

COMMUNITY ORIENTATED POST-DISASTER SUSTAINABLE HOUSING RECOVERY, REBUILDING AND COMMUNITY RENEWAL: SRI LANKA CASE STUDY

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Disasters, both natural and manmade, are increasing in frequency and have devastating effects on many communities, resulting in destruction of the built environment, displaced population, and poverty. The losses and damage as a result of disasters are often worse felt in least developed and middle-income countries, due at times to increased vulnerability and lack of preparedness. Disaster management and appropriate post disaster housing design approaches are demanding issues required for the successful long-term sustainable recovery of the affected communities. To be sustainable, communities need to be empowered and self-reliant, to enable them to cope with the adverse effects of past and possible future disaster events. The aim of this study is to explore the approach and strategy undertaken by an international non-governmental organisation (INGO) in the design and delivery of post disaster housing with a stated community participation orientated approach. A case study approach, utilising interviews with key INGO personnel, building studies and documentation evidence, of two post disaster housing projects in Sri Lanka is undertaken. The research uncovers the 5 key stages undertaken in the overall approach by the INGO. Each stage contains a subset of criteria considered by the organisation to enable meaningful community participation throughout the process. Participation approaches included design input, skills training in both labour and building product production and creation of enterprises. Non construction related aspects including the use of alternative simple household technologies and saving schemes were introduced by the organisation to further contribute to the community's long-term sustainability and resilience of the community.

Keywords: community empowerment; disaster management; resilience; sustainability

INTRODUCTION

The provision of long-term sustainable housing in post disaster contexts creates additional challenges to an already difficult task of housing provision. The contexts are usually chaotic, have limited resources available, timescales are usually tight for implementation of the projects, and often many different projects are running simultaneously. Post disaster housing is often seen as an opportunity to build back

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better and create lower levels of vulnerability and higher levels of resilience in the affected community. The value added by community participation in the design and delivery of post-disaster housing is a widely accepted paradigm in the literature on the topic. However, the concept of community participation can take many forms in housing design and delivery and to be relevant and beneficial to the communities' it must be used in an appropriate manner, be meaningful and used at the relevant times for each individual project depending on the specifics of that project. The purpose of this research is to explore the levels and methods of community participation used by a community orientated INGO in both the design and delivery of sustainable housing in a post disaster context. The research used 2 individual case studies of post disaster housing development undertaken by the INGO. The research examined the projects holistically in terms of their design and delivery to identify the key decision-making process and various stages and considerations undertaken by the INGO and the levels of beneficial community participation as part of these processes. The study provides new information for academia and practice on the decision making and processes used by a leading INGO in the design and delivery of community orientated post disaster housing.

Community Participation in Post Disaster Housing

The literature highlights that in the past, approaches to post-disaster housing delivery often involved a top-down macro level approach (Andrew et. al 2013). The approaches often involve the requirements of those implementing rather than the communities being served (Shaw and Ahmed 2010). Many of these approaches have failed due to issues including displacement, lack of community capacity, cost recovery, corruption, gender issues, affordability, lack of NGO competence, government policies and practices (Muraya 2006, Sadiqi et. al 2016). Muraya (2006) outlines the change in approaches and policies for housing have evolved over decades, from one centred on top-down macro level government provided housing, to a more bottom-up micro level, adopting a self-help approach that would focus on enablement and the involvement of communities and community-based organisations (CBOs). Sadiqi (2016) states the idea of community participation is not a new one but the concept of community participation as it is known today is a relatively new one.

Davidson *et al.*, (2007) states that although the value of community participation as a paradigm approach to housing delivery is now widely accepted in contemporary literature and by academics and practitioners, it can exist in many forms in practice. Davidson *et al.*, (2007) argues that the difficulty with the application of a participation approach is that it is not defined in terms of a project environment and the concepts are so widely expressed under various headings, that it now lacks the essential clarity that is required for its implementation on projects. Arnstein (1969) provided a ladder of citizen participation and Choguill (1996) provided a ladder of community participation to outline the various elements and ranking of this process. Davidson *et al.*, (2007) provides a "ladder of participation" adapted from both these original ladders of participation, noting that approaches at the top of the ladder empower people and communities, offer collaboration, and give communities control over the project.

