Research Studies: Environmental Economic Policy Series No.13
April 2010

Targeting and Distribution of Post-Disaster Aid: A Case of the Fishery Sector in Post-Tsunami Sri Lanka

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National Library of Sri Lanka-Cataloguing-In-Publication Data

Gunawardena, Asha
Targeting and Distribution of Post-Disaster Aid : A Case of the Fishery Sector in Post-Tsunami Sri Lanka / Asha Gunawardena .– Colombo : Institute of Policy Studies of Sri Lanka, 2010

38p. ; 29cm. .-- (Environmental Economic Policy Series ; No.13)

ISBN 978-955-8708-63-7 Price:

i. 363.348 DDC 22 ii. Title

1. Disaster Relief 2. Environmental Economics
3. Fisheries

ISBN 978-955-8708-63-7

Price

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Acknowledgements

This study has been undertaken with the financial support of South Asia Network for Development and Environmental Economics (SANDEE). I deeply express my sincere thanks to SANDEE resource persons and peers for their technical support and guidance during the course of the research. My special thanks go to Priya Shayamsundar and Pranb Mukhopadhyay for the valuable guidance and encouragement provided throughout the research work. I gratefully acknowledge the support of SANDEE secretariat; Kavitha Shrestha, Anuradha Kafle and Krisha Shrestha at various stages of the research work. I offer my grateful thanks to the relevant officials at the Department of Census and Statistics for providing a soft copy of secondary data on Tsunami Census. My special thanks go to Kachana Wickramasinghe, Research Officer, IPS, for her support in the field work. Finally, I extend my deepest gratitude and sincere thanks to my supervisor Prof. Jean-Marie Baland, University of Namur, Belgium for his invaluable guidance to make this task a success.

Abstract

The study focuses on two types of aid transfers: boats and houses, which were distributed as part of an effort to rehabilitate tsunami-affected fishery households in six districts of Sri Lanka. The study attempts to investigate the distributional impacts of these transfers on the affected households. The study also attempts to quantify the factors underlying the allocation of such asset transfers and examines the degree to which the government and donors targeted the right households. The study uses the Census of Tsunami, conducted by the Department of Census and Statistics in 2005, as the baseline survey for pre-Tsunami data. We base our findings on a follow-up survey carried out in 2008 for a sample of fishery households selected from the baseline survey. The results of the study show that there was better targeting of households for the allocation of houses compared to the targeting and allocation of boats. The findings also show that housing transfers have resulted in improved asset equality among the fishery households compared to what existed in the pre-Tsunami period. The boat transfers on the other hand, were not only poorly targeted but have also resulted in an increase in asset inequality. The differences between the two aid transfers may be due to the differences in the nature of the assets transferred, the availability of specific government policies, the availability of systematic information, and the dominant mode of aid delivery. The findings of the study also reveal that households who had access to social networks were more likely to receive aid transfers. Apart from household characteristics, regional disparities also played a role in the allocation of aid due to differences in access to infrastructure facilities, political preferences or the presence and absence of political turmoil. The findings also highlight the importance of making special efforts in targeting of such aid to reach certain sub-sets of people such as very poor marginalized groups and those who lost human capital in disaster situations.

Key words: Aid targeting and distribution, social transfers, post-disaster development, Sri Lanka

1. Introduction

Natural disasters are becoming an increasingly more prominent feature of the global landscape. In recent years, the world has witnessed massive destruction due to natural disasters. The frequency of occurrence and the economic impact of such disasters have been increasing from the 1970s (CRED, 2008). South Asia in particular is highly susceptible to such natural disasters due to high population density, high levels of poverty, disparities in income, health and education levels, and the heavy dependence on monsoons. Floods, wind storms, earthquakes, droughts and wave/surges including Tsunamis were the main types of natural disasters that created havoc in the region in the recent past. The number of recorded natural disasters in the region from 1990-2007 were about 680, which resulted in some 400,000 human deaths and large numbers of people injured and displaced, in addition to the massive losses economically (CRED, 2008).

Development aid in terms of social transfers to the victims of the calamities plays a major role in post-disaster situations of South Asian counties given their high vulnerability to such risks as well as other factors such as their low-income levels. Recent studies have shown that the priority in such situations should not be only on increasing the aid effort by raising and transferring more money but on increasing aid effectiveness by targeting the right recipients (Mavrotas, 2009). Very few studies to date have shed light on the effectiveness of post-disaster development aid in order to evaluate how effective these interventions have been in achieving the intended objectives.

Sri Lanka was one of the most affected countries by the Asian Tsunami that occurred on December 26, 2004 which resulted in the death of more than 35,000, more than 20,000 injured and displaced several hundred thousand people (GOSL, 2005). This is the largest natural disaster recorded in Sri Lanka's history. About 89,000 houses were fully or partially damaged (DCS, 2005). The number of people who lost their livelihoods amounted to 150,000. The fisheries sector was the most seriously affected economic sector. The loss of lives of fishermen was estimated at 5,000 with 71,500 households directly affected. Fishermen lost about 16,000 craft while roughly 7,000 craft were damaged due to the Tsunami (Amarasinghe, 2006). The total property damage in the fisheries sector, including damage to fisheries infrastructure, was estimated at US $391 million (ICSFW, 2005). In addition, many coastal protection structures and coastal ecosystems were either disturbed or destroyed.

Following the Tsunami, Sri Lanka was fairly efficient and effective in providing immediate relief to the victims. However, rehabilitation proved to be more challenging due to a variety of reasons. The delivery of post-Tsunami interventions was not systematic and planned. Concerns have been raised about poor targeting and distributional issues in the context of the unmet urgent demand for accurate pre-Tsunami information (MFAR, 2006). The situation was aggravated by poor coordination among government agencies and local and international donors, as well as local level poor capacities with regard to receiving and distributing aid and the different interests and priorities of donors.

This study focuses on two main social transfers: the transfer of houses and boats, as part of efforts to rehabilitate the Tsunami-affected fishery households in six districts of Sri Lanka. The study investigates the distributional impacts of such asset transfers on the affected fishery households. The study also attempts to examine the determinants of the allocation of aid and the degree to which government agencies and donors targeted and allocated these two asset transfers at the household level. The study yields valuable lessons with regard to improving the targeting and allocation of development aid in post-disaster situations. The study draws its data from a census of Tsunami-affected households that was conducted just after the Tsunami and a follow-up survey of a sample of Tsunami-affected fisher households conducted in 2008.

The rest of the paper is organized as follows. Section 2 reviews the available literature on the targeting of social transfers. Section 3 describes the policies and programmes on the distribution of houses and boats in the post-Tsunami period. Section 4 discusses the study area, the data and the data collection methods. Section 5 presents the empirical models while section 6 presents the results and discussion. The final section concludes with policy recommendations.

2. Targeting of Social Transfers

Targeting is the means by which the potential members of a society who would receive the particular benefits of a social transfer are identified. There are two elements in targeting: setting the eligibility criteria and establishing a mechanism by which to identify those individuals or households who meet the eligibility criteria (Rachel *et al*., 2009). The basic aim of targeting and allocating any development aid within a country is improving the welfare of beneficiaries and ultimately improving equality of social and economic distribution within the community and society. There are reasons why targeting may be more important than universal transfers. Firstly, most such interventions are provided by the government which is constrained by a limited budget. Thus, an efficient and effective use of the available budget while meeting the objectives of the intervention is important (Coady et al., 2004; Basely and Kanbur, 1990). Secondly, universal transfers can distort the local economy, for example, food-aid distribution can affect local food prices and labour allocation (Jayne et al., 2002). Targeting is also associated with costs. Improved targeting will likely incur administration costs such as the costs of gathering information, conducting surveys and conducting means-testing of households. In addition, the time taken for precision targeting will also be comparatively high. Moreover, there will be private costs to the beneficiaries involved in receiving transfers. For instance, in cases of "cash-for-work" programmes, households have to bear the cost of foregone income opportunities, the opportunity cost of queuing, and the cost of providing necessary documents to prove their eligibility (Coady et al., 2004). Apart from private costs, there can be indirect costs as beneficiaries may change their behaviour in order to meet the eligibility criteria. Social stigma is another fallout while political costs can result because the targeting of a particular group may lead to a reduction in social cohesion because of resentment among non-targeted groups in the community.

Researchers have come up with three main approaches to target social transfers: individual or household level assessment, categorical targeting, and self-selection. Individual or household level assessment can be done in three different ways: means testing, proxy means testing, and community based targeting (Coady et al, 2004). Means testing compares the income or expenditure of an individual or household with some threshold level. Proxy means testing uses a few indicators, such as certain household characteristics that are easy to observe, and develops a score for each household on that basis. In the case of community-based targeting, donors delegate the authority to the community to select the beneficiaries However, one cannot ensure that community leaders or leaders of community-based organizations will always select genuine beneficiaries (Coady et al., 2004).

The second main approach is categorical targeting which happens when only individuals or households in a specific category are eligible to receive intervention. Targeting based on region (geographical targeting) or demographic factors such as age and sex are common under this category. The third approach, self-targeting, provides universal eligibility with no administrative restrictions on participation but its design is such that it encourages the more needy ones to participate because it factors in the differences between the private cost of participation for the poor and wealthy households(Coady *et al*., 2004). For example, programmes that involve low-quality subsidized food, queuing to obtain transfers, or cash-for-work programmes, etc., where the opportunity cost of participation is costly for wealthy households. Apart from the above mentioned traditional approaches, conditional cash transfers are popular in several countries. These programmes provide money to poor families, conditional on certain behaviours, such as the requirement for school enrolment of children and regular attendance at child-care services. Such programmes are aimed at addressing not only short-term consumption needs but also measures for long-term poverty reduction via human capital accumulation through improvements in education, health and nutrition. What distinguishes these programmes vis-à-vis traditional targeting methods is that the programmes go beyond the provision of short-term relief to focus on redistribution and are comparatively more effective in reaching the poor (World Bank, 2006).

