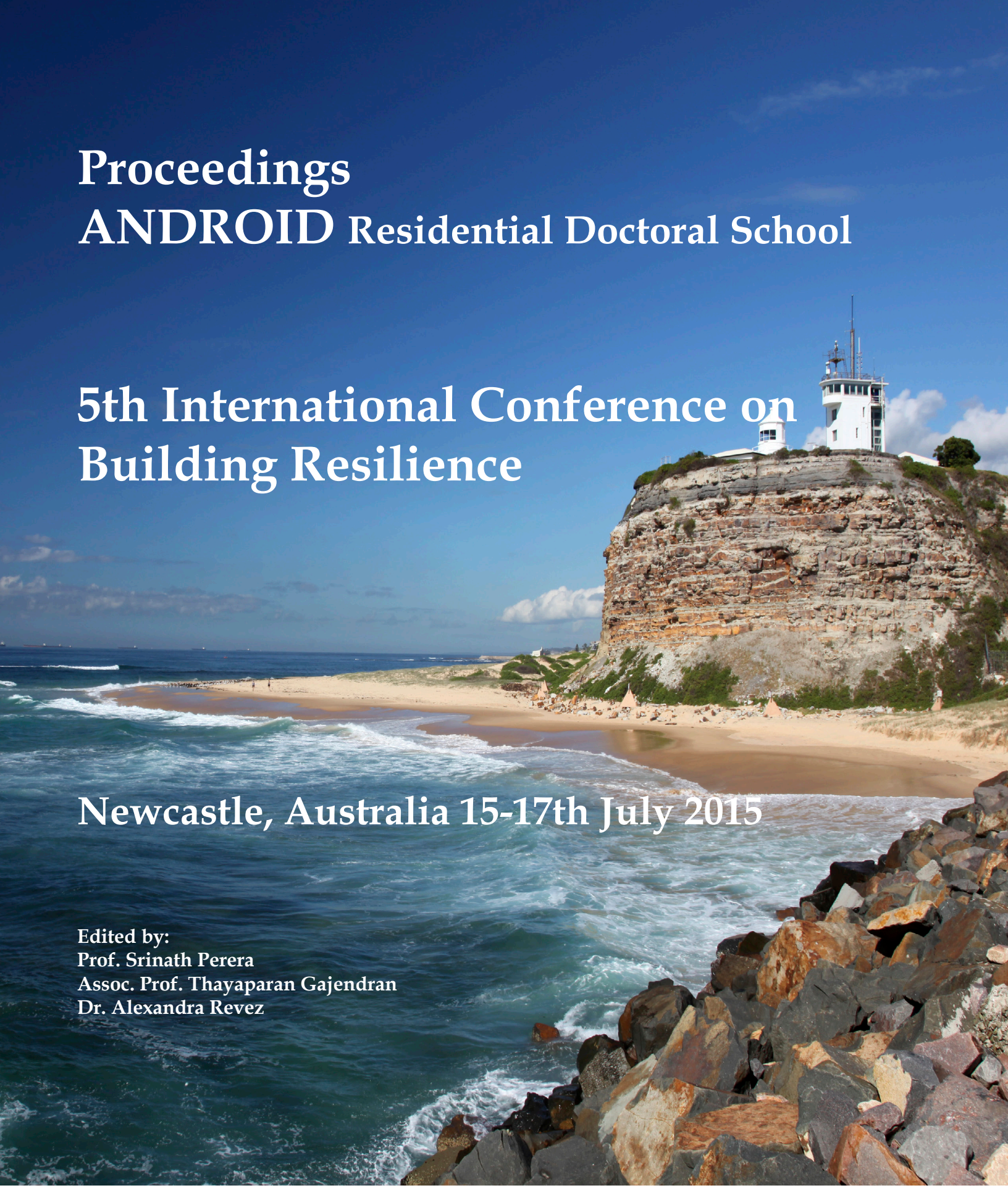
Proceedings
ANDROID Residential Doctoral School

5th International Conference on Building Resilience



Newcastle, Australia 15-17th July 2015

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TABLE OF CONTENTS

519-Paper 10
Life Cycle of Disaster Relief Shelters
Abdulrahman Bashawri, Stephen Garrity and Krisen Moodley

500-Paper 11
Skills Shortages in the Christchurch Subcontracting Sector
Imelda Saran Piri, Yan Chang-Richards and Suzanne Wilkinson

426-Paper 12
Lessons From Nature: Defensive Designs for the Built Environment
Rebecca Deek

440-Paper 13
Community spirit: Towards meaning and function for social and community resilience.
Jennifer Woods.