The lower end of the ladder offers beneficiaries a possible consultation or they are merely informed the shape their project is taking or possibly manipulated in to taking part in the project. Both Arnstein (1969) and Choguill (1996) argue that this cannot really be classed as actual participation, as users have little or no control over actual

decision making. Davidson *et al.*, (2007) outline that for participation to be meaningful for a project, communities have to be involved in the early stages of the project and have genuine control and influence over decision making to benefit their long-term wellbeing, with full responsibility for their own choices and projects, as opposed to being treated as passive victims receiving aid.

The research questions to be addressed include 1) what are the main stages a community orientated INGO goes through from inception to completion in the design and delivery of post disaster housing? 2) What are the main subsets and considerations under these stages? 3) What part does community participation play in the overall approach of the organisation and how meaningful is the participation?

RESEARCH DESIGN

The research proposes to examine the INGOs processes for the design and delivery of sustainable post disaster housing projects from inception to completion of the project. Based on the research questions and aim, a case study qualitative approach was identified as appropriate for this study to enable thorough examination of the process and decision-making process. Baxter and Jacks (2008) state that a qualitative case study is a tool that enables researchers to study complex phenomena in their context and inform professional practice and evidence informed decision making. Two case studies were undertaken on the suburbs of Batticaola in Sri Lanka involving the design and delivery of 151 post disaster houses following the 2004 Indian Ocean tsunami. The overall objective of the INGO was to use a methodology that enabled the dwellings to be designed and constructed in partnership with the community. The INGOs aim is to enable the limited financial resources to be used to their maximum benefit while concurrently empowering the community to be self-sufficient in many different aspects of their life. The empowerment and self-sufficiency for the community was considered essential by the INGO to ensure long term sustainable survival with minimal displacement. The case studies were undertaken between 3-5 years after the completion of the dwellings. This extended period post completion was chosen to assess how successful the dwelling design and delivery approach and wider community development was over an extended period.

Multiple sources of information were collected and analysed to gain a thorough understanding of the both the organisation, wider context and post disaster housing. Data collection consisted of 4 sources; 1: Literature review of the subject area; 2: Documentation from the case study organisation; 3: semi structured interviews including the national director of the organisation and the regions senior architect. Both interviewees developed and implemented the overall INGOs process and community engagement strategy and were best placed to discuss it in detail for this INGO. Finally, 4. Observation and recording of the physical artefact. This involved the author visiting the communities and undertaking measure and draw and photographic surveys of the dwellings (artefact) and post occupancy evaluation studies.

A research protocol was agreed between all participating parties and ethical approval obtained from the research funding institution. Data analysis used number of approaches appropriate to the various data collection methods and aims of the research. These included the following;

1. Cognitive Mapping - Hurby (2006) defines cognitive mapping as a form of empirical research that uses a theoretical and methodological approach that contends

that cognitive maps represent manager's (designers and project managers) causal knowledge. Cognitive maps represent more than what was discussed in an interview. Banxia Decision Explorer software was used for the cognitive mapping process and analysis. Cognitive causal maps were constructed for individual transcribed interviews. A global organisation map was constructed from the individual interview maps for the overall organisation (Fig 4 below). Maps were formed with identified colour coded concepts/nodes that arose out of the interviews. Central and domain analysis was undertaken using Banxia Decision Explorer Software.

2. Logic Models - Logic models, also referred to as process Flow Charts (PFCs), are graphic depictions that trace actual events and processes in individual organisations over time tracing the sequential order of events while underlining causal links and patterns emerging for a process. They are useful in providing a clear and simple method of communication to the various stakeholders of how an individual or organisation approaches a process. Yin (2009) states that pattern matching logic is one of the most desirable analytic techniques for case study analysis stating a logic model stipulates a complex chain of events over a period of time with repeated cause and effect patterns where a dependent event at an earlier stage becomes a causal event for the next stage. Fig 5 (below) represents the logic model that emerged of the INGO for the selected case studies.

3. Physical artefacts - Groat and Wang (2002) argue that the study of contemporary environments can benefit from the analysis of physical artefacts. Yin (2009) notes that the use of artefacts as a source of evidence can provide insights into cultural features and technical operations. The physical artefact that this research relates to is the dwelling and community itself which is inhabited by the beneficiaries' this is the physical output of the design and delivery process which is being studied. The dwellings from the case studies are located in their natural settings and created the opportunity for direct observations and are another additional valuable source of evidence for the study. Direct observation from the field involved dwellings been analysed and recorded in the form of measured surveys, photographs, and condition surveys by the researcher.

