged by a private donor to construct some houses in neighbouring Mandanai. With a budget of AUD7,000 per unit, the Kudilnilam houses were built to higher than average specifications, with six-inch wide concrete blocks rather than the standard four inches, and higher quality timber and fixtures. In Mandanai, with a budget of AUD4,500, the houses were built to standard specifications. While the houses in the Kudilnilam scheme were of a high standard and won a construction award from the District Secretary, those in neighbouring Mandanai were subject to most of the problems cited above.

Construction quality was compromised by pressures for quick results. Some agencies imposed penalty clauses for failing to achieve targets by specified dates, creating an incentive for contractors to cut corners, particularly in situations of limited supervision. In response to early pressures for fast completions, the earliest houses built in New Town and Mandanai were constructed very
rapidly. Learning from their initial experiences, agencies adapted their methods, and in most projects the most recently constructed houses were significantly superior to the earliest completions. In some schemes, contractors had responsibility for procurement, creating incentives and opportunities for kickbacks to local suppliers and purchase of cheap, substandard materials. Large agencies which were involved in multiple housing programs in different locations were able to arrange major supplies through their head offices in Colombo, thereby utilising economies of scale and to some extent remedying materials quality problems. One replaced contractors with salaried construction supervisors who hired and directly supervised local labour gangs. Some donors recruited Colombo-based or expatriate building professionals to supervise construction on-site.

In some cases the intended occupants were given the task of overseeing work on their houses. Although many welcomed the opportunity to participate actively in the construction process, the outsourcing of construction supervision to occupants was not always appropriate and should be handled with sensitivity. Implementing agencies should take steps to allay fears that being seen as ‘trouble-makers’ may jeopardise their entitlements. In addition, occupant supervision is not appropriate where occupants have limited technical knowledge, and should be sensitive to gendered norms which make it difficult for female household heads to visit building sites or raise issues with male contractors.

In three schemes in New Town and Mandanai houses were declared uninhabitable and remain abandoned and incomplete (Figure 17). In two of these cases, donors had no prior housing experience and maintained no on-site presence. Work was left entirely to local contractors who in turn subcontracted the work to others. In the Mandanai scheme, contractors were reported to have sold a large portion of the construction materials. Under the terms of the contracts between the GoSL and implementing agencies, the government was responsible for conducting building inspections. Inspection responsibilities were shared between a number of agencies including the UDA, RADA, Provincial Councils and Divisional Secretariats; however, staffers from these agencies were generally unable to explain how inspection responsibilities were demarcated between them. In practice, inspection routines were ad hoc arrangements which varied according to the distribution of expertise. UDA staff generally possessed good professional knowledge, but during 2005 were unable to discharge their duties effectively due to staff shortages. In some other government agencies charged with inspection responsibilities, building expertise was found to be in scarce supply. In one example, indicating a poor understanding of slab construction principles, a building officer at the Divisional Secretariat office in Hambantota commented, ‘The soil here in Hambantota is too loose, so floor slabs are bound to crack. There is nothing you can do about it.’

7. Infrastructure and services

Under the terms of their contracts, implementing agencies were required to provide internal roads and infrastructure connections within the settlement, while the GoSL undertook to provide external roads, water, power and sewerage up to the settlement boundary. On the completion of construction, responsibility for maintaining internal roads, street lighting, garbage collection and park maintenance was to be taken on by local councils. In the Chennai resettlement schemes the TNSCB handed over responsibility for many services three months after completion to the local municipal council. Although several instances were noted in which the responsible parties had not fully discharged their responsibilities, infrastructure and service development is a work
in progress in most of the case study locations, and many of the issues highlighted below are in the process of being resolved. However, there are some significant flaws such as lack of site preparation for drainage, inadequate drains and septic tanks without soak pits, and these will be difficult and expensive to rectify.