Targeting in order to provide social transfers is a challenging task while measuring the performance of such programmes is even more difficult. Barrett (2002) associates poor targeting with mainly two kinds of problems: errors of exclusion (i.e., missing intended beneficiaries) and errors of inclusion (i.e., providing benefits to the non-needy). For example, the Samurdhi Programme, the major poverty-alleviation programme in Sri Lanka which is based on means testing (where the beneficiaries are households that earn an income below Rs.1500/= per month) misses 36 per cent of deserving beneficiaries while 40 per cent of the programme recipients are from higher income brackets (Goonasekara S. and N. Gunatilake, 2005). Therefore, according to Barrett (2002), one approach to measure the performance of targeting is to compare the percentage of households under coverage due to errors of exclusion and leakage (that is, due to errors of inclusion) rates. However, this approach of using the above two indicators has limitations such as its failure to account for more distributional information and its focus on only the number of recipients but not the amount of transfers (Coady et al., 2004).

It is useful to examine the factors influencing the targeting and allocation of aid to households. But only a few studies are available to date on a multivariate household level analysis of the targeting of social transfers. Ravallion et al. (1993) and Datt and Ravallion (1995) have examined the determinants of household participation in food-for-work programmes while Galasso and Ravallion (2000) analyzed the distribution of food-for-school programmes in Bangaladesh. Jayne et al. (2002) on the other hand, have examined the factors underlying the allocation of food aid and the extent to which the food aid targets poor households and communities. They undertook a multivariate household analysis using a comprehensive set of panel data from Ethiopia and found that there was a spatial rigidity in food-aid distribution over time due to the fixed cost in setting up operations, political lobbying by the recipients, and/or other reasons. They concluded therefore that food aid had not reached the poorest households and communities.

The literature on targeting focuses largely on relief programmes such as food aid, cash-for-work, and food-for-work. There are also studies on conditional programmes such as cash for school enrolment and regular attendance at health care programmes. Our study, on the other hand, focuses on asset transfers: housing and boats for the purpose of rehabilitating Tsunami-affected fishery households. These asset transfers aim at achieving long-term development of the affected households. To date, there has been very little development literature on the targeting of asset transfers especially in post-disaster situations.

3. Policies and Programmes on Housing and Boat Distribution in the Post-Tsunami Period

There was a high level of interest from the government, multilateral donors, international and local NGOs, and the local private sector in rehabilitating the affected people. However, the rehabilitation of affected households posed a challenge due to many reasons. First, there was little coordination and planning behind this interest and effort. Different donors had different interests, budget and time-constraints. For example, when it came to replacing boats, providing small coastal boats was seen as an attractive quick fix as well as a way to publicize their work for many NGOs and other donors who were under pressure to distribute a large amount of funds within a short period of time (MFAR, 2006). The problem was compounded by the absence of accurate reliable pre-Tsunami data as some of the information available with village heads had also been washed away in the Tsunami waves. In the case of the fisheries sector, the main problem had to do with the lack of information on the composition of the fishing fleet and of fishery households, especially in the case of small scale fishers, due to the informal nature of their jobs. Although the registration of boats was a legal requirement for fishing, a majority of small-scale fishers had not registered and obtained licences. Furthermore, the lack of prior exposure to and thus experience of disasters of such magnitude and, hence, the lack of capacity at local levels to deal with them made development efforts difficult.

Our field discussions with affected households revealed that a permanent house was the main priority of affected people as a majority of them were living in temporary shelters. In March 2005, the government declared a no-build zone (which was meant to be a buffer zone) of 100m in the Southern and Western

Provinces and 200m in the Northern and Eastern Provinces. In addition, the government introduced two approaches to providing housing assistance: the owner-driven programme for households that were located outside the buffer zone and the donor-driven programme for those that were located within the government-declared buffer zone. The government agreed to provide grants and loans to those whose houses were fully (that is, more than 40 per cent damage)[1] or partially damaged and lived outside the declared buffer zone in order to rebuild their houses in the same location. In order to qualify for the entitlement, the government required the households to provide proof of ownership to the land on which they lived.

This policy did not permit families who lived within the buffer zone limit to rebuild their damaged or destroyed houses. Thus they were to be provided with new houses built with donor assistance on government land while allowing them to retain ownership of the original land. Nor did the government require them to demonstrate the ownership of the former land in order to qualify for the housing assistance. Guidelines were set by the Urban Development Authority (UDA) on the floor size (a minimum 500 sq.ft) of the new houses and on the amenities that the houses would be provided with such as electricity, drinking water, sanitation, drainage and access roads, etc. The other feature of this policy was a "house for house", according to which even extended families were entitled to receive only one standard-sized house irrespective of how big their former house had been (GOSL, 2005).

Unfortunately, the progress of the house construction and resettlement programme was slow because of the unavailability of suitable lands close to the affected villages. This forced households who lived within the buffer zone to continue in temporary shelters for years. The slow pace led the government to relax the buffer zone policy in 2006 along with a revised Tsunami housing policy. The revised housing policy refers to two zones[2] based on the Coastal Management Plan of 1997 of the Coast Conservation Department and aims at providing housing to all affected households irrespective of whether they owned land formerly or not. In addition, the government and other donors arrived at co-financing arrangements to build houses as the housing grant provided through the government was inadequate. The government also introduced a system of cash grants (IPS, 2006).

Most of the post-Tsunami livelihood programmes focused on providing cash for work, the replacement of assets (that is, boats and fishing tools), grants and loans to start a small business, and alternative livelihood training programmes. However, there were not many livelihood training programmes focused on the fishery sector. Hence, only some fishery households in Trincomalee received training on boat repairing. While the fishery sector lost a lot of physical assets, livelihood programmes were confined mainly to the provision of boats and fishing tools and did not extend to the implementation of holistic livelihood restoration programmes. Boat donations were mainly by NGOs and poor coordination between the government and NGOs as well as the absence of an accurate information system in the fishery sector made targeting more challenging (MFAR, 2006). Moreover, unlike in the case of house transfers, there was no policy when it came to the targeting and allocation of boats.

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[1] Housing grants given by the government were Rs. 100,000 (USD 1000) for partially damaged houses and Rs. 250,000 (USD 2500) for fully damaged houses.

[2] Zone 1 refers to state reservations within the Tsunami-affected coastal areas while Zone 2 refers to the other areas.

Two studies prior to the Tsunami have shown that the coastal fisheries sector in Sri Lanka has reached the optimum level of exploitation and further exploitation would lead to over-exploitation (Dayaratne, 1996; Wijeratne, 2001). These studies indicate therefore the necessity of controlling the fishing effort and introducing proper management strategies in order to avoid the depletion of stocks. However, the MFAR has not been successful in addressing these issues in a timely and effective manner. This situation has been aggravated after the Tsunami because of the unplanned supply of new coastal boats. MFAR suspects that the over-supply of boats/crafts through Tsunami rehabilitation programmes may result in an over-exploitation of coastal fisheries due to increased fishing (MFAR, 2006). National-level data from the Boat Census conducted by MFAR in 2006/2007 reveal that the total fishing fleet has increased by 35 per cent when compared with pre-Tsunami numbers (MFAR, 2008).

4. Study Area and Data

The Tsunami affected thirteen coastal districts in Sri Lanka (see Map 1 in the Annexure). Out of the thirteen, 8 districts were the most severely affected. The criteria we adopted in selecting the districts were the extent of the impact on livelihood activities, the extent of the damage to housing units and the number of the injured and dead in households. The study collected data from 6 of these districts: Galle, Matara and Hambantota from the Southern Province and Batticaloa, Trincomalee and Ampara from the Eastern Province. We set aside the two districts from the Northern Province because of difficulty in collecting data from these areas due to the conflict situation that prevailed in the country at the time of data collection.

The study used the Tsunami Census conducted by the Department of Census and Statistics, Sri Lanka, in 2005 as its source for baseline data. The Census had based its identification of households for the survey on the housing damage that occurred due to the Tsunami. The Census covered pre-Tsunami socio-economic conditions, the extent of damage to household members (both deaths and injuries), and data on both the ownership of the pre-Tsunami house and other assets as well as the damage to the house and other assets due to the Tsunami. In addition, we used the Census of Fishing Boats conducted in 2006/2007 for purposes of cross-checking current boat ownership of households.

We also collected primary data using both quantitative and qualitative methods. We used data from the Tsunami Census as baseline information in order to draw a stratified random sample of fishery households (396). We carried out a follow-up survey of 396 fishery households in the selected 6 districts. As there are several Divisional Secretary's Divisions (DSDs) under each selected district, we decided on the number of DSDs to be surveyed based on the percentage of affected fishery households that lived in each district. We listed the number of DSDs from each district where more than 10 per cent of the fishery households were affected. We randomly selected the number of DSDs required for each district from this list. For each selected DSD, we identified a list of Grama Niladari Divisions (GNDs) where there were more than 5 per cent affected fishery households. We then selected three Grama Niladhari Divisions (GNDs) from each selected DSD. Table 4.2 shows the selected DSDs and GNDs from the 6 districts. The study selected 39 GNDs from the 13 DSDs. Once again, we randomly selected ten fishery households from each selected GND (see Table 4.1 for more details).