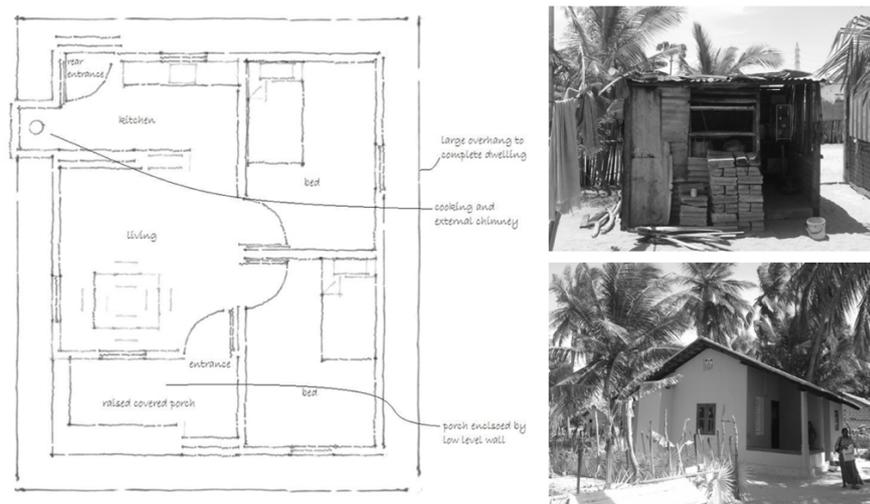


Fig 1, 2 and 3: Example of case study data collection (Source author)