**Transport and roads**

The quality of external roads to the settlements is generally good. The Chennai projects are within the city’s generally well-maintained metropolitan road network. Seenigama is located on an arterial coastal road which connects Colombo with the Southern Province and was refurbished after the tsunami. There has been extensive road building around New Town as part of the Greater Hambantota development, with the construction of new sealed roads around the settlement boundaries and connecting it with the town of Hambantota. To accommodate the port development, the arterial coastal road has been diverted and now runs along the southern boundary of New Town. A narrow sealed road connects Kudilnilam and Mandanai with the coastal town of Thirrukovil three kilometres to the east. The quality of roads connecting Thirrukovil with larger population centres to the north and south is poor; however, these routes are scheduled for refurbishment in 2010 under a major road-building program currently underway in Ampara district.

Chennai and Seenigama are the most advantageously positioned with respect to public transport, with ready access to bus services and, in the case of Seenigama, a rail link to Colombo in the north and the regional city of Galle to the south. An hourly bus service links New Town with Hambantota, where a central bus station provides regular services to Colombo and other regional destinations. Kudilnilam and Mandanai were the least well-served, with a single daily bus service to Thirrukovil, and infrequent bus services linking Thirrukovil with other regional centres. Motorised rickshaws are readily available for hire in Chennai, Seenigama and New Town, but are expensive and not used on a regular basis. In the Thirrukovil settlements, no household owned a motorised rickshaw. When asked whether this presented a potential business opportunity, most respondents stated that there was no local market, given low average household incomes and the high cost of fuel. Around 15 per cent in Seenigama and New Town own a motorised rickshaw or motorcycle, but in most households the standard means of transport is on foot or by bicycle.
There were variations between settlements in the quality of internal roads. In New Town and Mandanai, internal roads are not paved and become muddy and prone to potholes during the rainy season, rendering them inaccessible to vehicular traffic, a significant constraint for local businesses in obtaining supplies (see Figure 18). During the dry season, because of the sandy nature of the topsoil and clearing of trees and vegetation, dust from unpaved roads blows into houses and is a serious nuisance. In all Sri Lankan locations, responsibility for the upkeep of internal roads lies with local councils which have limited resources for regular maintenance. In New Town, routine maintenance works had not been carried out for several months at the time of the survey, as responsibility for the condition of internal roads is the subject of a dispute between the Urban Council and Pradeshiya Sabha, and is unlikely to be resolved before local government elections scheduled in 2010. The Kudilnilam and Seenigama settlements and the apartments in Hambantota town and Chennai have sealed internal roads. Some roads were designed without any edge containment element, causing the sides to become worn by water, which also creates furrows and scours the road edges from below, resulting in crumbling and gradual reduction of road width. In Seenigama, with internal road widths of about 2.5 metres, two cars can barely pass each other and the turning radius at corners is too narrow (see Figure 19).

**Drainage**

Inadequate site preparation is apparent in most of the settlements. In New Town, most schemes do not have any drainage plan. Low areas have not been elevated and land slopes not levelled, nor has land been compacted. Thus in the rainy season water flows through the area from higher areas to those at lower elevation, washing away topsoil, silting the drains and inundating gardens and homes. In some cases, flowing water was found to have exposed and undermined the foundations of houses by scouring, greatly weakening the structure and making the houses eventually liable to collapse in flash floods and storms (see Figure 20). Where provision has been made for drainage, blockage of open drains is common (see Figure 21). During rainy seasons, drains tend to overflow due to blockage and inadequate depth, creating unhygienic conditions and a mosquito hazard.

In one scheme an effective surface water drainage plan was designed (see Figure 22). Here large drains feed into a reservoir. The reservoir water is used to irrigate vegetation retained and planted on the site, and to rear water buffaloes, an important local livelihood (see Figure 23).
To prevent sedimentation in the drainage channels from topsoil washed away from the unpaved roads, the main internal roads were carpeted with a layer of gravel made from locally available lateritic rocks.

