POST - OCCUPANCY EVALUATION (POE) OF POST-TSUNAMI HOUSES IN BATTICALOA AND AMPARA DISTRICTS

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ABSTRACT

Consequent to the Tsunami on December 26, 2004 the coastal belt of Sri Lanka, Batticaloa and Amparai, Eastern coastal districts were severely affected. Among 13 affected districts in Sri Lanka. Batticaloa and Amparai recorded the highest number of affected families.

The Tsunami destroyed 99,480 and damaged 44,290 houses in Sri Lanka. Nearly 35,000 houses have been damaged and destroyed in the Batticaloa and Amarai Districts, which is almost 24% of the total houses affected in Sri Lanka and it was the largest amount of houses destroyed in the country. The Government of Sri Lanka has taken the initiative to construct houses for resettle these affected people with the participation of the National and International organizations.

The study was carried out after completions of permanent housing projects in two districts. The objective of the study was to conduct Post Occupancy Evaluation (POE) of the houses constructed for Tsunami beneficiaries on Technical, Social, and Environmental factors. The methodology adopted was to conduct a field survey among the beneficiaries based on the simple random sampling technique.

According to the study the status of the houses are with moderate level satisfaction. Social factors are better than the Technical, and Environmental factors concerning for constructed houses in the two districts. The recommendations are suggested to the decision makers to adopt for the future disaster situations.

Key words: Housing, Post-occupancy Evaluation, Post-Tsunami.

1.INTRODUCTION

Consequent to the Tsunami on December 26, 2004 the coastal belt of Sri Lanka were affected, Batticaloa and Amparai, Eastern coastal districts of Sri Lanka were severely impacted by tsunami. Among 13 affected districts in the country. Batticaloa and Amparai recorded the highest number of affected families. The two districts are generally characterised by low level of per capita income and low literacy rates. Education, health, infrastructure and other support services for a quality life of the populace is inadequate.

The Tsunami destroyed 99,480 and damaged 44,290 houses in Sri Lanka. Nearly 35,000 houses have been damaged and destroyed in the Batticaloa and Amarai Districts, which is almost 24% of the total houses lost in Sri Lanka and it was the largest amount of houses destroyed in the country by the tsunami.

The Government of Sri Lanka has taken the initiative to resettle these affected people with the participation of the National and International organisations.

The objective of the study was to conduct Post Occupancy Evaluation (POE) of the houses constructed for Tsunami beneficiaries on Technical, Social, Environmental and Project implementation aspects. The study will suggest certain guidelines and policies for the Non-governmental Organisations to implement future projects on housing during the disasters. The methodology adopted by the consultant was to conduct a field survey among the beneficiaries based on the simple random sample technique

The housing scheme was under owner-driven projects so all the houses were constructed with the people participation. The houses were also located at their original place where they were residents before the 'Tsunami'

2.METHODOLOGY

The methodology adopted for the Evaluation of the Housing Project go through the use of **Semi** structured interviews and household Surveys

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1. Personal interviews were conducted with staff members including, Project Manager, Housing Consultant, technical and financial personnel who were involved with housing projects in East and the staff members of CBOs in the two districts.

2. Visited government organisations to conduct personal interview with Divisional Secretaries, Chairmen and Technical officers of Peradeshiya Shaba and Urban Council and Community leaders and Grama Niladharies at selected villages and

3. Personally interviewed occupants of houses which were to be evaluated.

Surveys

A survey conducted among the beneficiaries from the Batticaloa and Amparai Districts. 30 houses have been selected randomly for the survey from the listed houses in nearly reconstructed of the two districts. The check list include 10 questions each for the Technical, Social and Environmental and Project Implementation aspects, which were measured on 3 scales ranging from Very satisfaction to low satisfaction level.

Table 1: Sample selection

	Places	Sample
01	Araimpathi	07
02	Palaimunai	01
03	Thalankudha	01
04	Kirankulam	01
05	Maruthamunai	07
06	Ninthvur	02
07	Thirukkovil	08
08	Vinayakapuram (Mandana)	02
09	Karaithevu	01
	Total	**30**

3.LITERATURE SURVEY

Whenever a disaster strikes and leave people homeless, reconstruction projects are undertaken for re-establishment purpose. Reconstruction projects include some decision making make such as the provision of post disaster houses the financing methods, the procurement method and the type of construction. Whether to relocate or rebuild in the same area is an important up- front decision to make during the process (Dikmen, 2001).