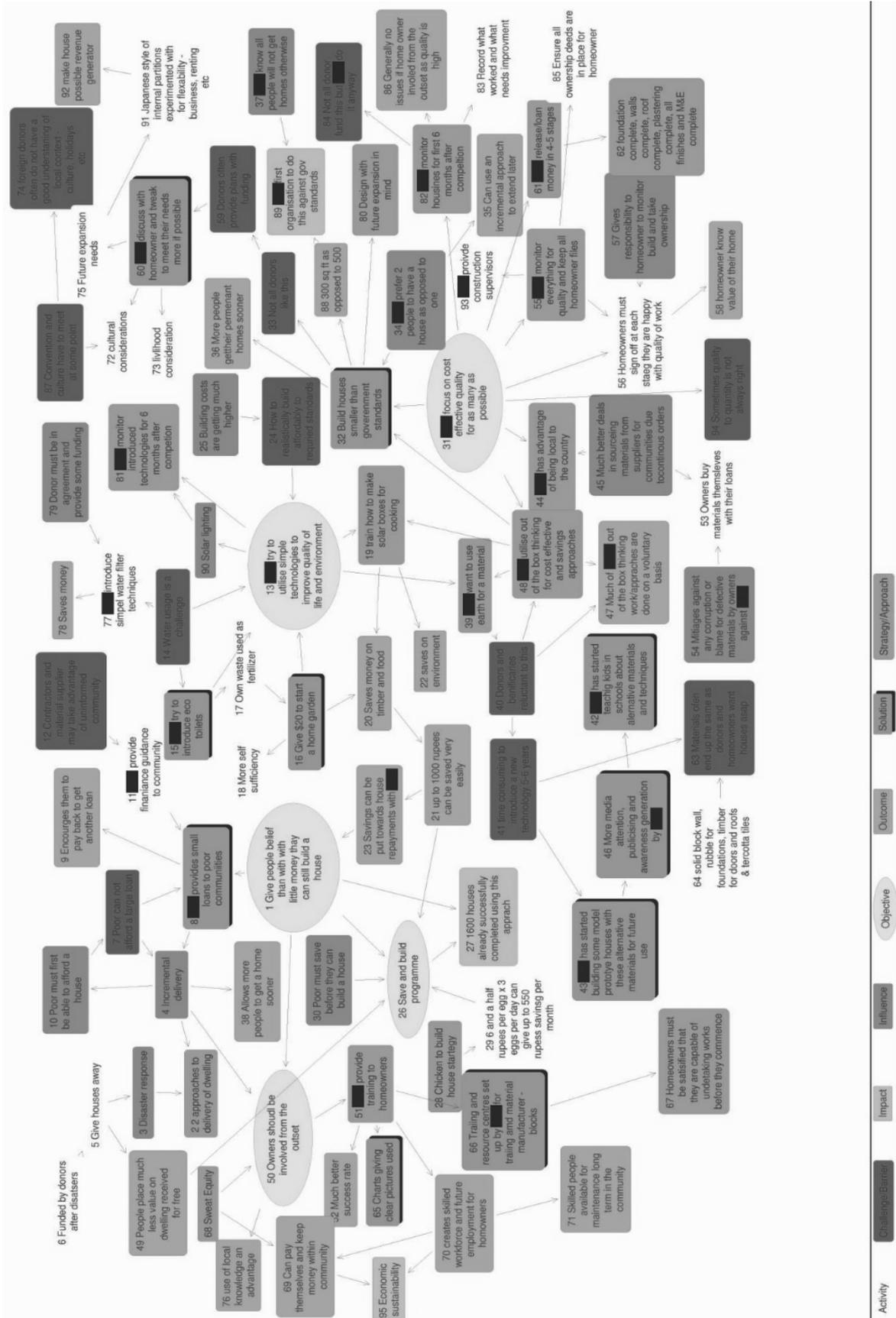


Fig 4 Global map for organisation (Source: Author)

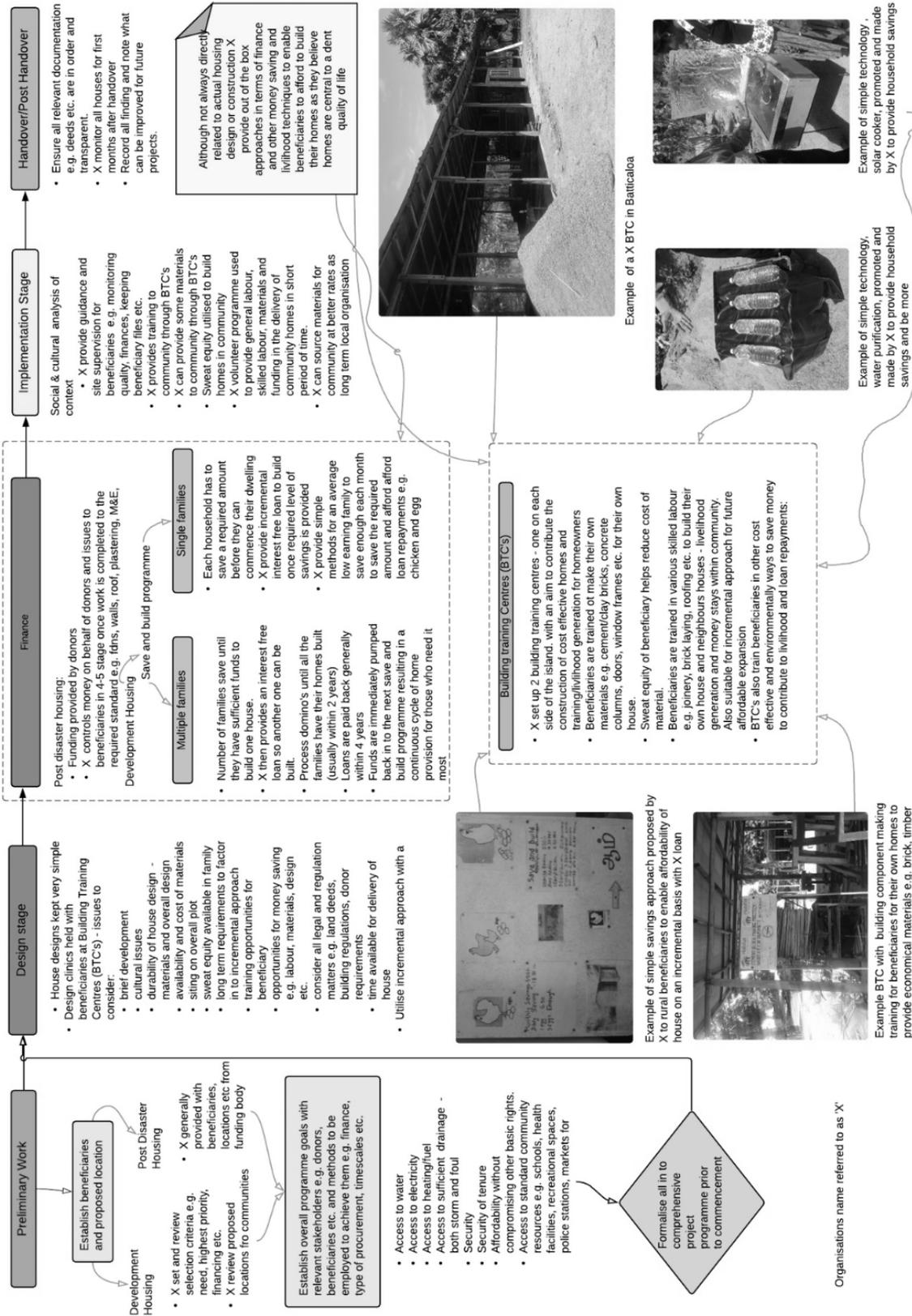


Fig 5 Logic Model of Organisations Process and Key Stages (Source: Author)