**Power supply**

The New Town, Seenigama and Chennai schemes have mains electricity. With the exception of small-scale solar power generation facilities in Kudilnilam, the Thirruckovil schemes were without access to a power supply for several years, but the installation of mains power cables has commenced and the schemes will be electrified in 2010. Household connection costs of about AUD100 will be met by the implementing agency in Kudilnilam but in Mandanai, where implementing agencies have departed, households must bear the cost themselves. The Mandanai settlement is the only scheme studied in this research in which households were liable for infrastructure connection costs. This anomaly results from the long delay in installing the necessary infrastructure, a widespread problem in the Eastern Province. Implementing agencies undertook responsibility for all internal infrastructure including household connections, but were not able to do so when the infrastructure did not exist. There was no agreed policy on transferring this role following the departure of implementing agencies. However, district officials interviewed for this research stated that the central government has declined to take responsibility, taking the view that the houses in question should be treated in the same way as newly built houses in the private sector, which do not receive any subsidy for infrastructure connection.

In Kudilnilam and one of the New Town schemes, some houses were provided with photovoltaic panels for electricity generation. In each house this allows running four light bulbs and one plug point. Households reported significant savings in electricity bills. As in many developing countries, electricity supply from the national grid is not entirely reliable and power outages are common. In such a context solar power provides a useful auxiliary supply. While a one year warranty was given and a telephone number for servicing and repair provided, implementing agency staff reported that long-term maintenance would present a problem as PV panels are not widely available locally. Solar power in rural areas should be mainstreamed through appropriate policy support and encouragement of local entrepreneurs.

![Figure 22: A surface water drainage system has been built …](image1)

![Figure 23: … and linked to a reservoir used for livestock and irrigation.](image2)
Water supply

Water supply has been provided in all the programmes, but conditions and quality vary. In Chennai, water is pumped to an underground reservoir and collected via hand-pumps installed in front of each apartment block (see Figure 24). The quality of water is reportedly poor; some residents complain of bad odour and dark colour, others of a chemical smell. Additionally, water is supplied for only a few hours each morning and generally household women form queues from dawn to collect water. Because of the limited supply, conflicts and disputes arise. Those living on upper floors have to carry containers of water up the stairs on a regular basis, a particular hardship for elderly residents. In some upper floor apartments, pulleys have been installed to pull up the water containers (see Figure 25), but that is also not an easy task.

In the apartment housing scheme in Hambantota town, water supplied to underground reservoirs is pumped to rooftop tanks to supply water to the apartments. Here it was found that the pumps sometimes do not work and residents then do not have water supply for several days. Some go to houses of relatives to bathe and wash, and bring water. It was unclear whether the pumps are of poor quality or if they were not being repaired properly. To add to this problem, water leaks from the rooftop tanks and pipes and in many places dampness has entered walls and roofs, evident from blistering and peeling of paint and plaster.

New Town and Seenigama have mains water from the municipal supply. In Seenigama, a foreign donor for one of the schemes insisted on building a rainwater purification plant which would provide an additional supply. With an operating cost of AUD350 per month, the cost of using the plant water is significantly higher than the cost of mains water. Hence, most households declined to use the plant water and paid to connect to the mains supply. Only 24 of the 84 households in the scheme use the plant water, heavily subsidised by the implementing agency. The agency is unwilling to continue operating the plant in the long term without significant user participation in cost-sharing and upkeep. Given ready access to a cheaper alternative supply, the benefits of the plant are unclear, as is its future funding base.

In the Thirrukovil programs no provision was made for a local water supply for four years. During this period water was trucked in to the settlements by the local
council twice a week and stored in central tanks, from which households collected their supply. Water was chronically scarce and securing an adequate supply was difficult, especially for households located furthest from the collection point. It was reported that the water supply problem was a factor in the decision of some households to vacate their houses. At the time of the survey, piped water facilities were in the process of being installed in both settlements. As described above in relation to power supplies, the implementing agency in Kudilnilam is supporting the cost of household connections (approximately AUD75), whereas in Mandanai, where implementing agencies have departed, the cost is borne by households.

Sanitation

In the Sri Lankan schemes standard size septic tanks have been built without taking into account household size. Thus in larger households, the tanks tend to fill up quickly and overflow during the rainy season—a potential public hazard. In some cases, no soak pit has been provided, so liquid waste from the septic tank overflows into the backyard during the rainy season. Many households were found draining the liquid waste into the backyard garden, resulting in very unhygienic conditions and breeding of mosquitoes and other insects. With blocked open drains and overflowing septic tanks, the environment in these settlements often becomes highly unpleasant and unhealthy (see Figure 26).