511-Paper 14
Coping With Disasters: The Potentiality of Indigenous Knowledge and Community Based Responses to Climate Change Adaptation
Mumita Tanjeela

352-Paper 15
A Hybrid Governance Framework for Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) in Australia
Giuseppe Forino, Jason von Meding and Graham J. Brewer

553-Paper 16
Significance of community participation in success of post natural disaster reconstruction project – evidence from developing country
Kamran Shafique and Clive M. J. Warren

INTRODUCTION

The Doctoral School initiative, set up by the ANDROID network with the aim to strengthen the nexus between the 'disaster resilience' research and teaching is a core element of the overall ANDROID project. The mixed teaching space developed as part of this project has encouraged and promoted the work of doctoral students in the area of disaster resilience. The Doctoral School signifies the ongoing effort of the ANDROID network to continue the processes developed through the ANDROID project beyond the duration of original funding, demonstrating the commitment of the network to develop Doctoral education in the area of disaster resilience.

The Residential Doctoral School (RDS) programme for 2015 aims to provide space and opportunity for doctoral students to engage, present, discuss and widely disseminate their research work in the area of disaster resilience. This involve (a) calling for submissions of original piece of doctoral research internationally, (b) providing feedback on the submissions through expert peer review process, (c) providing an opportunity to participate/present research work in a two-day workshop in which additional feedback is provided by a review panel, (d) providing an opportunity to network with experts in the field and (e) disseminate doctoral research work to a wider audience. For this purpose, the ANDROID network international conference (5th International Conference in Building Resilience) in Newcastle Australia ran parallel to the Residential Doctoral School.

This volume brings together the contributions of all the doctoral researchers. The papers collated here demonstrate the richness and interdisciplinary nature of the research topics and the theoretical and practical nature of challenges/opportunities addressed by disaster resilience researchers. The submissions cover a wide spectrum of topics including risk assessment and mitigation, post-disaster reconstruction, disaster governess, social/community resilience, and stakeholder engagement.

Given the growing need for evidence-based approaches to dealing with disaster situations created by increasing exposure to human/natural hazards and the need for development of research skills/expertise in this area of disaster resilience, the work of the doctoral researchers in this volume is a valuable contribution to a body of knowledge.

A summary of the papers presented in the doctoral secession is given below.

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357-Paper 1
Daniel Vermeer, Dejan Mumovic and Andrew Edkins explore the use of strategic procurement in building sustainability and resilience in the educational built environment. They identified key parameters and analysed across procurement stages: design, build, maintain and operate. They observed that the LEP model has a variable influence to achieve its objectives to deliver long-term environmentally sustainable and resilient built environment. Lower CAPEX PFI schools prove to be most effective investment option to deliver these objectives across the whole asset.

467-Paper 2
Rafiu Salami, Jason von Meding, Helen Giggins, Adebobola Olotu suggest that inadequate housing impacts on economic, political, and social development and ability to resist natural and human induced hazards by the poor. They propose a strategic framework highlighting the interrelationship, causes and effects of between inadequate housing, disasters, vulnerability and urban poverty.

484-Paper 3
Ke QIN, Yan Chang-Richards and Suzanne Wilkinson identifies the critical factors that influence the performance of construction migrant workers through literature review. The research context is set in the Christchurch earthquakes in 2010 and 2011. They propose that migrant workers' performance could be affected by their capability, previous experience, the demands for local training course and requirements of local qualification, the technology and construction methods used in the hosting country and differences in culture and language.

367-Paper 4
Mittul Vahanvati and Beau B. Beza explore an Owner-Driven Reconstruction (ODR) approach to post disaster rebuilding identify 'key processes' or effectiveness of ODR approaches that enhance long-term disaster-resilience of housing and community autonomy. They report on one of the primary themes (out of four) from multiple case study investigations- community mobilisation and facilitation for maintaining effective engagement. The findings highlight the (a) need for more equity in beneficiary selection, as that was found to be a disappointing aspect of the ODR process and (b) success of set up of a team dedicated to be nodal agents between government and community (known as KSK).

336-Paper 5
Chinh Luu, Jason von Meding, Sittimont Kanjanabootra and Doanh Pham suggest that a robust flood risk assessment is needed to mitigate the extreme flood risk for seasonal floods for Vietnam, particular in the Central region. They adopt risk assessment process in AS/NZS ISO 31000:2009 and a risk assessment technique in SA/SNZ HB 89:2013 to explores the characteristics of flood risks to propose a flood risk assessment method for Central Vietnam. They illustrate an integrated flood risk assessment method using Consequence/likelihood matrix tool contextualised in the hazard, exposure, vulnerability frame.

339-Paper 6
Hajer Al-Dahash and Udayangani Kulatunga reviewed relevant literature exploring the challenges and obstacles facing disaster response management in Iraq, in the context of Iraq war. Their exploration focuses on the achievement of the basic functions of management operations (planning, organizing, directing, controlling. The findings suggest that Iraq's disaster response management system are concentrated in the planning and organizing stages and lacking of adequate disaster response management strategies in Iraq.