FINDINGS

A total of 95 concepts were identified in the global map formed from the 2 individual interviews with each concept falling in to one of 9 identified colour coded themes as

outlined in the organisation map (Fig 4 above). Central and Domain analysis of the global map using Decision Explorer identified the 10 top featuring concepts under various identified category's (Table 1 below)

Table 1: Top 10 Central and Domain Analysis from Interviews

Factor	Rank	Category
X try to use simple technologies to improve quality of life and environment	1	Objective
X focus on cost effective quality for as many as possible	2	Objective
Build houses smaller than government standards	3	Solution
Owners should be involved from the outset	4	Objective
X provides small loans to poor people	5	Strategy
Save and build programme	6	Objective
X provides training to homeowners	7	Objective
X utilises out of the box thinking for cost effectiveness and savings	8	Strategy
X monitor houses for first 6 months after completion	9	Strategy
Incremental delivery	10	Objective

Key findings from the interview analysis outlined that the organisation was driven by specific objectives which included using simple technologies, cost effectiveness, owner involvement from the outset, saving to build concept, providing training to the community and the incremental delivery of housing. In terms of cost effectiveness, the organisation identified that the funds available for post disaster housing were not sufficient to achieve the dwelling area required by government standards. The area standard required resulted in poorer standard or incomplete houses. As a solution the organisation negotiated with government for a smaller area, 350 sq. foot as opposed to 500 sq. foot, dwelling and to build higher quality more resilient dwellings quicker using an incremental approach which could be extended and improved upon in the future. An incremental approach, factoring in the beneficiary's long-term requirements, was identified as a key objective of the organisation that enabled communities to start rebuilding quicker as many had been displaced and were living in temporary accommodation. This approach when first proposed was met with some resistance from both the government and funders. However, after the rational of an incremental approach was explained and demonstrated to work better long term for the beneficiaries it was accepted.

Consistent with the literature the organisation identified that for a community to be sustainable, it must have a meaningful input in to the overall process at the appropriate time from the outset to completion. The organisation formed a close working relationship with both communities from the outset as a key objective and considered that the genuine empowerment of the beneficiaries was essential, for both the buy in from the community and in relation to maximising their available project funds, and the communities long term sustainability. Effective financial management was identified as a core area that influenced a number of the themes, albeit the beneficiaries were empowered to spend it responsibly themselves with advice from the organisation. The organisation themselves funded many of their own projects and managed the funds on behalf of the donors on others. Funds were released in stages to the homeowner once certain milestones were met and demonstrated. The autonomy

of funding their own projects enabled some unique approaches that would not be possible on projects funded by others, for example, requesting households to save a certain sum themselves before commencing work, facilitating interest free loans for some households that could accommodate it. To assist households the organisation displayed divergent thinking to formulate savings schemes and efficient daily living approaches that enabled the community to maximise their funds. These included rural communities purchasing some animals to produce food with some of their available house funds to provide a better return for the household, more environment ways to light their dwellings and purify water without wasting fuel and simple technologies such as homemade solar cookers to enable food to be cooked without fuel and constant supervision. The latter example proved to be a very popular and simple technique among the beneficiaries in that it enabled the homeowner to focus on other tasks and earn money while food was cooking while simultaneously saving money on fuel. The organisation wished to instil in the communities that wise investment and financial management was key to their long-term security and that they had to take responsibility for this aspect of their lives themselves. In this respect the organisation was quite unique from others in terms of their consideration of the long-term wellbeing of the communities outside of merely building houses for them and invested time in the community in non-construction related elements of work to achieve this.

