

6. Summary of methodology

This section provides a summary of the methodology. A separate report provides the full set of questionnaires and the focus group themes.

6.1 Selection of *Grama Niladari Divisions (GND)* and Households

Selection of districts

Districts were selected from the Northern, Eastern and Southern provinces which were most severely affected by the tsunami of 26th of December, 2004. A total of 8 districts were most severely affected by the tsunami from the above three provinces:

- Trincomalee, Batticaloa and Ampara District from Eastern province and
- Jaffna and Mullativu District from Northern province,
- Hambantota, Matara and District Galle from Southern province.

Number of Grama Niladari Divisions (GNDs) per District

Out of the 8 districts, we first identified the GN divisions, where more than 50% of the houses were completely damaged or partially damaged but can not be used (henceforth referred to as unusable houses) – using Department of Census and Statistics (DCS) data and definitions. (www.statistics.gov.lk)

Distribution of GNDs across selected districts

District	Number of unusable houses	No of GNDs selected for survey
Jaffna	3,686	1
Mullativu	5,137	1
Trincomalee	4,643	2
Batticaloa	9,905	4
Ampara	10,566	4
Hambantota	1,290	1
Matara	2,401	1
Galle	6,169	2

Note: Information from Mullativu was not available for the selection process

The 16 GNDs for the study were distributed across the eight districts based on the level of housing damage in each district as shown in table 1.