Table 4.1
Sample Selection for the Household Survey and Focus Group Discussions

District	No. of DS Divisions	No. of GNDs	No. of Households Selected	No. of Focus Group Discussions
Galle	2	6	60	2
Matara	1	3	30	1
Hambantota	1	3	30	1
Batticaloa	4	12	120	2
Ampara	2	6	60	1
Trincomalee	3	9	90	2
Total	13	39	390	9

We collected data from the selected sample of fishery household with the use of a pre-tested structured questionnaire. The questionnaire obtained post-Tsunami information (that is, the situation that prevailed in 2008) of the fishery households such as their socio-economic status, family information, home ownership and ownership of livelihood-related and other assets, housing conditions, access to infrastructure, access to community-based organizations, and sources and amount of various assets received as aid.[3] In addition, we recalled data which were not available in the Tsunami Census such as pre-Tsunami data on livelihood-related assets.

Two qualitative methods were employed in order to obtain in-depth understanding of the context and issues:

a) Key informant interviews: We conducted interviews with key informants such as relevant government officials, fishery inspectors, Grama Niladharis,[4] representatives of fishery cooperatives, and officials of other relevant organizations in order to get a better understanding of the issues related to the targeting of beneficiaries and current problems. We conducted these interviews in each of the six districts during the first quarter of 2008.

b) Focus group discussions: We conducted nine focus group discussions in the selected communities in the six districts chosen (see Table 4.1). Each focus group consisted of different types of fishers (boat owners, crew members, etc.) and households who engaged in the fish trade and other related services. In addition, the participants of the focus group were representative in terms of the major age groups (young, middle aged, old) and socio-economic status. We utilized the information collected and knowledge gained from in-depth interviews and focus group discussions to develop the structured questionnaire for the household survey.

[3] However, we do not have information on the actual amount of housing aid received by each household.

[4] Grama Niladhari is the officer in charge of the village.

4.1 Sample Characteristics

The following two sub-sections provide a description about the data obtained from our follow-up survey of the tsunami affected fishery households with reference to housing and boat assets.

4.1.1 Reconstruction of Houses

As shown in the Table 4.2, 71 per cent of the households had fully damaged houses while the rest of the households had partially damaged houses. The majority (64 per cent) of the households had received housing aid through the government, followed by NGOs at 63 per cent, with the private sector and community-based organizations bringing up the rear at 6 per cent. It is important to note that most of the households had received housing aid from more than one source. For example, 45 per cent of the households had received housing aid from both the government and the NGOs. Among the 87 per cent current house owners, 82 per cent had been able to obtain housing aid either from one or more than one source of aid (see Table 4.2).

Table 4.2
Descriptive Statistics on Housing (n = 396)

Variable Name		Mean	Std. Dev.
Housing Damage			
Fully damaged		0.71	0.45
Partially damaged		0.29	0.45
Sources of Housing Aid[5]			
Through the government		0.64	0.48
NGOs/donors		0.63	0.48
Local private sector		0.03	0.16
Community-based organizations		0.03	0.16
Households' own contribution		0.05	0.32
Current Housing Situation			
Rebuilt		0.51	0.50
Relocated		0.40	0.49
Rebuilt and relocated		0.03	0.17
Neither rebuilt or relocated		0.06	0.23
Pre-Tsunami Housing Quality			
Permanent		0.65	0.48
Temporary		0.28	0.45
Current Housing Quality			
Permanent		0.83	0.38
Temporary		0.04	0.18
House Ownership			
Current house ownership	= 1 if current house owner	0.87	0.34
Pre-Tsunami house ownership	= 1 if pre-Tsunami house owner	0.93	0.25
Recipient of housing aid	= 1 if housing aid received	0.82	0.38
House Values			
Current house value		570088.2	487089.0
Pre-Tsunami house value		265555.1	250297.8

[5] Most of the households had received housing aid from two sources, for example, from the government and NGOs.

By 2008, 51 per cent of the households had been able to rebuild their houses on their land while 40 per cent had relocated to new lands away from the sea. But around 6 per cent of the households had neither been able to rebuild their houses in the same land nor been able to relocate to another land. In contrast, around 3 per cent of the households had not only been able to rebuild their houses but also to receive a house on new land. However, it is important to note that the percentage of households who live in permanent houses had increased from 65 per cent in the pre-Tsunami period to 83 per cent in the post-Tsunami period. We also compared the average value of their current house with the average value of their pre-Tsunami house (at current prices) and found that the current average house value was more than double (see Table 4.2).

4.1.2 Replacement of Boats

Forty six per cent of households in our sample were boat owners in the pre-Tsunami period. Thirty-nine per cent of total households had lost (totally destroyed) their boats while there was partial damage to the boats of 6 per cent due to the Tsunami wave. Only 1 per cent of the households had escaped any boat damage (see Table 4.3).

Table 4.3
Descriptive Statistics on Boats (n = 396)

		Mean	Std. Dev.
Boat Damage			
Fully damaged		0.39	0.49
Partially damaged		0.06	0.25
Not damaged		0.01	0.10
Did not own a boat		0.53	0.50
Sources of Boat Aid			
Through the government		0.05	
NGOs/donor agencies		0.25	
Private or community-based organizations		0.01	
Boat Ownership			
Current boat ownership	= 1 if current boat owner	0.38	0.49
Pre-Tsunami boat ownership	= 1 if pre-Tsunami boat owner	0.46	0.50
Recipient of boat aid	= 1 if boat aid received	0.31	0.46
Pre-Tsunami boat owner if boat was destroyed	= 1 if boat was destroyed due to Tsunami	0.39	0.49
Boat Values			
Current boat value		122444.20	381358.50
Pre-Tsunami boat value (at current prices)		82595.96	197159.10
Amount of boat aid received		99703.03	362778.90
Current value of the destroyed boat		63498.33	168395.70

The households had received boat aid primarily from local and international NGOs/donor agencies. The percentage of households that received boat aid from the NGOs (local and international) was 25 per cent while only 5 per cent received boat aid through the government. Another 1 per cent of households

received boat aid from either private or community-based organizations. When we compared the average amount of boat aid received with the mean value of the destroyed boats, we found that the value of boat aid received was higher compared to the value of destroyed boats (see Table 4.3).

5. Did Aid Targeting (Houses and Boats) Work in the Post-Tsunami Period?

Generally, development-related aid transfers at the individual or household levels basically target the neediest. However, in this study, we focus on aid transfers in the post-disaster context. Even households that owned their own houses and boats lost them either fully or partially due to the disaster. Thus, targeting in the post-disaster situation should take as its reference point asset ownership and asset levels of the pre-disaster situation so that those offering aid can attempt to reproduce at least the initial pre-disaster situation.

First of all, we compared the asset ownership of households in the present with that in the pre-Tsunami period (see Tables 6.1 and 6.3). Second, we plot the current asset value and the current value of the pre-Tsunami asset in order compare the pre-Tsunami situation with the current situation in order to find out whether the households were better off in terms of possessing particular assets. Secondly, we plot the cumulative distribution functions for aid value received and the current value of pre-Tsunami assets which were destroyed or lost due to the Tsunami. Thirdly, we plot Lorenz curves for the same variables used in order to plot cumulative distribution curves to investigate whether the distribution of particular assets among households have improved after post-Tsunami aid transfers.

In order to investigate these issues further, we examine the factors underlying the targeting and allocation of asset transfers (i.e., houses and boats) at the household level. We use household level data to understand which household-related factors made them eligible to receive post-Tsunami housing and boat aid. We employ two models: a Probit model to examine the determinants of allocation of aid among households and a Tobit model to explain the amount of aid received (i.e., the money value of the house/boat) by each household and the determinants of the allocation of such amounts. We carried out a similar analysis for both house transfers and boat transfers.

5.1 Probit Model

It is best to use Probit and Logit models when the dependent variable is binary and takes a value of zero and one. Probit and Logit models are mostly similar, the main difference being that Logit models have a logistic distribution while Probit models are based on normal distribution. In this study we use two Probit models.

First, we examine the probability of households receiving aid transfers (houses or boats). We use current asset ownership of households who received aid transfer as the dependent variable. Pre-Tsunami asset ownership and the extent of damage to such assets were the main concerns when it came to replacing assets as a means of rehabilitating affected households. Therefore, we use pre-Tsunami asset ownership

(that is, owning a house or owning a boat just before the Tsunami) of those who lost their assets due to the Tsunami as an independent variable in order to examine whether aid transfers targeted the right beneficiaries. In addition, some characteristics of the household head such as gender (male), ethnicity,[6] age and education levels (less than primary,[7] primary, secondary) were taken as independent variables in the analysis as they could have an impact on receiving assets or owning them. For example, donors provided a considerable proportion of housing grants through the government, which was, in turn, disbursed via the government banks. Thus, households that had secondary level and above education might have found it easy to obtain these grants compared to those without such education. Similarly, we hypothesize that the gender of the household head matters. Men were more likely to have access to social networks than females. We also took into account the age of the household as young households might have had more access to aid compared to older ones. In addition, the extent of damage to the family (that is, the death and/or injury of family members due to the Tsunami) might also have influenced the receiving of aid. Our field observations revealed that the families that experienced deaths or disablement of members due to the Tsunami had focused less on obtaining aid and more on either funerals or treating the injured members of the family. Since selecting genuine beneficiaries was a challenge because of the lack of reliable information at the local level, some donor agencies approached community-based organizations in order to identify beneficiaries. Therefore, we had to consider the household's access to social networks (that is, pre-Tsunami membership in a community-based organization/s) as an independent variable. We moreover use regional dummies for districts[8] (Ampara, Batticaloa, Trincomalee, Hambantota and Matara) in order to capture the effects due to spatial variation (see Table 5.1 for further details about household characteristics).