405-Paper 7
Paula Claudianos explores an approach to conceptualising relocation f\ocused on minimising impoverishment risks usually associated with development-induced displacement. She propose that relocation efforts will be most successful where implementing agencies accurately conceptualise and respond to the social dimension of involuntary resettlement.

534-Paper 8
Kayis Abuzayan, Andrew Whyte and Joyce Bell explore the issues associated to ignoring end user requirements and needs during conflict based post-disaster reconstruction. They aim to propose an integrative asset-management framework for infrastructure facilities in adverse/ high-alert conditions using a multitude of North African case-study locations.

368-Paper 9
Elvira Hewson and Ruth Beilin explores resilience in non-urban food systems through a case study of southwest Victoria. They suggest diversity was a locally appropriate concept for resilience building efforts, a lack of diversity characterised the region, and this was consistent with other indicators captured through the Charter demonstrating eroded resilience of food systems.

519-Paper 10
Abdulrahman Bashawr, Stephen Garrity and Krisen Moodley explore life cycle considerations for effective disaster relief shelters in the context of environmental, economic, technical, and sociocultural factors, that should be taken into account in the design processes of such shelters.

500-Paper 11
Imelda Saran Piri, Yan Chang-Richards and Suzanne Wilkinson explores the challenges in the subcontracting sector resources for the Christchurch earthquake reconstruction. They suggest that the workforce resourcing success depends on the integration between the management of human resources and human resource development and the ability to establish collaborative strategy between the government agencies, tertiary institutions and training providers in the planning of long-term labour resourcing management.

426-Paper 12
Rebecca Deek explores the weather events and devastating seismic activities, and offering examples of how nature's work can be imitated for self-defensive measures using the human body as a model. The paper suggests that using the human body as a metaphor could assist in the design of built environments.

440-Paper 13
Jennifer Woods explore flood recovery and the capacity for building resilience through application of community spirit within a community development framework. The literature review explores meaning of community spirit with regard to the connection to community resilience, social capital, place attachment/displacement and psychosocial wellbeing.

511- Paper 14
Mumita Tanjeela explores participatory approaches, through the consideration of indigenous practices and community-based adaptation principles to build the resilience of affected communities in Bangladesh in the context of climate change policy and disaster risk reduction. They suggest that the success of any policy or program to reduce climate vulnerability depends on incorporating indigenous practices and knowledge systems effectively and be implemented through a collaborative and participatory approach with the community.

532-Paper 15
Giuseppe Forino, Jason von Meding and Graham J. Brewer explore the integration of climate change adaptation (CCA) in disaster risk reduction (DRR) for improved benefits for societies and the environment. They propose a Hybrid Governance (HG) as a valuable framework towards the CCA&DRR integration efforts.

553-Paper 16
Kamran Shafique and Clive M. J. Warren explore In this paper the literature to reveal the significance of community participation and current practices adopted for implementation of post disaster reconstruction projects in developing countries. The studied the 'New Balakot City Development Project' initiated in the earthquake struck area of Pakistan and identified community participation as the most significant factor for PDR project success. They suggest avoiding confrontational approach with the community and resolve issues through dialogue. They also suggest that the planning and implementing of PDR projects should give due considerations to the interests of the community along with economic, social, cultural and political issues of the community.

Appraising schools procured through strategic frameworks using a selection of environmental sustainability and resilience criteria

Paper ID: 357

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Abstract

Addressing commitments made in the UK Climate Change Act 2008 to become a low carbon economy and the use of strategic procurement are two developments that have been subject to critical debate by UK's recent governments. In this context, Local Education Partnerships have been investigated as a form of strategic procurement in England, and 600 schools delivered by these between 2006 and 2014. Key parameters for building sustainability and resilience have been selected and analysed across procurement stages: design, build, maintain and operate. By comparison of data at each procurement stage against industry benchmarks it was observed that Local Education Partnerships have a variable influence to achieve objectives for environmental sustainability and resilience.

Keywords: Environmental sustainability, Measurement, Building resilience, PPP Procurement

1. Introduction

1.1 Recent school capital procurement in England

The UK Labour Government operated a major capital investment programme between 2004 and 2010 with an estimated total cost of £55 billion called 'Building Schools for the Future' (BSF). The aim of the programme was to renew or restructure England's 3,500 secondary schools estate and a large proportion of primary schools in 150 local authorities by 2020 (NAO 2009).