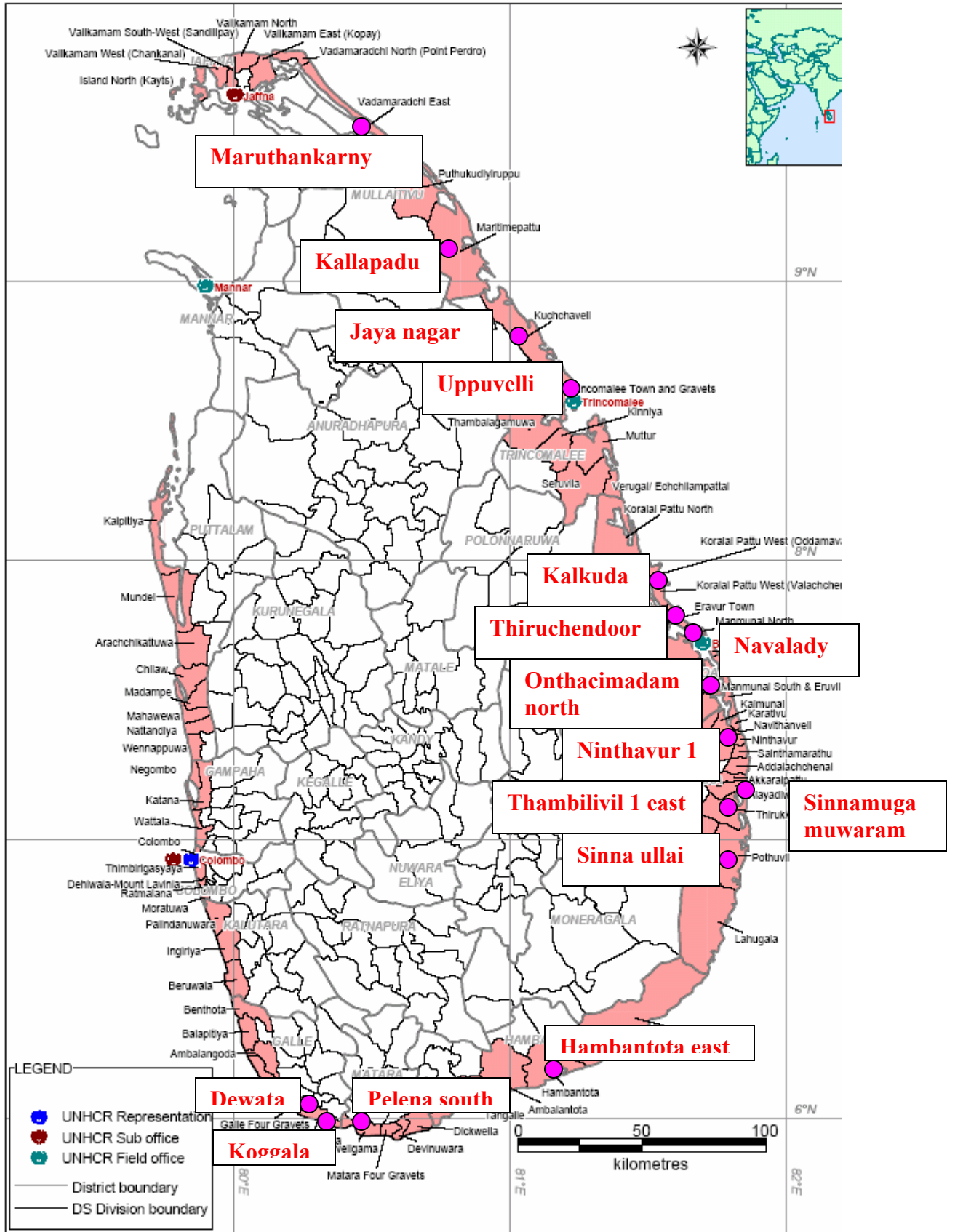
Selection of GNDs

Within the districts, GNDs were chosen based on socio-economic data so as to select a representative set of GNDs considering ethnicity, religion and livelihoods. Socio-economic data for this purpose for the Southern districts were obtained from the 2001 Census by the Department of Census and Statistics. Since census data did not extend to the districts in the Eastern and the Northern provinces, socio-economic information for these provinces were obtained through key-informants from those areas (See table 3).

The initial selection of 16 GNDs was revised twice. The first revision was needed with the refocusing of the study to include rebuilding issues of households outside the no-built zone. In this revision, GNDs that fell entirely inside the no-build zone were reduced from the study sample, as rebuilding issues were not relevant for these GNDs. The census survey that contained information on the location of households inside and outside the no-build zone was not available at the time of the sample selection, hence we had to rely on key informants to determine the location of GNDs with respect to the no-built zone. (information given to us by key informants in this regard were not entirely accurate, as a result some GNDs who were mostly within the no-built zone remained in the sample) The second revision was needed as the World Bank requested the survey to cover DS divisions that were funded by them. However, since some of the DS divisions funded by the World Bank did not have any GNDs with more than 50% housing damage, we were unable to entirely restrict the sample to DS divisions funded by the World Bank in all districts. The GNDs that were finally selected for the study are given in the table.

Selected GNDs for the study

District	DS division	Selected GN Division		Completely damaged + partially Damaged cannot be Used (A)	(A) as a per cent of Number of households before tsunami
		Name	No.		
Matara	Weligama	Pelena South	387B	275	68.24
Hambantota	Hambantota	Hambantota East	93	326	50.00
Galle	Habaraduwa	Koggala	144A	97	54.80
	Galle four gravets	Dewata	100A	164	55.97
Ampara	Ninthavur	Ninthavur 01	41	222	65.10
	Pothuvil	Sinna Ullai	P/18	242	62.05
	Thirukkivil	Thambiluvil 1 East	TK/12C	360	64.76
	Alayadiwembu	Sinnamugamuwaram	AV/14	226	78.20
Batticallo	Manmunai North	Navalady	172	433	100
		Thiruchendhoor	172B	618	78.83
	Koralai Pattu	Kalkuda	204	548	74.56
	Manmunai South & Eru	Onthachimadam North	111	318	76.56
Trincomalee	Kuchcheweli	Jaya Nagar	239C	378	74.12
	Town & Gravets	Uppuvelli	243	215	62.12
Jaffna	Vadamarachchi East	Maruthankarny	J/428	292	100
Mullativu	Maritimepattu	Kallapadu	91	N/A	N/A