For many former residents of coastal shanty communities, septic tanks are an innovation not previously encountered, and occupants may require training in their cleaning and maintenance. The lack of such training was apparent in many cases. In an indication of a broader issue relating to the limits of their functions, some agencies claimed that they had discharged their duty by building tanks according to government specifications, and that problems caused by poor maintenance and irregular cleaning of the tanks by occupants were not their responsibility. Agencies differed in their views on the extent of their mandates. Some stated that their functions were limited to the building of houses and short-term post-occupancy maintenance, and excluded post-resettlement training and community development activities, others engaged in
post-occupancy community activities for a limited period before departing, and a small minority retain an active presence in the community.

In Chennai, to the credit of the schemes, the sewage system worked well and this is one achievement all interview respondents praised. This is a success story, given the typical resource constraints in a developing country like India and indeed for a low-cost housing scheme such as this one. Good sewage management contributes significantly to public health, especially in such high density settlements where epidemics can spread rapidly. On the other hand, in the similar urban housing scheme in Hambantota town, original septic tanks did not have the capacity to absorb all the waste and larger septic tanks began to be built through the initiative of a local community development organisation. However, dispute with the contractor arose mid-way, resulting in the contractor abandoning the half-finished work, which remained lying in that condition for a long time.

**Solid waste management**

As New Town is not yet under the jurisdiction of the Urban Council, there is no solid waste collection within the area as the *Pradeshiya Sabha* (provincial council) does not manage garbage. It is mandated to provide services to provincial areas where households generally manage their own waste; only in the more dense urban areas does waste management become an issue of civic management. There is a garbage dump outside New Town, which is managed by the Urban Council. As it is some distance from the New Town settlement it requires significant effort to take household waste there, though some households did claim to be doing that. Although some households attempt to burn non-degradable waste and use organic waste as compost for backyard gardening, there is widespread littering in communal open areas and on the fringes of New Town. This is gradually becoming a public health issue and a matter of contention between the Urban Council and the *Pradeshiya Sabha*. In addition, the garbage attracts wild elephants from the nearby woods, creating a safety problem.

In the Chennai settlements the municipal council operates a waste collection service and there are large waste collection bins outside the main gates of the apartment compounds. These areas are subject to overflow, indicating insufficient or irregular collection by the municipal authorities (see Figure 28). Notwithstanding the collection service there was widespread open dumping of garbage.
in the narrow open corridors behind the apartment buildings. Residents of ground floor apartments were found to keep their windows closed to avoid the unpleasant odour and view, hence compelled to use electric lights and fans, an expense that many of them could ill-afford. With communities making a transition to a new settlement and way of life, in a global context of rapid urbanisation, densification of settlements and increasing waste from industrial products (packaging, plastic bags, etc), communities need other forms of support such as awareness raising, waste management training, access to recycling and compost plants and even employment opportunities in this sector for effective solid waste management in such settlements.

On the other hand, in the apartment scheme in Hambantota town, the environment is clean and there is very little evidence of littering. The implementing agency provided support and basic training on sanitation and environmental management, and being in a central urban area, there is reportedly regular collection of waste by the Urban Council from built-in bins near the main gate.

The bins are colour-coded for separation of organic and non-biodegradable wastes and households separate and bring their wastes in plastic bags for disposal in the bins. This example represents a success story, particularly in a developing country context where environmentally sensitive waste management and institutional support for it are largely lacking.

In Seenigama the implementing agency has attempted to introduce household level garbage management. Occupants have been provided with two plastic garbage bins of different colours per household for separation of biodegradable and non-organic wastes and basic training on solid waste management given. Several households reported their good waste management practice: separation of garbage, using organic waste for composting in the home gardens, regularly placing bins next to the road for waste collection by Urban Council trucks, and some households even washing the bins afterwards. However this initiative is not without its problems: Erratic waste collection by the Urban Council and persistence of former habits of poor waste management threaten to set back the progress made. Nonetheless, the initiative is definitely a step forward and the problems experienced are characteristic of a transitional stage of moving away from earlier unorganised waste disposal patterns, which with concerted effort and institutional support can be expected to phase out.