Following the global financial crisis of 2008-09, on 5 July 2010 the Secretary of State for Education of the then elected Conservatives/Liberal Democrats coalition Government announced

that after a review, the BSF programme was to be summarily cancelled. Prior to the financial crisis, the original urgency for the Government's investment was driven by a structural maintenance and investment backlog of public funded schools, targeting local levels of deprivation, and a transformational agenda to provide learning environments not just compatible with current state of thinking but with an eye to future needs and developments (DCSF 2009).

The Local Education Partnership or "LEP" model has been developed for BSF projects as a standard PPP (Public Private Partnership) delivery framework to be identified in local authorities' strategic plans. The 44 established LEP joint-ventures that have reached contractual close prior to July 2010 are now fully operational (PwC 2010). When BSF was terminated over 700 schools had received nearly £10bn of capital investment through LEP's (PfS website, 2010). As most completed their portfolio of pre-allocated capital funding, operational business activities have either been closed, postponed or scaled down into a short form version. Others continue to deliver operational Facilities Management (FM) or ICT contracts, or continue to have a pipeline of new build and refurbishment projects.

This research commenced in September 2010, just after the then newly elected Government abandoned BSF. The 'Review of Education Capital' commissioned by Department for Education (DfE) that followed in April 2011 examined how education capital was spent by the previous Government looking specifically at the allocation and distribution of capital funds, the design and build process, at removing burdens and maximising Value for Money (DfE website, visited March 2013). The report was critical, stating "the [BSF procurement] system is complex, time-consuming, expensive and opaque. The aims of capital expenditure in education should be to build good, fit-for-purpose facilities, and to look after them over their lifetime". The DfE Review of Education Capital also reported that despite the rising spend on energy by schools across the estate, not much has been done to reduce either usage or energy management in a coordinated way. In addition, the carbon benefits gained from new buildings have been outweighed by increases in energy usage elsewhere. This research is addressing some of the concerns in the DfE Review of Education Capital (James 2011), as well as previous reviews by PwC and the National Audit Office (PwC 2010; NAO 2009). The Government observed a lack of confidence to what extent local authorities and their inhabitants will obtain satisfactory long-term sustainability performance from their schools (James 2011).

The influence of climate change on the sustainability and resilience specifications of school buildings requires a measurement and appraisal of aspects that can suit this highly complex part of our future social environment. In this context, how do contracted environmental sustainability and resilience considerations impact on the design, build, maintenance, and operation of schools? And secondly, how can strategic procurement models be organised optimally to deliver schools when set the challenge of requiring them to be effective buildings during the whole asset life? The empirical findings could allow a discussion on theories underpinning procurement risks and benefits, and organisational learning.

1.2 What is a LEP?

The LEP model enables a series of school capital investments to be made without the need for repetitive separate tendering as required under the EU procurement rules. The LEP enters into a

long-term Strategic Partnering Agreement (SPA) with the concerned local authority where it gets the sole and exclusive right to provide all the works and services for the initial capital project it tendered for and any subsequent approved new projects identified in the authority's strategic plan. The SPA formally sets conditions for granting exclusivity to the partners in the LEP and the requirements for the LEP to perform (PfS 2008). Whilst the scope of each LEP can vary, in general it is expected to (PwC 2010):

- develop strategic investment plans for primary and secondary education for the area;
- enable investment options of education provision and other social infrastructure through a mix of procurement routes, both PFI (Private Finance Initiative) and conventionally-funded;
- act as the single point of procurement and service provider;
- integrate and manage a diverse range of supply chain sub-contractors, ranging from building contractors and FM providers to ICT suppliers;
- deliver new/refurbishment projects under a long-term partnership agreement; and
- maintain the new/refurbished schools, including hard and soft FM and ICT.

1.3 Public Private Partnerships (PPPs)

The notion of the term PPP has been associated with very different types of perceptions internationally. Weber and Alfen (2012) point out that the term was first used in the USA in the 1960s to refer to typical urban development projects involving private investors. Later, PPPs became known as a method of procurement for the public sector among others for social infrastructure and infrastructure management. Since 1992, PFI has become the form of PPP used most frequently in the UK and has been used across a broad range of sectors (HM Treasury 2012). This standard was taken up throughout the world in various forms. The LEP as a PPP often consists of elements of horizontal (or institutional) partnership joint-venture where the public sector procurement function is partly privatised, and also an element of vertical (or contractual) PFI where the agent is a purely private company.

1.4 Why strategic partnership procurement?

According to Bennett and Peace (2006) strategic partnering means firms supporting project teams in partnering over a series of projects. The OGC stated that strategic partnering involves the integrated supply team and the client organisation working together on a series of (construction) projects to promote continuous improvement (OGC 2003). In the context of PPP, HM Treasury (2006) define strategic partnerships where smaller investments in PFI and non-PFI projects are planned and managed by an organisation which is a joint venture between public and private sector, and has a long term, strategic relationship with the procurer(s). In the case of LEP's the SPA formalises the commitment of project teams in partnering over a series of projects and exist when two or more organisations develop a close, long-term partnership based on working together to enable all to secure the greatest benefits.