Houses not only serve as a shelter but also permit to develop the daily life of a family, its beliefs and the culture. Therefore its design is affected by the socio-economic, socio-cultural and physical environmental conditions (Sengun, 1996). Demiroz (1996) claims that the cultural aspects of recovery after disasters have not been given the same consideration as the engineering and practical considerations. This is true especially for rural area where housing is the product of environmental, geographical, social, economic and cultural factors, which are specific to communities. Furthermore Demiroz (1996) declares that resettlements are the end products of political decisions, governmental regulations and technical assessment, are designed by outside agencies, which have none or very little knowledge about affected communities. Thus they do not really match with local patterns and traditional need. It is fact that post-disaster houses act as agents of change in physical and social environments especially in rural areas.

Therefore it is vital to identify and consider the environmental, geographical, social, economic and cultural factors that form re-settlements in order to design and construct post-disaster houses, which are appropriate to the needs of the users.

4. FINDINGS AND DISCUSSION

4.1. Technical

Table 2: The technical aspects of the housing

Elements	Level of satisfaction		
	High	Moderate	Low
Foundation	**100%**	**0**	**0**
Structure of the house	57%	20%	23%
Floor	73%	17%	10%
Roof Details	47%	23%	30%
Walls	50%	27%	23%
Quality of timber for doors and windows	07%	20%	73%
Plumbing and Sanitation	23%	3%	74%
Electricity	20%	33%	47%
Finishing	40%	30%	30%
Overall quality and maintenance	43%	23%	34%

(Source: Field Survey, 2008)

The foundations of the houses are very good and accepted by all stakeholders. According to the respondents of the sample 57% of them were high satisfied about the structure of the houses. The floor is almost at satisfactory level except a few houses which were not completed yet in the Amparai district. Regarding roof, few houses have problems such as leakages of water, slope of roof etc. Walls are satisfaction levels but they made complained about defects made

by insects in walls. Some of the beneficiaries did not stay at houses during the recent Tsunami and cyclone warning time due to fear of staying at house.

The quality of timber supplied for doors and window are not at satisfactory levels. Only 20% of them are at with high satisfaction levels and the balance householders are mentioned about low quality of woods, locks and other accessories. A few houses are not having doors and windows and a few are not properly fitted. Hence the quality of finishing of doors and windows are not accepted by most of the house owners. Nearly 74% of the selected houses are not having plumbing and sanitation. Wiring,77% of the houses have problems such as breaking switch boards, wiring is not properly done etc. 40% of them are at satisfaction levels about the finishing of houses. 30% are moderately satisfaction

4.2 Social Factors

Table 3: The Social aspects of the housing

Categories	Level of satisfaction		
Aspects	High	Moderate	Low
Acceptabilityof aesthetic appearance	65%	15%	05%
Housing facility	70%	17%	14%
Religion based needs	43%	27%	30%
Future extension	60%	17%	23%
Reception room or hall	67%	27%	06%
Toilet facility	17%	13%	70%
Kitchen facility	30%	20%	50%
Bathroom Facility	17%	17%	66%
Access to house	75%	15%	10%
Living standard	43%	27%	30%

(Source: Field Survey, 2008)

According to the respondents of the sample 70% of them are with high satisfaction about the housing. Most of the houses belonging to Hindus have a prayer room which is more satisfaction (43%). But people belong to other religions are not happy because they do not have separate room for their special needs. According to the survey more than 70% of them are with low satisfaction about toilet. The proposed house does not provide toilet facility but the house includes space to the toilet which is not completed and usable status. Only a few houses have been provided toilets. Hence this is the major problematic issue in the housing scheme. They have kitchen which does not have the facilities such as wash basin, pantry cabinet , space to put plat track and etc. about half of them are with low satisfaction. About 66% of them are with low satisfaction regarding bathroom facilities.

All the poor people have got better houses which are far better than their houses before the Tsunami. Comparatively they are very happy to stay in the new houses except a few people. They are not satisfied with the facilities and size because they had big houses before Tsunami.

In general the social aspects of the houses are at moderate level. There are some drawbacks in the housing which should be focused by the donors and the partner organization for the better project implementation in the housing scheme in the future disaster periods.

4.3 EnvironmentalAspects

All the projects must be concerned about environmental aspects which are very essential especially, in society related projects. The housing project was evaluated through the following factors.