To facilitate community participation and empowerment from the outset Building Training Centres (BTCs) were established by the organisation on or close to the community site. The BTCs provided a number of functions in both the construction of the dwelling, but also the long-term sustainability of the communities. Training was provided in the making of various building components, for example, bricks, roof timber, doors and windows; thus' introducing new skills into the community, as well as saving money in the purchase of finished products. The BTCs also assisted the community in pooling their available funds to purchase the raw materials in bulk at better rates thus extending how far their funds would reach. Further training was provided for community members in skilled labour for example joinery, brick laying, roofing and plastering. The success of the BTCs was integral to the overall organisations approach and long-term sustainability of the community as they provided many in the community with new skills and means of livelihood generation for the long-term future. The ability of having the skills within the community also enabled the maintenance of their dwellings in the long term.

Observation studies of the dwellings identified that over 50% had already been extended or modified to meet the homeowner's needs, indicating the incremental housing approach was successful. The occupancy rate was 90+% which were high in comparison to some adjacent government funded schemes which displayed occupancy rates as low as 60%. The BTCs continue to serve the community and help generate income both in the production of building components and training in skilled labour years after the works completed. Community members are utilising the skills learned on their own homes and went on to work on adjacent housing schemes creating incomes for their families and community. Other smaller cottage industries were evident within the community at people's homes for example, food and building material sales.

The data analysis identified five key stages and a sequential approach by the organisation (Fig 2 above) in the two case studies albeit no formal approach or methodology was discussed or said to exist by the organisation. Stage one consisted of preliminary works involving an assessment of the beneficiaries and those with the

greatest needs. Other aspects of a practical nature were in relation to the proposed site location and legal tenure and its ability to be sustained as a community in relation to its adjacencies to services such as schools, health facilities and markets.

Stage two involved the overall design of individual dwellings and community master planning. House designs were kept relatively simple with set core house designs which could be revised within reason on consultation with the individual households, to reflect any particular aspect they may wish to change, be it for practical or cultural reasons. Construction methods were set as masonry construction and rendered walls with timber structure roof and timber joinery. This more contemporary method of construction was at odds with what some members of the community had lived in previously for example Cajun huts. However, this form of construction was deemed essential for the dwelling to be considered a house by government bodies. This stage was resource and time intensive for the organisation dealing with individual households, but it was considered essential as each household was assessed in terms of aspects including their demographic, available sweat equity and earning availability all of which informed how far each household could maximise the available funds.

Stage three was closely linked to and informed by stage two. The financial element of the overall process was considered key for the organisation as they endeavoured to instil financial empowerment and competency in the community. A save and build programme was also introduced and interest free loans were also made available where appropriate. All financial matters had to be agreed and finalised with individual households before work could commence on their dwellings.

Stage four involved the implementation and construction of the dwellings. The organisation provided mains services where required but took a more passive approach in terms of the dwelling construction as the majority of the labour was provided though sweat equity by the individual households. Guidance, training, and site supervision for quality control was maintained by the organisation throughout the builds with key milestones on each dwelling having to be signed off before the homeowner could proceed to the next stage and have funds released. The organisation did organise several volunteer programmes and where appropriate communities were assisted with these programmes in terms of manual and skilled labour.

Stage five involved the final sign off for the dwellings and ensured that all required documentation such as the house deeds were in place of the homeowner. The organisation monitored individual dwellings for 6 months after the handover to ensure they were performing to the required standards and that the beneficiaries were living in them. This was a basic form of post occupancy evaluation and any lessons learned were recorded for future projects.

CONCLUSIONS

The research study involved an in-depth examination of the real-world approach and decision making of a community orientated INGO in the delivery of post disaster housing. Through interviews, observation studies, documentation research and analysis involving cognitive mapping and logic modelling, key individual sequential stages were identified in the overall approach. Within each of the identified stages, further key tasks were identified that informed the organisations overall decision making, design and delivery approach. The study demonstrated that meaningful community participation, if implemented correctly, had a positive impact on the overall project outcome and as such is consistent with the literature. The

organisations approach and level of community participation can be considered to be at the upper end of the ladder of participation proposed in the literature as it demonstrated genuine efforts to empower the community for their long-term resilience and sustainability. In doing this, the organisation went beyond the mere physical artefact of the building/dwelling and identified the aspects of providing skills for livelihood generation, financial management, and other simple technologies that benefited the community in the long term. The study provides new information on the decision making and aspects involved in the design and delivery of post disaster housing with a community participation and empowerment agenda central to the overall approach. The findings add to the current research and literature on the subject and will prove useful in practice for similar organisations and other relevant stakeholders for example donors, communities and funders in the design and delivery of post disaster houses and the long-term resilience and sustainability of communities.

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