1.5 Why is environmental sustainability important?

The planning, design, construction, maintenance and operation, including transport to and from schools is of social, economic and environmental significance (Urban Mines and PEPF 2010). Ten million pupils in the UK spend almost 30% of their life in schools and about 70% of their time inside a class room during school days. In the UK, schools alone are responsible for 15% of the energy consumption in public and commercial buildings. As such, schools are the second most important indoor environment after children's homes. The UK Government have emphasised the importance of school infrastructure as a way to help achieving the objectives of the UK Climate Change Act 2008 and EU 2020 Sustainable Development Strategy (Chatterjee and Reynolds 2008; ESC 2007; James 2011; UK Parliament 2008).

1.6 What is the relation to building resilience?

Resilience in the context of the built environment has been suggested as one of the guidelines for a conception of strong sustainability (Ott 2003). Brand and Jax (2007) describe ten different definitions of resilience with respect to the degree of normativity. One of which is sustainability related and defined by Ott and Döring (2004) as the maintenance of natural capital in the long-term in order to provide ecosystem services that provide instrumental as well as eudemonistic values for human society. The UK Climate Projections 2009 provide projections of future changes to the climate in the UK to the end of this century (Defra 2009). The projections predict an increase in both the frequency and severity of extreme weather events, including an increase in high-intensity rainfall events which increases the risk of flooding. The UK Climate Change Act 2008 established a legal framework for action on climate change mitigation and adaption.

In the context of schools estate, a balance between design and build and the management of buildings in operation will help address resilience in future climates whilst maintaining current targets to mitigate any further changes by unnecessary carbon emissions. Recent studies by Dasgupta, Prodromou and Mumovic (2012) showed that newly built schools are failing to meet even basic operational performance criteria related to both energy consumption and provision of indoor environmental quality (acoustics, indoor air quality, thermal comfort and lighting).

2. Methodology

The modernised low carbon schools developed and delivered by 44 LEP's between 2006 and 2014 have been identified using a database set of all England's education establishments, downloaded from the Edubase2 website on 20 June 2014. The LEP-built schools were identified using index-matches of three other datasets against the base dataset: list of BSF schools received from the Education Funding Agency (EFA) in February 2013, BSFI Information Memorandum dated March 2011 and a list of BSF schools published by Department for Education in July 2010. This led to a master dataset of 600 schools as in Table 1 below.

Total sample = 600	New Build	Refurbishment	Remodel	PFI[1]	Non-PFI
Secondary school	247	126	23	122	274
Primary school	47	45	6	6	92
Referral Unit, Nursery	67	31	8	25	81
Total assets	**361**	**202**	**37**	**153**	**447**

Table 1 – Sample sizes by type of schools vs type of investment and procurement route

2.1 Whole-life asset value criteria

Based on the SPA, Schedule 14 - Key Performance Indicators (PfS 2008) and UK industry standards a set of meaningful variables have been selected that Local Authority clients, LEP's and their supply chains have signed up to. These may help to understand how the contracted environmental sustainability considerations impact on the design and build of schools, and the resilience considerations on the maintenance and operation of schools. Table 2 below shows for each variable a description, the total number of school data entries gathered and the BSF performance expectation set that can explain this "impact" as follows:

School level data total sample = 600		**Criteria**	**Type**
Procurement stages	**Design**	**Design Quality Indicators (326 entries)** DQI processes based on the data collected. (binary marker: 'yes' or 'not answered')	**Environmental sustainability**
	Build	**BREEAM Status (321 entries)** **Building Services Type (472 entries)** Achieved BREEAM Very Good or better, or a building services type 'natural ventilation' or 'predominantly heating with natural ventilation'. (nominal: 7 categories including 'unknown')	**Environmental sustainability**
	Maintain	**Display Energy Certificates (317 entries)** The industry norm is that a typical building of its type would have a DEC rating of ≤100. (numerical: greater than 0)	**Building resilience**
	Operate	**Post Occupancy Evaluations (163 entries)** Commitment to POE's based on data collected. (binary marker: 'yes' or 'not answered')	**Building resilience**

Table 2 – Environmental sustainability and resilience criteria set against each procurement stage

Capital expenditure (capex)	**Type of provision**
Capital cost (£/m^2) ≤ benchmark[2] (249 entries) Schools with capital cost £/m^2 less than or equal to EFA average benchmarks, or BCIS average benchmarks for refurbishments. (numerical: greater than 0)	**Extended and/or community provision (410 entries)** Schools that offer extended/external facilities for pupils or community use, such as youth/sports club or venue hire. (binary marker: 'extended' or 'standard')
Capital cost (£/m^2) > benchmark[2] (273 entries) Schools with capital cost £/m^2 exceeding EFA average benchmarks, or BCIS average benchmarks for refurbishments. (numerical: greater than 0)	**Standard provision (190 entries)** Any schools that have a standard provision only, including nurseries and Special Education Needs schools. (binary marker: 'extended' or 'standard')

Table 3 – Performance differentiators for any LEP-built schools

[1] The PFI schools include seven refurbishments, the rest of the sample are all new build.