Household selection

From each of the GNDs given in table 2 a sample of 45 households from the list of *unusable houses* for each GND were randomly selected for the household survey, with 30 households outside the no-build zone and 15 within. Since information on distribution of houses in the two zones within each GND was not available a priori, screening for zonal placement of houses were done at the field. Although an attempt was made to select GNDs that were spread evenly across the two zones, based on key informant information, this information proved to be inaccurate in some cases. As a result, in some GNDs the required sample of houses in each zone could not be surveyed. This was of special concern when electing houses outside the no-build zone, as some selected GNDs were mostly in-side the zone. In these instances more houses from the inside the no-build zone was included in the sample. As a result the survey was conducted on an average of 25 household outside the buffer zone per GND and 20 households within the buffer zone per GND. The households were selected using DCS data where available. For the two GNDs where, DCS data were not available, household lists obtained from GNs were used as a frame.

6.2 Information gathering

The survey was not conducted in Jaffna and Mullativu districts of Northern province due to delay in obtaining the consent of the LTTE. Therefore information was gathered only in the 6 Districts and 14 GNDs in the Southern and Eastern provinces.

Focus groups

Information from the selected GND were collected at several levels. To obtain community level perspectives on rebuilding, relocation and land issues focus groups were conducted in all GNDs. In the ethnically mixed GNDs focus group discussions were conducted for each ethnic group separately. Each focus group consisted of roughly 10 individuals who were affected by the tsunami. Attention was given to choose a mix of individuals to represent both genders, all main livelihoods, and individuals from both inside and outside the no-build zone. The focus groups roughly lasted for one and a half hours each. The proceedings of these meetings were taped and later transcribed for analysis.

Key informant interviews

Community level information to ascertain community characteristics and information on rebuilding, relocation and land issues were obtained, through key informant interviews. In each GND the GN and two other key informants, community leaders other than representatives from community-based organizations, were selected for the interviews. The interviews were conducted based on a structured questionnaire.

Land supplier survey

In addition to these interviews, information on land supply in the GND were obtained from the relevant Divisional Secretary's Office, also based on a structured questionnaire.

Household interviews

In addition to the before mentioned community level information collection, 45 household interviews, 25 households outside the no-build zone and 20 inside, are being conducted in each of the selected GNDs. These are also conducted using a structured household questionnaire. The questionnaires were grafted in English and translated to Sinhala and Tamil for use in different GNDs. Each household questionnaire is being conducted in the most commonly used language in the community.

6.3 Multivariate analysis of willingness to relocate and willingness to rebuild decisions of households

6.3 Multivariate analysis

In order to glean out the factors affecting decisions regarding rebuilding and relocation of households, the following probit regressions were estimated.

Samples and dependent variables

Willingness to rebuild on the same site regression (regression 1):

The sample included households that were outside the no-build buffer zone. The final sample included 341 households. Dependent variable is one when the household indicated that they were willing to rebuild on the same site, zero otherwise.

Preference for reconstructing own house regression (regression 2):

The sample included households that were outside the no-build buffer zone. The final sample included 341 households. Dependent variable is one when the household indicated strong preference for reconstructing own house, zero otherwise.

Preference for a pre-built house (regression 3):

The sample included households that were outside the no-build buffer zone. The final sample included 341 households. Dependent variable is one when the household indicated strong preference for a pre-built house, zero otherwise.

Ability to re-build own house (regression 4):

The sample included households that were outside the no-build buffer zone. The final sample included 341 households. Dependent variable is one when the household indicated that they are able to re-build own house, zero otherwise.

Willingness to relocate regression (regression 5):

The sample included households that fell within the no-build buffer zone. The final sample included 281 households. Dependent variable is one when the household indicated that they were willing to relocate, zero otherwise.

In the case of missing information for explanatory variables, dichotomous controls for missing values were created, in order to retain all the observations in the sample.

Explanatory variables

Most of the explanatory variables were common for the two regressions. Exceptions are indicated in parenthesis.

Location: An attempt was made to control for location at the GND level. However, given the small sample size this was not possible. Hence, dummy variables were included to control for locations at the district level. Matara district, consisting of a sample of 100 per cent sinhala households, was used as the reference group.