Table 5.1
Descriptive Statistics of the Household Survey Data (n = 396)

	Mean	Std. Dev.
Household Characteristics		
Gender of the Household Head *(*male)	0.96	0.20
Age of the household head	45.42	12.24
Level of Education of the Household Head [9]		
= 1 if the household head has completed primary level of education but not secondary level	0.19	0.39
= 1 if the household head has secondary or more than a secondary level education	0.51	0.50
Damage to Household Members		
= 1 if the household experienced a death of a family member due to Tsunami	0.12	0.33
= 1 if a family member injured due to Tsunami	0.11	0.31
Households Access to Social Networks		
= 1 if head of the household was a member of a community-based organization before Tsunami	0.64	0.48
= 1 if head of the household was a member of a fishery cooperative before Tsunami	0.53	0.50

[6] We had to drop the ethnicity variable as it is strongly correlated with districts/regions.
[7] Households with less than primary level education are taken as the reference category.
[8] Households from Galle district are considered as the reference category.
[9] We considered household heads with less than primary level education as the base.

We estimate another Probit model in order to understand the probability of owning assets at present by households in order to compare pre-Tsunami asset ownership with current asset ownership. Here, our dependent variable is current asset ownership by the households (whether the household owns a particular asset, a house or boat, or not). In addition, we use all household characteristics described above as other independent variables (see Table 5.1).

5.2 Tobit Model

We use Tobit models when the dependent variable is continuous. Although in principle it can take negative values, this is not observable. Instead, we observe zero values due to the consequence of censoring or non-observability.

We examine to what extent the values of destroyed/lost assets are compensated by aid transfers. Here we use a Tobit model with the aid value received as the dependent variable. The aid value received[10] is a continuous variable and takes zero or negative value when a household did not receive a particular asset as a form of aid transfer. As the minimum value that can be observed for the variable aid value received is zero, we use the left-censored Tobit model. We take the pre-Tsunami asset value (that is, the current value of the destroyed asset) as an independent variable. We use characteristics of the household head, the extent of damage to the family, the access to social networks, and the regional dummies as other independent variables. These are the same independent variables we used in the previous section.

We use another left-censored Tobit model in order to examine to what extent households recover in monetary terms the pre-Tsunami assets via the new assets in order to understand whether households are better off in the present in terms of assets ownership. Therefore the explanatory variable in this model is the current asset value. The independent variables are the pre-Tsunami asset value[11] and the same set of independent variables that we mentioned above.

5.3 Calculation of Current and Pre-Tsunami Asset Values

We used guidelines of the Urban Development Authority (UDA) to calculate house values. First, we classified houses as temporary or permanent based on materials used for house construction (i.e., wall, roof and floor materials). Then we calculated house values based on floor area, age of the house and house type with the use of UDA guidelines (further details are available in Annexure 2). We calculated pre-Tsunami house values at current prices in order to adjust values against inflation.

We collected the current value of boats and the current value of the pre-Tsunami boats from our household survey. In addition, we collected boat type and the year the household bought or received the boat. We checked the boat values given by households against values available from MFAR and private boat yards based on the boat type and the age of the boat. We assumed 5 per cent boat depreciation for each year and the productive period of a boat as 15-20 years.[12] We value both pre-Tsunami and current boats at 2008 prices in order to adjust against inflation.

[10] We calculate the aid value received as the current value of the asset received in aid transfer.

[11] We take the current value of the pre-Tsunami asset as the pre-Tsunami asset value.

6. Results and Discussion

In this section, we present changes in asset ownership from the pre-Tsunami period to the present with the use of cross tabs (Tables 6.1 and 6.3) and the cumulative distribution curves. In addition, we analyze changes in the distribution of assets from the pre-Tsunami period to the present using the Lorenz curves. Further, we attempt to investigate whether aid transfers have resulted in improvements in asset equality among the households. We also discuss here the results of the empirical models. Finally, we demonstrate how these results are related to the targeting and allocation of aid transfers.

6.1 Housing

There has been a reduction in the percentage of households who currently own houses compared with the pre-Tsunami period from 93 per cent to 87 per cent.[13] It is interesting to note that most of the pre-Tsunami house owners (92 per cent) currently own houses (see Table 6.1) while out of the 53 households who do not own a house now, half of them were landless before the Tsunami and have not been able to get housing aid. The rest had built temporary houses on government lands or other lands which do not belong to them. Most of them still live close to the sea. Perhaps, this has happened as a result of the initial housing related policies on "no built zone" and "house for house". Later, the relaxation of no- build zone policy also has resulted in some poor landless households losing potential ownership of a new house in a new location.

Table 6.1
Change in House Ownership: Pre-Tsunami and Current

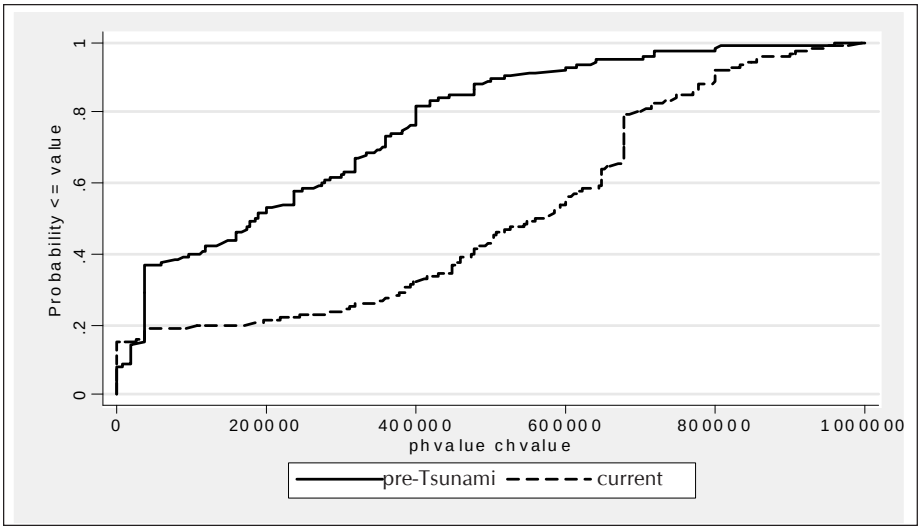
		Current House Owner		
		Yes	**No**	**Total**
Pre-Tsunami House Owner	Yes	339	30	369
		(92%)	(8%)	(93%)
	No	4	23	27
		(15%)	(85%)	(7%)
	Total	343	53	396
		(87%)	(13%)	

Note: Pearson chi2(1) = 128.8600 Pr = 0.000 Fisher's exact = 0

Due to limitations in the available data, we do not have details on the amount of housing aid received or the damage value of the houses. However, we attempt to compare pre-Tsunami and current house values as the majority of the current house owners have received housing aid (refer Table 4.2). Two cumulative distribution curves on pre-Tsunami house values and current house values show that except for 24 households that were landless and 49 households that lived in very small temporary houses located in the previously declared buffer zone, a majority of the households now possess more expensive houses (see Figure 6.1).

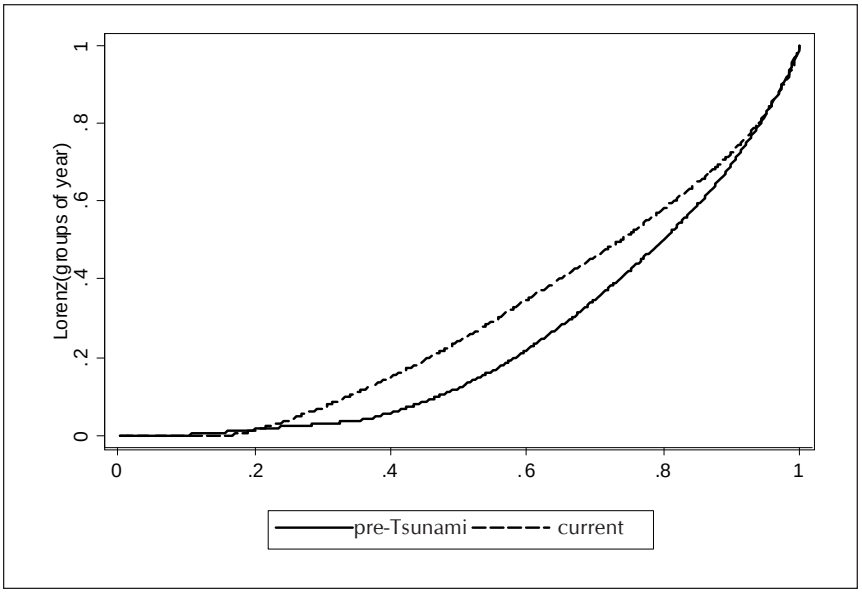
[13] Seven per cent of the households did not own houses before the Tsunami. They lived with either relatives or friends or in temporary shelters on government reservations such as marine reserves.