8. Post-occupancy issues

Tenure

In Chennai, occupants have a form of long-term leasehold in which they can transfer title to relatives but are not permitted to sell or sublet their properties. In Sri Lanka, RHP occupants received a limited form of title which restricts transfer of land for a period of seven to 10 years, after which full freehold title is conferred. Transfers to family members are permitted during the interim period. The restriction on transfers means that houses cannot be used as collateral for a bank loan during the interim period, a significant constraint on enterprise development, given the difficulties faced by small businesses in accessing credit.

Nevertheless, in practice active informal real estate markets exist Seenigama, New Town and Chennai, where a significant proportion of occupants have sold or sublet their houses. Houses sold in informal markets can in theory be reclaimed by the Divisional
Secretary, although this is an unlikely eventuality. The informal market price, which is discounted by about 30 per cent, was around AUD5,000 in New Town in 2008, and around AUD2,000 in Seenigama. The higher prices of New Town real estate are attributable to its inclusion in the Greater Hambantota plan. Labour demand generated by the port development and other infrastructure projects has attracted workers to the area, and there is evidence of speculative real estate investment, with some individuals reported to have bought several houses. In Mandanai and Kudilnilam, by contrast, no real estate market exists due to lack of demand.

As the Tzu Chi houses were larger and better-built than most other houses in New Town, and were located close to public transport and the old Hambantota town, residents considered them to be more desirable than other houses, and many endeavoured to have themselves placed on the Tzu Chi beneficiary list. Nevertheless, an occupancy check in 2008 by the Tzu Chi Foundation revealed that 12 per cent of houses were unoccupied or occupied by persons other than the designated occupants. The CARE International houses, another high-quality scheme, had similar occupancy rates. In poorer quality houses and in more remote locations, occupancy rates were lower. In Mandanai, the relaxation of the buffer zone legislation reduced the buffer zone boundary from 200 to 65 meters beyond high tide mark, allowing many households to reclaim their original land, and several received support from a local NGO to rebuild in situ. In addition, it was reported that the lack of livelihood opportunities for women in Mandanai had made life especially difficult for female household heads and that many had left. As a result, more than 20 per cent of houses in Mandanai were unoccupied.

In addition, several transfers of residence within the resettlement schemes were observed. These were motivated to a large extent by the desire to maintain patterns of residence based on traditional extended family structures. Even where extended families do not live under the same roof, they prefer to live nearby and it is common to find that in rural or informal urban settlements neighbours are often relatives. Different members of an extended family were provided houses built by different donors, not necessarily nearby or in the same location. Although occupants often tried to exert influence to be allocated houses next to or near other occupants to whom they were related by kin, they were not always successful. Thus after receiving houses, they transferred them and moved closer to relatives living elsewhere who received houses from a different programme.

Gender equity in land tenure emerged as a significant issue, with evidence that the housing reconstruction program in Sri Lanka marginalised women’s property rights. In the case of married couples, beneficiary lists generally listed the male as the title holder, regardless of pre-tsunami property ownership arrangements, thereby increasing women’s vulnerability in the event of marital separation or the death of a husband. Implementing agencies have mounted advocacy campaigns aimed at instituting joint title for married couples, but the outcome remains to be seen.

**Repair and maintenance**

Most implementing agencies provided a one-year warranty and during this period made repairs and rectified faulty construction when complaints were received. However, two to three years after completion, major problems of poor quality construction were evident in many cases. Cracks in walls and floors, chipping of plaster, masonry and concrete, inoperative doors and windows, leaking roofs and malfunctioning plumbing, among other types of deterioration, were widespread. It is unacceptable that such problems have emerged within such a short time. Some houses require major repairs which are beyond the means of occupants, and in some cases faults are structural and irremediable. Understanding this, an occupant in New Town commented:
‘I know this house needs repair, but it has already become too weak and I am fearful that it may collapse if I try to make repairs. We will need to break this house and build a new one.’