[2] Based on Government Construction Cost Benchmarks 2014 (Cabinet Office), with BCIS indices at June 2010 and location factors.

For each criterion, specific datasets were called upon and merged into the master dataset using a unique identifier. Subsequently, three steps were taken at each procurement stage:

Step 1: Using formulaic filters in MS Excel enabled to calculate how many entries met each criterion set, how many did not, and any missing values;

Step 2: Using compounded formulaic filters the frequencies were allocated for single variables and for a combination of two variables within that single criterion set (e.g. BREEAM Status and/or Building Services Type);

Step 3: Using pivot tables the results were filtered at each procurement stage. After correcting for any errors and missing values it was possible to extract the frequency and ratio outputs as presented below in Table 4. The results were broken down further into type of investment and procurement route as shown in graphs 1 and 2.

Each of the criteria analyses is explained in detail below.

Design Quality Indicators (DQI) analysis – Schools that follow the DQI evaluation process play a fundamental role in contributing to the improved design, long term functionality and sustainability. A dataset of 318 schools that conducted a DQI process was received from Construction Industry Council in November 2014. Eight further schools were added manually after it was found online that a DQI process was applied.

BREEAM Status analysis – The BRE assesses the performance of buildings in the areas: management, energy use, health and well-being, pollution, transport, land use, materials, and water. BREEAM assessment ratings range between: Pass, Good, Very Good, Excellent, Outstanding, and Unclassified. LEP built schools were required to meet or exceed the BREEAM 'Very Good' standard (James 2011; PfS 2008). Data was acquired through the PfS School Building Survey 2009, the BRE 'GreenBookLive' portal, and manual online searches.

Building Services Type analysis – Data on the NDEPC Landmark register confirms the main type of building services installation installed in schools: air conditioning, heating and mechanical ventilation, heating and natural ventilation, mechanical ventilation, mixed-mode with mechanical ventilation, or mixed-mode with natural ventilation. This information was entered manually on the master database.

Display Energy Certificate (DEC) analysis – Since 2008, regulations require schools with floor areas >1,000m^2 to have a DEC, based on actual measured annual energy consumption. DEC data is publicly available via manual online entry on the Landmark NDEPC register. In total 317 valid DEC ratings post school renewal date were extracted manually. The CIBSE TM46 energy benchmarks for DECs were utilised. Industry norm is that a DEC rating ≤100 is a reasonable reflection of energy efficiency, 179 schools currently meet this criterion.

Post Occupancy Evaluation (POE) analysis – POE for schools include a peer review by design and sustainability professionals and an assessment of environmental and resilience performance. In total 137 POE markers have been extracted from the PfS School Building Survey 2009, a further 18 schools were added as a result of POE feedback recorded on the DQI dataset, plus 8 manual entries making a total of 163 POE's carried out.

Community / extended schools analysis – Developing schools that have extended or external facilities for outside curriculum activities and/or community use was one of BSF objectives. The DEC database 2010-11 managed by Landmark and obtained by CIBSE has an extended schools marker which highlighted 50 schools. The Consistent Financial Reporting (CFR) datasets 2006/07 to 2013/14 obtained from DfE yielded a further 85 schools. The remaining schools have been identified using online manual searches on school websites. In total 410 extended schools were found with the remaining 190 classified as standard schools.

Construction capital cost analysis – Capital cost data was gathered from multiple sources including: EFA BSF schools list 2014; DfE Basic Need Scorecard 2010/11 to 2012/13; BSFI Technical Memorandum 2011; and PfS School Building Survey 2009. In addition, internet searches were performed to fill missing values or LEP's were approached directly with requests to confirm or verify the data. To enable comparison the cost data was normalized per m^2 internal floor area (£/m^2), indexed to June 2010 price levels using the cost indices from BCIS.

3. Results

3.1 Meeting the investment challenge

In answer to the question how strategic procurement models can be organised to deliver school infrastructure effectively it needs to be established whether the challenge of requiring them to be sustainable and resilient buildings (Table 2 and 3) can be delivered during the whole asset life. Resilience to climate change will be appraised solely by comparative analysis of LEP built schools for a single criterion at maintenance of operation stage. Assessment of the criteria on the selected schools will be against contractual or industrial benchmarks. Table 4 below presents the separated results at each procurement stage for all 600 schools.