Figure 6.1
Cumulative Distribution Curves for Pre-Tsunami[14] and Current House Values



We plotted two Lorenz curves for pre-Tsunami and current house values. We note an improvement in the distribution of housing assets in the post-Tsunami period compared to the pre-Tsunami period as the Lorenz curve for current house distribution is closer to the perfect distribution line (45 per cent line) in comparison with the curve for pre-Tsunami house distribution (refer Figure 6.2). The Gini co-efficients of the pre-Tsunami distribution and current are 0.5 and 0.43 respectively.

Figure 6.2
Lorenz Curves for Pre-Tsunami and Current House Values



[14] We calculate pre-Tsunami house value at current prices to adjust for inflation.

With the use of a Probit model, we examine the factors that affect the households' probability of receiving housing aid. Being a pre-Tsunami house owner increases the probability of receiving housing aid by 0.77 while pre-Tsunami membership in a community-based organization increases the probability of receiving housing aid by 0.09. In addition, we observe regional disparities in aid allocation. For instance, compared to Galle, all other districts except Hambantota had less probability of receiving housing aid (see column 1 in Table 6.2).

We examine the probability of owning a house at present (that is, in the year 2008) by the households using another Probit model (see column 2 in Table 6.2). Owning a house before the Tsunami increases the probability of owning a house at present by 0.79. Being a pre-Tsunami member of a community-based organization increases the probability of owning a house at present by 0.09. In addition, being a resident in Batticaloa reduces the probability of owning a house compared to Galle.

Table 6.2
Results of the Empirical Models - Housing (n = 396)

Dependent Variable	Probit		Tobit		
	Recipient of Housing Aid	Current House Ownership	Current House Value[15]	Current House Value[16] (Rebuilt)	Current House Value[17] (Relocated)
	1	2	3	4	5
	Marginal Effects		Marginal Effects at Observed Censoring Rate		
Pre-Tsunami house ownership	0.77***(0.080)	0.79***(0.080)			
Pre-Tsunami house value			0.21***	0.26**	-0.06
Male	0.023(0.096)	0.007(0.073)	-62092.18	-13626.41	-38389.61
Age	0.0003(0.0087)	-0.003(0.066)	6407.87	11412.90	8936.73
Primary education	-0.1078(0.073)	-0.012(0.047)	7361.09	46899.37	-115707.33
Secondary and above education	-0.017(0.047)	0.026(0.046)	21843.36	43608.76	-80151.37
Dead	-0.044(0.064)	-0.036(0.056)	-91763.65*	-63951.13	-48927.59
Injured	-0.009(0.07)	-0.027(0.062)	-106732.57*	-79131.96	-116795.73
Membership of a CBO	0.087**(0.041)	0.094**(0.035)	42885.23	-19401.88	125790.72**
Matara	-0.348*(0.203)	-0.286(0.19)	-160249.56	-215179.84**	-115711.10
Hambantota	-0.217(0.222)	-0.016(0.146)	506936.60***	572209.40***	391730.37***
Trincomalee	-0.48**(0.155)	-0.21(0.135)	-96125.44	-73841.76	-27244.44
Batticaloa	-0.327**(0.137)	-0.247**(0.115)	33050.4	17335.66	41055.65
Ampara	-0.484***(0.169)	-0.26(0.152)	28260.5	13306.14	-7554.69

Note: ***,**,* denote significance at the 1, 5, and 10 per cent levels, respectively.

[15] 53 left-censored observations at current house value < =0 and 343 uncensored observations.

[16] 14 left-censored observations at current house value < =0 and 188 uncensored observations.

[17] 21 left-censored observations at current house value < =0 and 139 uncensored observations.

We next attempt to examine with the use of a Tobit model to what extent the damaged/destroyed house values were compensated for by housing aid.[18] Calculating the marginal effects, conditional on being censored, the results show that a one rupee increase in pre-Tsunami house value has resulted in a 0.21 increase in the current house value (see column 3 of Table 6.2). As mentioned in Section 3, donors provided housing aid for two main purposes: to rebuild their houses on previously owned land or to relocate to new land. Among rebuilt households, we observed a significant relationship between their pre-Tsunami house value and their current house value. A one rupee increase in the pre-Tsunami house value has resulted in an increase in their current house value by 0.26 rupees (see column 4 of Table 6.2). However, it is interesting to note that there is no significant relationship between the current house value and the pre-Tsunami house value of relocated households. On the other hand, being a member of a CBO in the pre-Tsunami period was likely to increase the current house value for relocated households (refer column 5 in Table 6.2).

Households that experienced death or injury among a family member/ members were more likely to own less expensive houses at present. Compared to Galle, households from Hambantota were more likely to own expensive houses. This is true for separate analyses of both rebuilt and relocated households as well (see column 3, 4 & 5 in Table 6.2).

6.2 Boats

Boat ownership has changed from the pre-Tsunami period to the present. The percentage of households who owned a boat(s) has decreased from 46 per cent (in the pre-Tsunami period) to 38 per cent. Only 59 per cent of the pre-Tsunami boat owners are able to own boats at present (see below Table 6.3).

Table 6.3
Changes in Boat Ownership (pre-Tsunami and Current)

		Current Boat Owner		
		Yes	**No**	**Total**
Pre-Tsunami Boat Owner	Yes	109	75	184
		(59%)	(41%)	(46%)
	No	42	170	212
		(20%)	(80.2%)	(54%)
	Total	147	243	396
		(38%)	(62%)	

Note: Pearson chi2(1) = 64.9099 P value = 0.000.

Of the pre-Tsunami boat owners who lost boats, 48 per cent have received boat aid transfers. Since boat transfers were said to target those who lost their boats, the exclusion rate (that is, the proportion of households who should have received but have not received benefits) is 52 per cent (see Table 6.4 for more details). This also confirms claims by fishery households that among those who received boats

[18] However, we do not have actual amounts of housing aid received by each household. Therefore, we could compare the pre-Tsunami house values only with current house values.

were households that did not have boats, that had boats which were either not damaged or only partially damaged and, in some cases, those that were not related to the fishery sector at all. Some of the pre-Tsunami boat owners who did not receive boats have in fact had to change their occupations into crew members of boats, labourers, fish traders or masonry workers. Out of the number who did not own boats prior to the Tsunami, 20 per cent currently own boats. These figures constitute the evidence for the poor targeting of boat aid.

Table 6.4
Boats Destroyed and Aid Received

		Aid Received		
		Yes	**No**	**Total**
Boat Destroyed	Yes	74	80	154
		(48%)	(52%)	(39%)
	No	49	193	242
		(20%)	(80%)	(61%)
	Total	123	273	397
		(31%)	(69%)	

Note: Pearson chi2(1) = 33.9765 Pr = 0.000.

In addition, we plotted cumulative distribution curves using the amount of boat aid received and the value of the destroyed boat and the current boat values and pre-Tsunami boat values (see Figures 6.3 and 6.4).

Figure 6.3
Cumulative Distribution Curves for Values of Destroyed Boats and Boat Aid Received

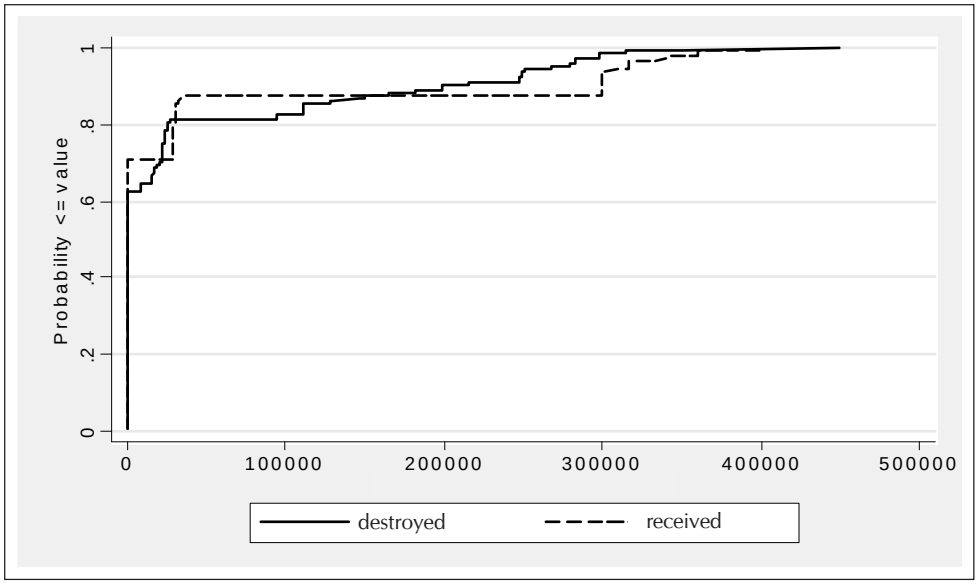
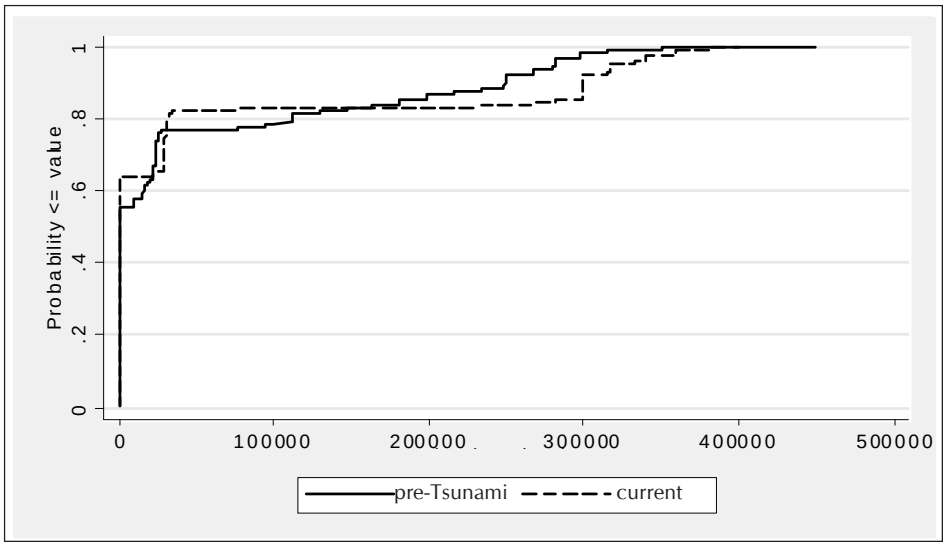