Despite so much evidence of poor construction, many agencies are reluctant to accept responsibility. As one agency staffer commented:

‘They [occupants] are responsible for the cracks. They keep making extensions to the house and in the process weaken the structure and then cracks develop.’

Unlike the Sri Lanka settlements, where maintenance and repair responsibilities were transferred to occupants after 12 months, the TNSCB retains responsibility for most maintenance work. TNSCB projects have a programmed schedule for maintenance works to be carried five years after the completion of construction, and in the interim repairs have been carried out. However as faults are often structural, the repairs can only be cosmetic and cannot rectify the problems for the long term. For example, after the concrete handrails of the stairs in one apartment had chipped off extensively, repairs were made by filling the chipped areas and plastering with cement concrete, which began to fall off within a short time. If a low-density mix had been used originally, a possible reason for the chipping off, a higher density mix for the repairs, if used, may not bond with the earlier component. In general, it is not impossible, but certainly very difficult to repair damaged concrete, and highly skilled and careful work is required.

Extensions and alterations to houses

In most housing reconstruction projects, a ‘one-size-fits-all approach’ (Russell et al. 2008) is followed where a standard-sized house is provided to occupants with widely varying numbers of household members and diverse home-based livelihoods. Where land is restricted, or in multi-storey buildings, this approach places occupants in an inconvenient position, particularly large households or those requiring more space to generate livelihoods. On the other hand, when possible and if resources permit, occupants actively remodel, modify, extend and renovate the standard house to accommodate their needs. Understandably, in a post-disaster situation where a large volume of houses have to be built as quickly as possible, it is not practicable to build housing catering to individual occupant needs. However, some agencies have begun to understand the post-completion housing transformation process and incorporate provisions for future changes that can be made by occupants.

Box 8: Design for future flexibility

In southern India, World Vision built extendable houses with an earthquake-resistant structural core that allowed building another floor without compromising the strength of the structure (Greenblott 2007). A built-in partial extension on the second level allowed occupants to complete another living unit on that level for an extended family. Column stubs extending into the upper level as well as a staircase for accessing the second level made building and inhabiting an extra floor easy. All the occupants may not choose to extend their house, in which case, they can continue to live in the original standard house. What this example underscores is the need for agencies to recognise the diverse spatial needs of occupants and incorporate provisions and options for adapting and transforming a standard or core house over time to such needs.
Although there are stipulations against altering the houses provided under the post-tsunami resettlement schemes, these are rarely enforced. In addition to building kitchen extensions, a widespread alteration as discussed above, some households have built shops or workshops. In Seenigama, because the plot sizes are much smaller, there is little space for extensions for shops, although some households have converted the living room to a small shop (see Figure 29). Many households complained about the lack of space for outdoor activities and building extensions, and particularly to run a small income-generating business, common in such communities. In the Chennai apartment compounds, where home-based shops are not practicable, some households have started running small mobile wooden shops (see Figure 30). The TNSCB does not approve of such shops, which is why they are mobile and temporary, and can be dismantled in case of a raid.

Resilient and resourceful communities

Now that most donors have withdrawn and governments become busy with other development projects, the memory of the tsunami has faded in the face of other current issues, occupants of the resettlement schemes have become isolated and will need to address their problems by themselves. Most of them have proven themselves to be resilient, adaptive and resourceful, and to seek ways of improving their living conditions and livelihoods, indicated for instance by the informal shops and workshops mentioned above.