Table 4 : The Environmental aspects of the housing

Categories	Level of satisfaction		
Aspects	High	Moderate	Low
Smoke-free chimney	-	15%	85%
Distance between toilet pit and well	73%	7%	20%
Proper construction of toilet pit to the soil condition	35%	12%	43%
Safe drinking water	35%	10%	55%
Ventilation and light free	50%	27%	23%
Waste water lines correctly fitted	40%	03%	57%
Special care for disabled	27%	23%	5%
Space for vegetation around the house	73%	17%	10%
Domestic waste disposal availability	87%	13%	-
Plot boundaries clearly defined and marked	90%	05%	05%

(Source: Field Survey, 2008)

It is very important for the houses in the rural areas. We can simply observe all houses are having a smoke – free chimney at the top of the roof. According to the survey about 85% of them with low satisfaction and 15% are moderately satisfaction. This shows very clearly that the proposed and constructed smoke-free chimney is not suitable for their life patterns. It also observed and noted during field visit that most of the chimnies were not used by them (more than 95%), because

- Smoke is not going outside and is making internal circulation within the house and dusty.
- Chimney is not constructed properly for fire wood cooking.
- The Space is very small which is not enough to keep the kitchen tools in the chimney.
- No lighting (Too dark).
- Covered slaps are not fitted with the chimney

According to the analysis of the sample in the two districts , the environmental aspects are generally good but the specially designed chimney the kitchen inside the houses were not at the satisfatory levels. The thermal comfort inside the house during day and night is at better level and they feel more comfort with roof made tiled house than the Filler Slab RCC flat roof houses.

All the sampled houses had drinking water facilities. 60% of the respondents agreed that they are highly satisfied and 10% of them say moderately satisfaction at the same time about 30% of them have low satisfaction. According to the survey more than 90% of the houses have clearly marked and defined boundaries.

4.3 Project Implementation and Financial System

The sucessess of the project depends on the implementation of the project that is user level of satisfation and the effectiveness of the project implementation.

63% of the sample with high satisfation about the quality of matterials supplied. At the same time 27% of them are with low satisfaction about the material they received.

The completion period is very important in the Tsunami housing projects. Still the affected people are staying at the temporary shelters with their relatives. According to the survey 67% of stated that their houses had been completed within six to ten months.13% are with moderately satisfaction. 20% of them are with low satisfaction they said their house is not completed yet but they are living in the same house. Majority of the house has been completed within one year from the date of begining of the projects. During the projects, the level of supervisions, monitoring were very satisfaction level. 67% of them are with the high satisfaction and 17 % of them are with moderately satisfaction level. Nearly 20 % of them are with low satisfaction.

Only 37% of the beneficiries are with high satisfation over the acceptance of the beneficiary suggestions during construction period because they expected any type of house and they did not keep any pre plan about the houses.20% of them are with moderatley satisfation which shows certain suggestion was accepted. Nearly 43% of the beneficeries are with low and very low satisfation about acceptance of their suggestion in to the housing projects. Overall

Table5: Project Implementation and Financial System

Categories	Level of satisfaction		
Aspects	**High**	**Moderate**	**Low**
Selection of beneficiaries	63%	14%	23%
Effectiveness of intervention during site selection and construction period	63%	07%	30%
Estimate includes all housing needs of the beneficiaries	15%	10%	75%
Cost of a house	30%	13%	57%
Quality of material supplied	63%	-	27%
Satisfaction of man power supplied	50%	40%	10%
Completion period	67%	13%	20%
Level of supervision and monitoring of the local partner organization and Donors	67%	17%	16%
Acceptance of the beneficiary suggestions during construction period	37%	20%	43%
Overall satisfaction of the project implementation	13%	57%	30%

(Source: Field Survey, 2008)

Table 6 : Mean and Std. deviation of the Post Tsunami housing projects

Evaluated Factors	Mean	Std. deviation
1. Technical factors	2.9933	.39561
2. Social factors	3.0167	.38335
3. Environmental Factors	2.9767	.33598
4. Project Implementation and Financial management	2.9433	.71520

satisfaction of the project implementation is at moderately (57%) satisfaction level. Only 13% of the people say the implementation of the project is high satisfaction levels. About 20% of the beneficiaries are with low satisfaction levels

5.CONCLUSION AND RECOMMENDATION

The previous section explained the detailed analysis of the each element of the major four factors which were used for the Post – Occupancy Evaluation of Post Tsunami Houses in Rebuilding Programmes implemented in the Batticaloa and Ampara districts. The evaluated factors were:

- Technical
- Social
- Environment
- Project Implementation and Financial System

This table shows the mean value of the four factors between 2.9433 to 3.0167. According to the mean value the housing projects are moderately level satisfaction. Social factors are better than the Technical, Environmental, and Project Implementation. This study will result in an order of level of satisfaction are:

1. Social factors
2. Technical factors
3. Environmental Factors and
4. Project Implementation and Financial management

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