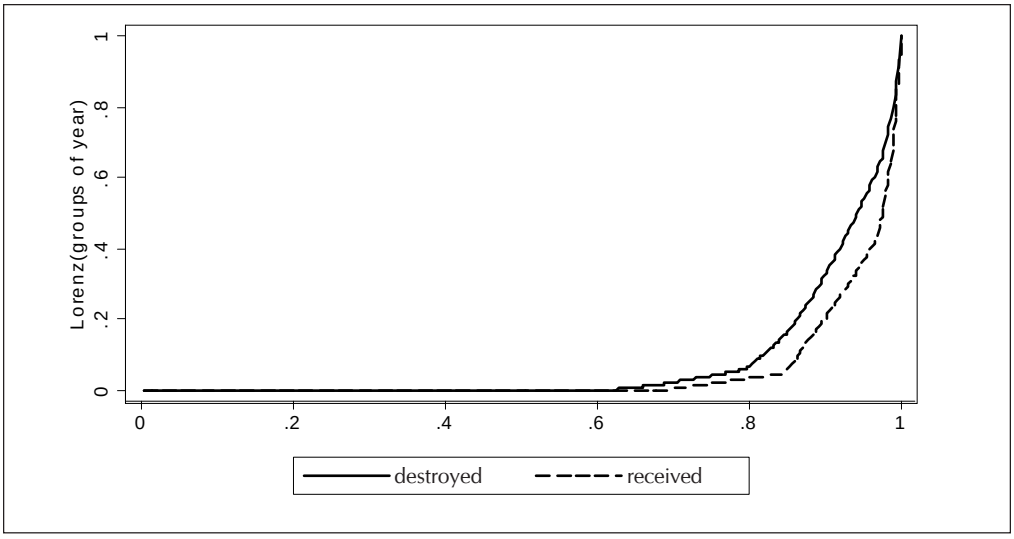
Figure 6.4
Cumulative Distribution Curves for Current and Pre-Tsunami Boat Values[19]



The cumulative distribution curves show that while a larger number of boat owners who owned less expensive boats before the Tsunami, a relatively smaller number of boat owners who owned more expensive boats had actually benefited due to post-Tsunami boat aid.

Two Lorenz curves that we plotted using the current value of the destroyed boat and the value of boat aid received reveal that current boat distribution does not compare favourably with the pre-Tsunami situation as the curve for boat aid received is placed well away from the perfect distribution line (Figure 6.5).

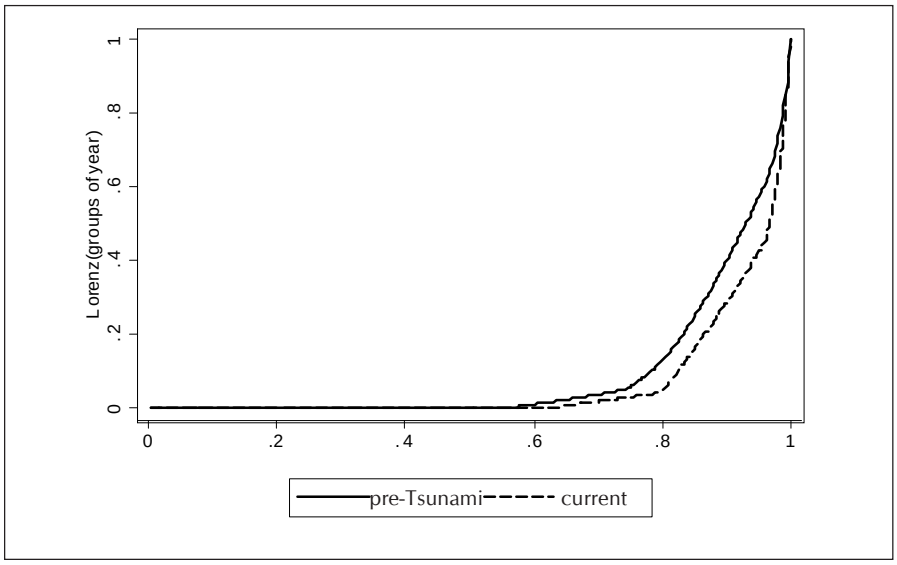
Figure 6.5
Lorenz Curves for Current Values of Destroyed Boats and Boat Aid Received



[19] We calculate pre-Tsunami boat value at current prices to adjust for inflation.

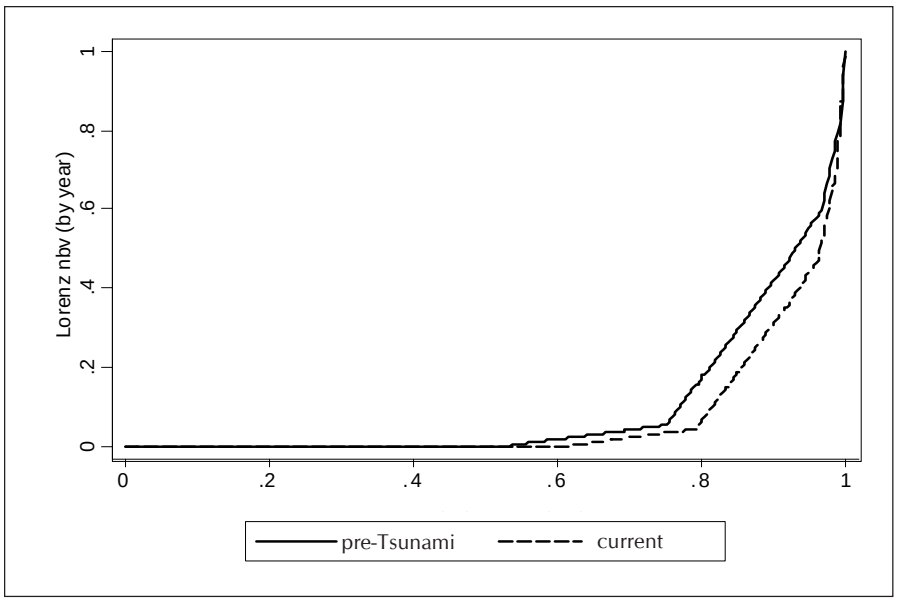
We also plotted two Lorenz curves for current boat value and pre-Tsunami boat value and found that these curves also follow a similar pattern (see Figure 6.6).

Figure 6.6
Lorenz Curves for Pre-Tsunami and Current Boat Values



The Gini coefficients for the distribution of pre-Tsunami and current boats were 0.81 and 0.86, respectively. We also plotted a Lorenz curve using current boat value and pre-Tsunami boat value (that is, without taking into account the depreciation of boat values) to test whether the boat distribution follows the same pattern and that such distribution is not due to the provision of new and high value boats (Figure 6.7).

Figure 6.7
Lorenz Curves for Pre-Tsunami[20] and Current Boat Values



[20] Boat prices are not depreciated according to age of boats.

We use a Probit model to examine the probability of receiving boat aid by pre-Tsunami boat owners who had lost their boats with other household characteristics and regional dummies (column 1of Table 6.5). When we do so, the probability of receiving a boat by a pre-Tsunami boat owner who lost his boat increases to 0.26. Being a member of a fishery cooperative (before the Tsunami) increases the probability of receiving boat aid by 0.11. When compared with the Galle district, being a household from Batticaloa increases the probability of receiving a boat by 0.16.

Table 6.5
Results of the Empirical Models – Boats (n = 396)

Dependent Variable	Probit		Tobit	
	Recipient of Boat Aid	Current Boat Owner-ship	Boat Aid Received[21]	Current Boat Value[22]
	1	2	3	4
	Marginal Effects		Marginal Effects at Observed Censoring Rate	
Pre-Tsunami boat owner who lost boat	0.26*** (0.05)			
Pre-Tsunami boat owner		0.38*** (0.05)		
Current value of the destroyed boat			0.42***	
Current value of the pre-Tsunami boat				0.48***
Male	0.03(0.13)	-0.06(0.145)	33634.29	-27552.83
Age	0.00(0.01)	-0.002(0.014)	-2945.09	-21.49
Primary	0.04(0.08)	0.04(0.086)	23575.58	31859.76
Secondary & above	-0.12*(0.06)	-0.09(0.069)	-58066.79	-43892.62
Dead	-0.08(0.07)	-0.14**0.06908	-41500.45	-39144.62
Injured	0.01(0.08)	0.07(0.088)	16377.38	34096.46
Member of a fishery cooperative	0.11**(0.05)	0.11*(0.055)	55270.59*	48451.10*
Matara	0.03(0.12)	0.08(0.129)	47704.20	77188.18
Hambantota	-0.07(0.10)	0.039(0.1257)	-5607.81	28382.76
Trincomalee	-0.08(0.08)	0.05(0.01)	-38881.56	7943.31
Batticaloa	0.16*(0.09)	0.16*(0.092)	56355.24	47148.27
Ampara	-0.06(0.09)	-0.025(0.1055)	-42123.13	-43819.98

Note: ***,**,* denote significance at the 1, 5, and 10 percent levels, respectively.