Total sample 600 schools	**Schools meeting environmental sustainability and resilience criteria combined**								
	Lower capex (£/m^2), extended			**Higher capex (£/m^2), extended**			**Higher capex (£/m^2), standard**		
Procurement Stage	**Count**	**Net sample**[3]	**Net effect ratio**	**Count**	**Net sample**[3]	**Net effect ratio**	**Count**	**Net sample**[3]	**Net effect ratio**
Design	111	181	61%	129	200	65%	36	73	49%
Build	146	169	86%	175	192	91%	60	69	87%
Maintain	63	109	58%	73	126	58%	24	42	57%
Operate	52	181	29%	65	200	33%	24	73	33%
Whole Life	15	109	14%	14	126	11%	5	42	12%

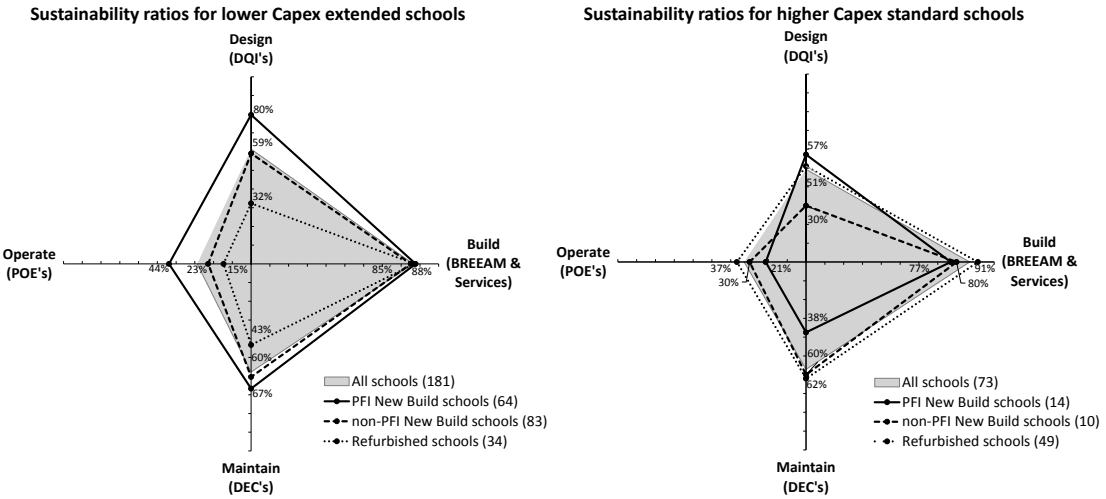
Table 4 – Outputs environmental sustainability and resilience criteria for LEP-built schools

The net effect ratios give an indication of how effective the LEP-model has been to date in delivering contracted performance criteria at each procurement stage and throughout the full asset lifecycle. The row along the bottom called "Whole Life" represents a very limited proportion of schools that, based on the data available at the time, meet all performance criteria set across the full asset life. Table 4 shows only very marginal net effect ratios of schools that meet all

[3] Representative sample size corrected to exclude errors and missing data.

environmental sustainability and resilience criteria set across all procurement stages: Design, Build, Maintain and Operate. From the Table 4 it can also be observed that the level of capital investment had limited impact. There are no significant differences in ratios for schools with a capital cost £/m^2 equal or lower than the average national benchmark for its type (14%), versus more expensive schools that offer extended (11%) or standard provision only (12%). In all cases the net effect ratios during Build stage is very high ranging between 86-91%, and during operate stage is very low between 29-33%.

Differences between the above ratios may be further explained by interpretation of the Graphs 1 to 2. The areas marked grey represent the average net effect ratios in Table 4, which ignores type of investment (New Build versus Refurbishment) and procurement route (PFI and non-PFI).



Graphs 1 and 2 – Net effect ratios of environmental sustainability and resilience criteria

The ratios for PFI schools with lower capital costs (Graph 1) exceed average ratios at all stages while non-PFI and refurbished schools (except for construction time) score average levels or lower. Environmental sustainability and resilience ratios (Graph 2) score close to average or lower ratios regardless what type of investment (New Build / Refurbishment) or procurement option, except PFI schools with lower capital costs which score better. Graph 2 shows that schools have net effect ratios of sustainability and resilience at or below average despite the higher amount of capital investment.

4. Conclusions and recommendations

The role of strategic partnership procurement for delivering school infrastructure in England is a relatively new phenomenon in the construction industry and its effects need to be appraised. Based on comparison of data against British industry benchmarks it was observed that the LEP model has a variable influence to achieve its objectives to deliver schools that can be long-term environmentally sustainable and resilient. Lower capex PFI schools prove to be most effective investment option to deliver these objectives across the whole asset life based on data available.