Characteristics of the head of the households: these variables controlled for the gender, ethnicity and level of education of the head of the household.

Livelihood of the head of the household: Two specifications of each of the above mentioned regressions were estimated. One set of regressions controlled for the type of industry (e.g., agriculture, fisheries, etc.) of the livelihood of the head of the household. Manufacturing was used as a reference group in these regressions. The second set of regression controlled for the type of employment (e.g., casual labour, public sector, etc.) of the head of household. Employment in the private sector was used as a reference in the second set of regressions.

The effect of tsunami: two sets of variables were included to capture the psychological effect of tsunami on the relocation and rebuilding decisions. These were the level of flood water, and the death rate due to tsunami.

Pre tsunami housing conditions: these variables included controls on the floor area of the pre-tsunami house, housing quality, dwelling tenure, land tenure, proof of ownership of land, and access to latrines. A pre-tsunami house was considered to be of poor quality if it had either a wall or a roof made of temporary material.

Priorities for relocation (only for regression on relocation): These variables captured the household's priorities for relocation such as: distance to sea, type of house, access to main road, access to schools and access to a health center.

Household structure: these included controls for whether the household consisted of children below five years, 5 to 16 year old children, and elderly – individuals more than 60 years.

Household skills (only for regression on rebuilding): this variable controls for existence of household members skilled in building

Community capacity for rebuilding (only for regression on rebuilding): this variable controls for whether the household belonged to a community that could help with rebuilding.

Ethnic characteristics of the community (only for regression on relocation): Two variables were included to capture the ethnic characteristics of the community, compared to the household. The first, indicated whether the household belonged to the majority ethnic group of the community. The second indicated whether the community is multi-ethnic.

Extent of housing damage to the community (only for regression on relocation): A set of variables were included to capture the extent of housing damage to the community. As indicate in the sample selection section, only communities that experienced more than 50 per cent housing damage was included in the sample. These variables included dichotomous variables that indicated whether the extent of housing damage to the community is 70 to 90 percent, or more than 90 per cent. Communities with 50 to 70 percent housing damage was used as a reference group.

Size of Family (only in ability to re-build own house regression): Indicates the size of the family.

Number of household member who are able to help with re-building (only in ability to re-build own house regression): Indicates the number of household members who are able to help in rebuilding.

The estimated equations for all the regressions are given in the following tables. Variables used as reference groups are indicated in parenthesis.

Regression results 1. - Willingness to rebuild on same location (by those outside buffer zone)		
	No. of observations - 341	Coefficient
Household head characteristics		
Gender (Female)	Male	0.93
Ethnicity (Sinhalese)	Tamil	0.54
	Moor	-0.30
	Other ethnic groups	0.29
Education (Secondary education)	Not attended	0.11
	Less than primary education	0.27
	Primary education	-0.04
	Ordinary level and above	-0.50***
Type of industry (Manufacturing)	Agriculture	-0.08
	Trade	-0.19
	Fisheries	-0.35
	Tourism	0.56
	Other industry	0.07
	Missing values of Industry	-0.09
	Not able to continue usual activities	-0.02
Post tsunami housing conditions		
Level of flood water (Less than 6 feet)	6 feet to 12 feet	-0.70**
	More than 12 feet	-0.63***
Floor area of house (450 sq.ft. - 600 sq.ft.)	Less than 450 sq.ft.	0.46
	More than 600 sq.ft.	0.35
	Missing values for floor area	1.49**
Housing quality (Good housing quality)	Poor housing quality	0.06
Dwelling tenure (Owned by household)	Owned by the government	0.54
	Other ownerships	0.96**
Land tenure (Owned by household)	Government land	0.09
	Other land ownerships	-1.12**
Property title or deed (Yes, possess deeds)	Lost during tsunami	-1.07*
	Possess another document	-0.40
	No property titles	-0.78**
Monthly income situation (Rs. 5000 to Rs. 10000)	Less than Rs. 5000	-0.30
	More than Rs. 10,000	0.66
Distnace to sea (100m - 200m)	More than 200m	0.29
Family information	Below 5 years	-0.12
Age (16 years to 60 years)	5 to 16 years	0.07
	More than 60 years	0.17
Death rate	No. deaths per family / no. of family members	-1.12**
Household skills	Skills in rebuilding	0.37
	Missing values for skills in rebuilding	-1.63*
Community based orgs	Capacity to involve in rebuilding	0.64***