[21] 273 left-censored observations at boat aid received < = 0 and 123 uncensored observations.

[22] 245 left-censored observations at current house value < = 0 and 151 uncensored observations.

With the use of another Probit model, we examine the relationship between current boat ownership and pre-Tsunami boat ownership with other variables (see column 2 of Table 6.5 for further details). Being a pre-Tsunami boat owner increases the probability of owning a boat at present by 0.38. Being a member of a fishery cooperative and being a household from Batticaloa district increase the probability of owning a boat at present by 0.11 and 0.16 respectively.

Using a Tobit model, we examine the relationship between the value of the destroyed boat and the amount of boat aid received in order to understand to what extent the destroyed boats are compensated by the boat aid received. A one rupee increase in the value of the destroyed boat increases the amount of the boat aid received by 0.42, which is conditional on being uncensored. Being a member of a fishery cooperative before the Tsunami also increases the likelihood of receiving a more expensive boat (see column 3 of Table 6.5).

Using another Tobit model (see column 4 of Table 6.5), we examine the changes in boat values between the pre-Tsunami period and the present. A one rupee increase in the pre-Tsunami boat value has resulted in an increase of 0.48 in the current boat value. Being a member of a fishery cooperative before the Tsunami increased the likelihood of owning a more expensive boat in the post-Tsunami period.

This study attempts to investigate the efficiency, effectiveness and distributional impact with regard to the targeting and allocation of post-Tsunami asset transfers. In a post-disaster situation, the reference point for targeting of asset transfers is thought to be asset ownership and asset levels in the pre-disaster situation. Thus targeting should be such that the government agencies or donors are able to reproduce at least the pre-disaster situation. The reference point for targeting of house transfers was initially based on all pre-Tsunami house owners affected by the Tsunami (that is, the policy of "house for house") as mentioned in Section 3. However, later the government changed the reference point for house transfers to assist needy households. Therefore, the second reference point was all Tsunami-affected households that did not own a house after the Tsunami devastation, irrespective of whether they had owned a house during the immediate pre-Tsunami period or not.

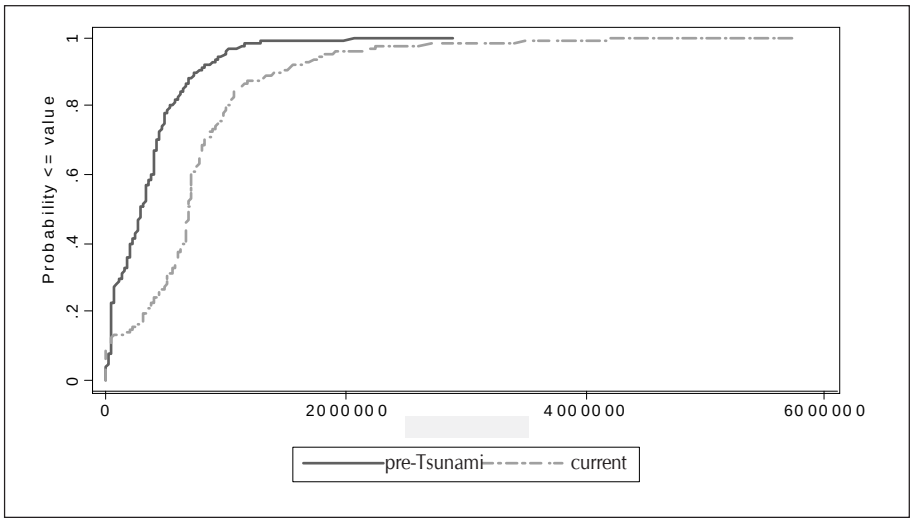
The majority of the pre-Tsunami house owners (92 per cent) in our sample have received houses by now. Empirical results also show that being a pre-Tsunami house owner increases the probability of receiving housing aid by 0.77. Therefore, housing transfers have reached the initial reference point to a greater extent. However, the replacement of asset values was not based on previous asset values. In the case of housing, donors used two methods to replace damaged or destroyed houses. Firstly, they based housing aid given for rebuilding on the severity of damage (whether fully or partially damaged) and not on the amount or value of the damage. Secondly, they did not base housing aid provided for relocated households on their previous house value or the damaged value of the house. Instead, the government (GOSL) set guidelines on the minimum requirements of a standard house for relocated households. Our empirical analysis of housing transfers for relocated households shows that there is no relationship therefore between the pre-Tsunami and current house values. Most of the relocated households were able to receive standard-

size permanent houses irrespective of whether the household concerned had occupied temporary or semi-temporary houses in the immediate pre-Tsunami period. The cumulative distribution curves show that the majority of the households therefore benefited due to housing transfers despite a slight bias towards a very small proportion of households that had been either landless and/or homeless before the Tsunami. In addition, our empirical results show that those who were severely affected (due to the loss of a family member/s or due to injured family member/s) were less likely to own expensive houses. However, the Lorenz curves of pre-Tsunami and current house values show that that there has been in general an improvement in the distribution of houses. Hence, housing transfers have achieved the second reference point also to some extent.

In the case of boat transfers, on the other hand, the initial reference point was to reproduce pre-Tsunami assets by compensating those who had lost their boats.[23] However, among pre-Tsunami boat owners who had lost boats, only 48 per cent were able to receive boat aid transfers. The results of the empirical model also show that having a boat before the Tsunami increased the probability of receiving a new boat by only 0.26. Therefore, boat aid transfers have not reached the targeted reference point to the same extent as house aid transfers. The cumulative distribution curves for current and pre-Tsunami boat values show that a relatively big proportion of small boat owners lost while a smaller proportion of big boat owners have benefited due to boat aid. The Lorenz curves further illustrate that the current boat distribution is more unequal compared to the pre-Tsunami boat distribution.

We calculated total asset value (house and boat) for each household and plotted cumulative distribution curves for pre-Tsunami and current total asset ownership (see Figure 6.8).

Figure 6.8
Cumulative Distribution Curves for Pre-Tsunami Total Asset Value[24] and Current Total Asset Value

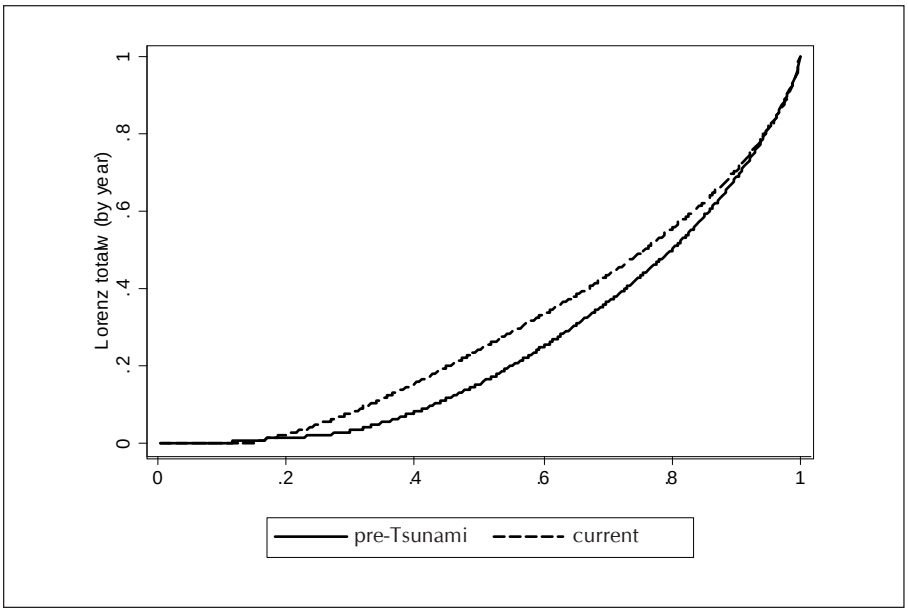


[23] As mentioned in Section 3, there was no clear policy in the case of boat transfers.

[24] We add up the value of the pre-Tsunami house and the value of the pre-Tsunami boat to calculate the total pre-Tsunami asset value.

The curves show that majority of households in better position in terms of asset ownership compared to pre-Tsunami. This was further analyzed by plotting Lorenz curves for pre-Tsunami total asset values and current asset values (see Figure 6.9). The two plotted curves show that the total assets distribution is more equal than total pre-Tsunami assets distribution.

Figure 6.9
Lorenz Curves for Pre-Tsunami Total Asset Value and Current Total Asset Value



7. Conclusions and Policy Recommendations

The study attempts to investigate the distributional impacts of house and boat transfers on Tsunami-affected households. The study also attempts to quantify the factors underlying the allocations of such asset transfers and to examine the degree to which they targeted the right households.