Where space is available many have carefully nurtured home gardens, growing food as well as attempting to overcome the barrenness of some of the areas. In the absence of an adequate waste collection system, many households manage their own solid waste by separating organic waste for garden compost and burning and burying non-biodegradable waste. Home-made rattles and scarecrows are placed on fences to deter wild elephants who enter the New Town are at night, creating a hazard and causing damage to vegetation. One household was found to have dug out its malfunctioning septic tank and build a larger and better one. Another household, allocated an abandoned incomplete house from the first lot of initial poor quality housing in New Town, spent more than AUD4,000 from personal savings and loans to repair and complete the house, which is now of much better quality than many houses built by donors. Residents of Chennai apartments have formed a system of taking turns to clean the common stairwell area and in the event of prolonged blockage of drains, pool funds and labour to clean them. An elderly woman in one of the Seenigama schemes built an attractive fishpond in her small front yard.
The above examples indicate that such communities have inherent skills and are able to maximise them with some support, in contrast to top-down heavy-handed processes that undermine such skills. Consultation and participation of communities at all stages of decision-making, design and implementation coupled with adequate technical and managerial support can enhance the quality of the programmes. Where the intended occupants have relevant skills or a desire to participate in the construction process, they should be involved. Many respondents possessed construction experience or were linked via social and family networks to local contractors, and several claimed ‘If they gave us the money, we could have done a better job.’

9. Conclusion

Agencies implementing post-tsunami housing reconstruction and resettlement programmes operated under trying circumstances and the challenges in such a context were many. There were some success stories, such as environment-sensitive site planning in one of the New Town schemes, community-based environmental management in the Hambantota town apartment scheme, and household level waste management training in the Seenigama schemes. In general, however, despite the presence of abundant international funds, the opportunity to develop a model process of sustainable, community-responsive planning and construction, offering lessons beyond the borders of these countries, was largely missed. Particularly in the construction of houses, the key ingredient in the resettlement programmes, performance overall was less than satisfactory. With a wide range of contributing factors, responsibility must be shared between the GoSL and the aid community. Among the most important constraints were:

- the flawed buffer zone policy and uncertainty caused by subsequent revisions
- resource deficiencies in the public sector, limiting the oversight and supervision capacity of local government agencies
- rejection of unsuitable implementing agencies
- poor coordination between government agencies and between the government and the aid community
- a lack of transparency in the allocation of aid resources, leading to an oversupply of houses in some regions
- politicisation and mismanagement in the allocation of housing
- a severe shortage of technical skills among government agencies, implementing agencies and in the local construction industry
- pressure from the government, media and international funding bodies for quick results
- inappropriate and insufficient community consultation processes
- absence of mandatory requirements covering construction methods and materials
- construction cost escalation, resulting in part from industry skills shortages
- absence of agreed processes for transferring infrastructure and service responsibilities to local authorities
- in some schemes, lack of attention to community development
- in the Thirrulkovil schemes, delays in infrastructure provision.
Recommendations

- Improve development and coordination of policy on housing and post-disaster management within the central government with an emphasis on wide consultation, accessing the expertise of specialist and district agencies and where appropriate, internationally. Build existing reservoirs of expertise such as the NHDA and ensure its involvement in policy-making.

- Establish a standing national disaster response capacity including a steering committee comprising government and major development partners, and a central government agency with unambiguous authority and overall responsibility for coordinating housing reconstruction.

- Support effective decentralised structures with appropriate delegations of budgets and responsibilities. Ensure local government agencies are equipped with adequate technical capacity and resources to carry out their roles. To improve staff calibre, re-introduce merit-based public sector recruitment, promotion and staff development.

- In consultation with the aid community, establish clear disaster response guidelines setting out the roles and responsibilities of all actors, including government and non-government agencies. Guidelines should include an explicit recognition of the importance of allowing sufficient time for beneficiary selection and community consultation.

- Build data collection capacity. Establish effective, open access, data collection systems on housing needs and delivery. To promote transparency in resource allocation, provide a rigorous evidence base to support and justify policies and programs.

- Establish a certification process for the selection of non-government implementing agencies.

- Strengthen and broaden regional coordination mechanisms to ensure the involvement of all government and non-government actors. Regional coordination bodies should conduct regular assessments of the operating environment to anticipate, identify and act on policy and coordination gaps and operational or capacity constraints that may affect program delivery.

- Establish a central registry of beneficiaries to minimise risks of corruption and political interference, beneficiary selection should be a transparent tripartite process involving district-level government agencies, local communities and aid agencies.

- Invest in capacity development in the construction industry by expanding access to formal technical training.