Constant	1.31***
Pseudo R2	0.37

Note: Regression included district dummies. Significance at 1%; 5%; and 10% given by *, ** and ***

Regression results -2. Strong willingness to reconstruct own houses (by those outside buffer zone)			
	No. of observations – 341	Coefficients	
Household head characteristics			
Gender	Male	0.29	0.28
(Female)			
Ethnicity	Tamil	1.13**	0.97**
(Sinhalese)	Moor	0.62	0.39
	Other ethnic groups	0.42	0.36
Education	Not attended	0.35	0.49***
(Secondary education)	Less than primary education	0.06	0.24
	Primary education	0.12	0.23
	Ordinary level and above	0.36	-0.31
Type of industry	Agriculture		0.005
(Manufacturing)	Trade		0.79***
	Fisheries		-0.34
	Tourism		0.89
	Other industry		-0.12
	Missing values of Industry		-0.13
	Not able to continue usual activities		-0.02
Main source of livelihood	Casual Labour	-0.42	
Salaried employment			
(Government)	Salaried employment (Private)	-0.40	
	Self employment	0.07	
	Other employments	-0.15	
	Missing values for livelihood	0.04	
Post tsunami housing conditions			
Level of flood water	6 feet to 12 feet	-0.13	-0.08
(Less than 6 feet)	More than 12 feet	-0.43	-0.30
Floor area of house			
(450 sq.ft. - 600 sq.ft.)	Less than 450 sq.ft.	0.60**	0.54***
	More than 600 sq.ft.	0.79*	0.83*
	Missing values for floor area		
Housing quality	Poor housing quality	-0.01	0.07
(Good housing quality)			
Dwelling tenure	Owned by the government	0.81	0.66
(Owned by household)	Other ownerships	0.20	0.19
Land tenure	Government land	-0.43	-0.39
(Owned by household)	Other land ownerships	-0.17	-0.30
Property title or deed	Lost during tsunami	-0.43	-0.29
(Yes, possess deeds)	Possess another document	0.35	0.41
	No property titles	0.25	0.21
Monthly income situation	Less than Rs. 5000	-0.01	0.01
(Rs. 5000 to Rs. 10000)	More than Rs. 10,000	0.83**	0.72***
Distance to sea	More than 200m	0.27	0.27
(100m - 200m)			
Composition of household	Below 5 years	0.10	0.04
	5 to 16 years	-0.16**	-0.17**
	More than 60 years	-0.10	-0.09
Death rate	No. deaths per family / no. of family	-0.22	0.02

	members		
Household skills	Skills in rebuilding	-0.08	-0.12
	Missing values for skills in rebuilding	-0.47	-0.58
Community based organizations		0.01	
	Capacity to involve in rebuilding		0.16
Constant		-0.22	-0.47

Pseudo R2

* Significant at 1%

** Significant at 5%

*** Significant at 10%

Regression included district dummies.

Regression results – 3. Strong preference for a prebuilt houses (by those outside buffer zone)