Our results reveal that the targeting and allocation of housing aid was better compared to boat aid. In addition, the distribution of houses was also more equal when compared with the pre-Tsunami situation despite a slight bias towards the homeless and the landless. On the other hand, the distribution of boats was less equal resulting in a larger proposition of small boat owners losing previously enjoyed benefits in the process while a relatively small proportion of big boat owners gained more expensive boats. The differences between the two aid transfers may be due to differences in the nature of the two asset transfers, the availability of specific government policies, the availability of systematic information, and the dominant mode of aid delivery. The nature of the two assets under study was without doubt different:

[25] We add up the value of the current house and the value of the current boat to calculate the total current asset value in the pre-Tsunami period and at present.

house transfers demand more planning and coordinated effort, putting in place infrastructure and other facilities and ensuring the long-time duration of the asset whereas boat transfers do not demand as much. Moreover, it is comparatively easy to prove damages to houses compared with boats. Furthermore, while there was a government policy on the rebuilding and relocation of houses, there was no specific and clear policy for boats. Local-level information on fishermen and especially boat owners were not available, which made the selection of beneficiaries for boat transfers more difficult compared to the selection of beneficiaries for house transfers. In the case of house transfers, the government mainly administered the aid, followed by local and international NGOs and other private or community-based organizations. In the case of boat transfers, however, the NGOs were mainly in charge.

The poor targeting, which has led to an unequal distribution in boat aid, only aggravates the rapid increase in the fishing fleet where, according to secondary data from the Boat Census conducted in 2006/ 2007, there is already an over-supply of coastal boats. This shows the number of boats received at national level would be more than enough to compensate all boat owners despite poor targeting and allocation of boat aid. Thus cash transfers to enable households to buy boats or to invest in some other industry may have prevented adding to the over-supply, which has negative implications on ecosystems and the environment.

It is interesting to note that total asset distribution among households has also improved at present compared to the immediate pre-Tsunami situation.[26] Therefore, we can conclude that there is a more equitable distribution of total assets (houses and boats) after post-Tsunami aid transfers.

However, we observe regional disparities in the allocation of aid. In the case of housing aid, southern districts such as Hambantota and Galle have received more houses than other districts. One explanation for this disparity might be their relative proximity to the centre of power, that is, the capital city of Colombo, compared to other districts and the better infrastructure facilities such as roads which make access to the affected communities easier. Moreover, the districts from the East were located closer to the centres of the conflict in the North-East, which may have led to some donors steering away from these areas in their aid-distribution efforts. This highlights the importance of governments' making a more coordinated effort in targeting and allocating in less served areas compared to areas which are less disturbed and where infrastructure and other facilities are available.

In both house and boat transfers, the aid was biased towards those who had access to social networks such as community-based organizations. Most donors approached local community-based organizations in order to identify potential beneficiaries due to a lack of local-level systematic information about pre-Tsunami asset owners. There could be both positive as well as negative impacts arising from this approach. Our field visits reveal that in places where community-based organizations were strong, the aid went to the right beneficiaries. In other areas, those who had access to or link with officials of such community-based organizations were able to receive more aid than those without such links. The findings

[26] See Figure 6.8 and Figure 6.9 for further details.

of the study shows that access to social networks plays a significant role in receiving aid by households especially in the case of absence of local level information. Therefore, donors should take certain steps to make sure they reach marginalized poor households who usually do not have access to social networks, especially in communities where the presence of social capital is minimal.

Households that had experienced death of, or injury to, a family member(s) were more likely to own cheaper houses and less likely to own boats. It is possible that they concentrated more on mourning and/or treating the injured, leaving them less time to pay attention to requesting or receiving aid. In addition, those who were very poor and/or marginalized were also less likely to receive housing aid although this number is comparatively very few. All this makes evident the importance of/need for donors to be alert to these special sub-sets of people in disaster situations and to make a special effort to reach them in their aid transfers.

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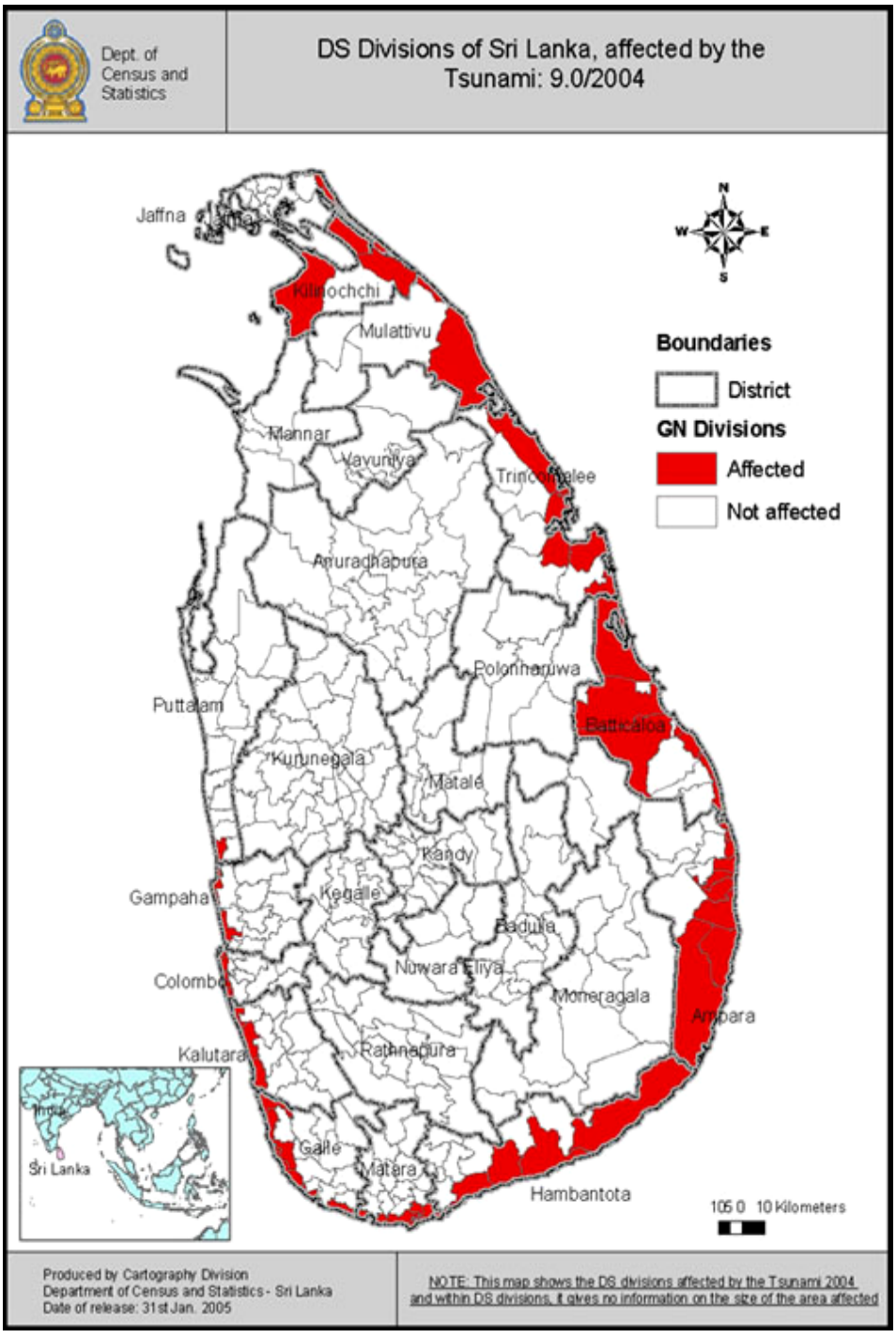
Annexure 1

Map 1
Tsunami Affected Districts in Sri Lanka
Source : The Department of Census and Statistics 2005



Annexure 2

Valuation of Houses

The following section describes how the study valued houses. However, these values may not be the market prices of such houses. The study calculates the total cost of building a house based on indicators (data) from the baseline and follow-up survey. The actual price of such houses may be different with the location, access to infrastructure, the distance to sea and many other factors which the study has not taken into consideration. We value both pre-Tsunami and current houses at 2008 prices.

We valued the houses under two categories: pre-Tsunami houses and current houses. We performed the valuation of pre-Tsunami houses using secondary data that we obtained from the Tsunami Census (i.e., the baseline survey) of the Department of Census and Statistics. We performed the valuation of the current houses with the same set of data from the follow-up sample survey.

Pre-Tsunami	Current
Materials (Roof, floor, wall)	Materials (Roof, floor, wall)
Floor area	Floor area
Number of rooms	Number of rooms
Age of the houses	Year that house was rebuilt or relocated

We classified houses as permanent or temporary based on the materials used for the construction.

a. Valuation of Current Permanent Houses

We used different price rates (Rs/ft2) based on the year that the households rebuilt or relocated their houses.

Year	Rate(Rs/ft^2)
2005	1000
2006	1100
2007	1300

(Source: Urban Development Authority)

b. Valuation of Current Temporary Houses

We performed the valuation of the temporary houses based on the floor area. We estimated temporary houses with a floor area between 250-500 ft2 at SLRs. 40,000. Houses with less than 250 ft2 were valued at SLRs. 20,000. We valued houses with more than 500 ft2 floor area at SLRs. 60,000.

c. Valuation of Pre-Tsunami Permanent Houses

Since the Department of Census carried out their survey in 2005, they used Rs.1000 /ft2 for the valuation of permanent houses. They also took into consideration the age of the houses in order to get the depreciated values.

Age Category	Depreciation
<10	20%
10-25	40%
25-50	60%
50-100	80%
>100	80%

d. Valuation of Pre-Tsunami Temporary Houses

We performed the valuation of temporary houses based on the age of the house. Since 99% of the houses were less than 500 ft2, we did not take the floor area into consideration.

Age Category	Value(Rs)
<10	40,000
10-25	20,000
25-50	10,000