- Non-government agencies embarking on housing resettlement programs should ensure they have sufficient staff and the right skills mix, including not only professional building expertise but also the management and interpersonal skills needed to interact with government agencies in a highly politicised environment and address policy and institutional constraints. Senior staff should be aware of the formal responsibilities of local, district and national government agencies and of key informal relationships between them.
• Ensure close coordination between agencies responsible for housing and infrastructure delivery. Establish clear mechanisms for the transfer of infrastructure and maintenance responsibilities. Where necessary, ensure that local government agencies are adequately resourced to take on additional functions in new settlements.

• Reconstruction programmes offer opportunities for demonstrating good practice and building local capacity. However local capacity building should be viewed as a two-way process of synthesis of formal and informal knowledge streams. Housing design and construction technologies should be developed by educated professionals in partnership with local ‘barefoot’ professionals. In that way the knowledge would continue to be used in the community after agencies have left.

• Reconstruction should not be viewed as a one-off process of only building houses and settling people in them. It has to be complemented with a long-term system of support for warranty, repair, maintenance, extension and remodelling. Agencies should be prepared to engage over a longer term as the process of settlement and adapting to new housing, especially in a newly developed area, can be protracted.

• Housing reconstruction needs to be integrated with other community development sectors. Of particular relevance as this study indicated, support for solid waste management and sanitation in the context of rapidly changing consumption patterns and increasing density of settlements as intrinsic elements of housing is necessary. In general, after the housing and infrastructure has been constructed, it is necessary to facilitate community bonding and cohesiveness so that responsibility and ownership is developed for the scheme and its communal facilities.

• A mechanism for ensuring good quality of construction has to be considered from the earliest stage of a reconstruction programme. This can only be done through a thorough study of local construction practices including their strengths and weaknesses. Particular attention should be paid to any form of construction with concrete—mistakes can be permanent and it is easy to make mistakes in the absence of skilled supervision and monitoring.

• Understanding and appreciation of local culture and traditional practices and patterns is essential to designing successful housing. The family, often in its extended or joint forms, is a key element in the culture of many developing countries such as Sri Lanka and India, and how the family manifests itself over space should be an important factor in housing design, layout and location.

• It is important to pay attention to orientation of houses and incorporate passive cooling and climate-responsive features in a context where air-conditioning is unaffordable. In any case these should not be promoted in the current situation of global climate change.

• As much as possible, unimaginative barrack-type layouts and the one-size-fits-all approach to housing design should not be followed. It is understandable that post-disaster reconstruction demands quick results and such detailed design requires time. However once a settlement and housing has been built, it is too late to make changes and people have to live there over a long term and face problems. Therefore it is worth investing time for good design at the expense of delayed outputs as it pays over the long run. Governments, policymakers and the media need to be made aware of this.
• In the event resources and time are limited, ‘core houses’ should be built in such as way that there is provision for making extensions. In hazard-prone areas, if it cannot be ensured that future extensions by occupants would be hazard-resistant, the ‘core house’ should be built to hazard-resistant standards so that it can serve as safe shelter during disasters.

• Disasters should be used as opportunities to build back better and to demonstrate hazard-resistant construction in a context of recurring hazards. Houses that withstand hazards provide tangible and visible demonstration, and allow promotion of safe building practices.

• During reconstruction, it is important to address and overcome the underlying vulnerabilities that had previously prevented safe house construction and the risks that threaten durability and sustainability of housing. Building housing back to a better standard that is less vulnerable to context-specific hazards can contribute to reduced risks in the long-term. Reconstructed or rehabilitated housing with future risk in mind can prove more sustainable.

• A mode in-between donor-driven and completely owner-driven housing reconstruction might allow the best results. Allowing control of the house building process to be in the hands of the occupant while providing technical support for design, supervision and construction management facilitates effective partnership and teamwork, occupant satisfaction and achieving good quality construction to professional standards.

• Implementing agencies ensure where possible that relatives and former neighbours are co-located.

• Given that a functioning informal land market exists in the settlements, consider allocating freehold title upon occupancy. This will push land prices closer to market values and enable the use of property as collateral.

• Ensure that women are included as joint title holders in the case of married couples, and sole title holders in the case of female-headed households.


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