	No. of observations – 341	Coefficients	
Household head characteristics			
Gender	Male	-0.22	-0.34
	(Female)		
Ethnicity	Tamil	-1.64*	-1.41*
	(Sinhalese)		
	Moor	-0.83**	-0.62
	Other ethnic groups	-0.67	-0.66
Education	Not attended	-0.44	-0.54**
	(Secondary education)		
	Less than primary education	-0.11	-0.24
	Primary education	-0.02	-0.07
	Ordinary level and above	0.49	0.44
Type of industry	Agriculture		0.47
	(Manufacturing)		
	Trade		-0.52
	Fisheries		0.47
	Tourism & Other		0.20
	Missing values of Industry		0.61
	Not able to continue usual activities		0.013
Main source of livelihood	Casual Labour	0.14	
	Salaried employment	-0.09	
	(Government)		
	Salaried employment (Private)		
	Self employment	0.03	
	Other employments	0.004	
	Missing values for livelihood	0.24	
Post tsunami housing conditions			
Level of flood water	6 feet to 12 feet	-0.16	
	(Less than 6 feet)		
	More than 12 feet	0.09	
Floor area of house			
	(450 sq.ft. - 600 sq.ft.)		
	Less than 450 sq.ft.	-0.34	-0.25
	More than 600 sq.ft.	-0.59***	-0.55***
	Missing values for floor area	1.3***	1.2***
Housing quality	Poor housing quality	0.08	-0.01
	(Good housing quality)		
Dwelling tenure	Owned by the government	-0.54	-0.53
	(Owned by household)		
	Other ownerships	-0.73**	-0.74**
Land tenure	Government land	0.16	0.21
	(Owned by household)		
	Other land ownerships	-0.10	0.03
Property title or deed	Lost during tsunami	0.13	-0.03
	(Yes, possess deeds)		
	Possess another document	-0.14	-0.23
	No property titles	-0.26	-0.28
Monthly income situation	Less than Rs. 5000	0.12	0.10
	(Rs. 5000 to Rs. 10000)		
	More than Rs. 10,000	-0.94**	-0.87**
Distnace to sea	More than 200m	-0.91***	-0.92

(100m - 200m)			
Composition of household	Below 5 years	-0.22***	-0.19
	5 to 16 years	0.02	0.04
	More than 60 years	-0.12	-0.10
	No. deaths per family / no. of family members	0.43	0.47
Death rate			
Household skills	Skills in rebuilding	-0.02	0.09
	Missing values for skills in rebuilding	-1.6**	-1.52**
Community based organizations	Capacity to involve in rebuilding	-0.26	-0.36
Constant			

Pseudo R2

* Significant at 1%

** Significant at 5%

*** Significant at 10%

Regression included district dummies.

Regression results –4. Ability to rebuild their own houses (by those outside buffer zone)

	No. of observations – 341	Coefficient	
Household head characteristics			
Gender (Female)	Male	-0.20	0.25
Ethnicity (Sinhalese)	Tamil	0.75	0.68
	Moor	1.11	0.96**
	Other ethnic groups	1.18	0.76
Education (Secondary education)	Not attended	-0.33	-0.29
	Less than primary education	-0.34	-0.31
	Primary education	-0.51**	-0.35
	Ordinary level and above	-0.07	0.08
Type of industry (Manufacturing)	Agriculture		-0.36
	Trade		0.74
	Fisheries		-0.28
	Tourism		0.88
	Other industry		0.31
	Missing values of Industry		-0.56
	Not able to continue usual activities		-0.24
Main source of livelihood			
Salaried employment (Government)	Casual Labour	-1.78*	
	Salaried employment (Private)	-0.96	
	Self employment	-1.29	
	Other employments	-1.26	
	Missing values for livelihood	-2.28*	
Not able to continue usual activities	-0.13		
Post tsunami housing conditions			
Floor area of house (450 sq.ft. - 600 sq.ft.)	Less than 450 sq.ft.	1.26*	1.23*
	More than 600 sq.ft.	0.32	0.43
	Missing values for floor area		
Housing quality (Good housing quality)	Poor housing quality	-0.89*	-0.76*
Dwelling tenure (Owned by household)	Owned by the government	0.75	0.57
	Other ownerships	0.57	0.40
Land tenure (Owned by household)	Government land	-0.50	-0.40
	Other land ownerships	-0.25	-0.32
Property title or deed (Yes, possess deeds)	Lost during tsunami	-0.84**	-0.55***
	Possess another document	-0.32	-0.22
	No property titles	0.09	0.09

Monthly income situation	Less than Rs. 5000	0.08	0.04
(Rs. 5000 to Rs. 10000)	More than Rs. 10,000	0.84***	0.50
Distnace to sea	More than 200m	0.51	0.43
(100m - 200m)			
Composition of household	Below 5 years	0.20	0.14
	5 to 16 years	0.09	0.06
	More than 60 years	0.27	0.31***
Family size	No. of family members	-0.03	0.002
Household skills	Skills in rebuilding	0.90***	0.84***
	Missing values for skills in rebuilding	-2.63*	-2.75*
	No. of members who are willing to participate in construction work	-0.49	-0.06
Family members in construction			
Community Characteristics			
Community based organizations	Capacity to involve in rebuilding	-0.31	-0.29
Access to main road		-0.57	-0.52
Access to market		0.24	0.15
Constant			
Pseudo R2			

* Significant at 1%

** Significant at 5%

*** Significant at 10%

Regression included district dummies.

Regression results - 5. Willingness to relocate (by those INSIDE buffer zone)

No. of observations - 281			
Household head characteristics			
Gender	Male	-0.89**	-0.72***
(Female)			
Ethnicity	Tamil	1.08	1.06
(Sinhalese)	Moor	1.39**	1.48**
	Other ethnic groups	0.49	0.26
	Whether household belongs to the ethnic majority of relevant GND	0.26	0.45
Ethnic majority			
Education	Less than primary education	0.45***	0.57
(Secondary education)	Primary education	-0.29	-0.26
	Ordinary level and above	0.15	0.21
	Missing values of education	-0.72	-1.02***
Type of industry	Agriculture		-1.16***
(Manufacturing)	Trade		-0.41
	Fisheries		-0.16
	Tourism		0.37
	Other industry		-0.17
	Missing values of Industry		0.57
	Not able to continue usual activities		
Source of Livelihood			
(Private sector)	Casual labour	-0.19	
	Government sector	-0.82	
	Self-employed	-0.21	
	Other source of livelihood	-0.43	
	Missing values -livelihood		
Post tsunami housing conditions			
Level of flood water	6 feet to 12 feet	0.48	0.34
(Less than 6 feet)	More than 12 feet	1.04**	1.05**

Floor area of house (450 sq.ft. - 600 sq.ft.)	Less than 450 sq.ft.	-0.29	-0.19
	More than 600 sq.ft.	-0.52	-0.47
	Missing values for floor area	-0.29	0.49
Housing quality (Good housing quality)	Poor housing quality	0.24	0.19
Dwelling tenure (Owned by household)	Owned by the government	-0.27	-0.27
	Other ownerships	0.02	0.02
	Missing values for ownership	-0.20	0.06
Land tenure (Owned by household)	Government land	0.80***	0.85***
	Other land ownerships	0.50	0.47
Property title or deed (Yes, possess deeds)	Lost during tsunami	0.47	0.46
	Possess another document	-0.39	-0.42
	No property titles	0.52	0.55
Access to latrine (Private latrine within the housing unit)	Private latrine outside the housing unit	0.69**	0.62**
	No private latrine	0.64**	0.61**
Monthly income situation (Rs. 5000 to Rs. 10000)	Less than Rs. 5000	0.31	0.37
	Rs. 10,000 to 15,000	-0.46	-0.56
	More than Rs. 15,000	1.5	1.41
	Missing values for income	1.5	2.00***
Priorities for relocation	Distance to sea	-0.09	-0.07
	Type of house	0.31	0.28
	Access to main road	0.04	0.02
	Access to schools	-0.10	-0.01
	Access to health centre	-0.25	-0.31
Composition of household	Below 5 years	0.01	0.02
	5 to 16 years	-0.04	-0.03
	More than 60 years	-0.67**	-0.64**
Death rate	No. deaths per family / no. of family members	0.43	0.06
Community Characteristics			
Extent of the damage to the community (50%-70%)	(70-90)%	1.4 *	1.6*
	More than 90%	2.4 *	2.54*
Multi-ethnicity	Whether the community has multi-ethnic representation	-0.54	-0.55
Constant			
Pseudo R2			

* Significant at 1%

** Significant at 5%

*** Significant at 10%

Regression included district dummies.