A more robust understanding is needed as to why ratios are relatively low during maintenance and operation. Why have performance conditions not been met in particular for lower capex refurbishment projects and why in general ratios are relatively low for the various investment /

procurement options during maintenance and operation stage? Further insight and data collection of the various performance criteria would improve the robustness of the analyses.

Those LEP's that are able to meet the all the criteria across all procurement stages for predominantly most of their schools portfolio are demonstrating that they can deliver more resilient schools need to be selected for further analysis. Detailed surveys are recommended on those selected LEP's to find out how the model could be most effectively managed to ensure that contract participants will deliver ongoing environmental sustainability and resilience targets for the duration of the partnership.

The findings could enable a discussion on theories underpinning procurement risks and benefits, and organisational learning. The insights could also be relevant to England's health sector where a similar model is applied (Local Improvement Finance Trust), as well as internationally to those countries considering the use of strategic procurement for modernising their infrastructure.

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Disasters, vulnerability and inadequate housing in Nigeria: A viable strategic framework.

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Abstract

Inadequate housing has a significant impact on the livelihoods of poor people in Nigeria. It affects their economic, political, and social development, as well as providing poor resistance to natural and human induced hazards. More vulnerability reduction interventions are needed to tackle the devastating impact of climate change on the urban poor who are highly vulnerable as a result of their unplanned environmental conditions, low-quality shelter and poor infrastructural systems. This paper aims to develop a viable strategic framework specifically address the impact and vulnerability of dwellers of the substandard housing so as to enhance the creation of resilient communities and significantly improve their living conditions. It provides a broad understanding of dynamics and interrelationship between inadequate housing, disasters, vulnerability and urban poverty, as well as the causes and effects of inadequate housing on its inhabitants. It is hoped that the framework will serve as a guide for mitigating disaster, housing inadequacy and thereby improving the livelihoods of the urban poor.

Keywords: Inadequacy, Housing, Vulnerability, Urban poor, Disaster, Framework.

1. Introduction

1.1 Background of the study

At the beginning of the millennium, more than one billion people lived in inadequate, substandard housing conditions. According to Bredenoord et al.,[1], one-third of the world's urban population do not have access to adequate shelter. More than a billion people in developing countries are with no access to clean water and 270 million children without access to health services.

Housing stands as the single largest expenditure in a household budget; it mostly affects other necessities and even exacerbates an already insufficient income. Housing-Induced Poverty is often a silent or overlooked factor in considering both the causes of poverty as well as potential remedies to alleviate poverty [2]. Poverty issues often manifest themselves in spatial patterns. The manifestation of poverty arises when poor families and individuals cluster in one area, the outcomes of these developmental processes are diverse urban problems ranging from overcrowding, the deplorable environment, substandard living conditions, inadequate and poor infrastructural services, homelessness and other related problems [3].

Olotuah,[4] asserts that poverty is not only limited to one's ability to acquire life's basic amenities, it also restricts the choice of living environment. Most of the urban poor are now compelled to live in unsanitary conditions. Substandard and unhealthy housing contributes to an overall reduction in health outcomes among the poor. This situation indeed is a manifestation of vulnerability, social exclusion, helplessness and powerlessness.

Several researchers have given much credence to the fact that there is a strong link between poverty, inadequate housing and vulnerability. It is evident that poverty is a major contributor to vulnerability. The urban poor is more likely to live in substandard and insecure shelter in a severe environmental condition that is susceptible to disaster.

This paper attempts to take an incisive look at the causes and effects of inadequate housing on occupants and their vulnerability to natural and man-made hazards. It is also aiming at developing a useful model that will provide many answers to questions concerning inadequate housing and vulnerable urban poor.

2. Literature review: Theoretical framework

This section presents a comprehensive discussion on the current state of knowledge on the dynamics and nature of the interrelationship between inadequate housing, urban poverty and vulnerable urban poor. It seeks to review the related literature on the causes, effects of inadequate housing and consequences on poor urban dwellers. It provides a right direction to develop a model that capable of mitigating the vulnerability of inhabitants of substandard housing to natural and man-induced disaster.

2.1 Nigeria as a vulnerable country

Nigeria is one of the sub-Saharan countries, the most populous nation in Africa and seventh in the world. Nigeria lies between latitudes 4^0 North of the Equator and latitudes 3^0 and 14^0 on the east of the Greenwich Meridian. Nigeria has a large expanse of land with the area put at 923,768.64sq.Kilometres and a population of about 177 Million people [5].Nigeria is becoming richer with economic growth, paradoxically, more Nigerian becoming poorer day by day. More than 67 percent of the entire population lives in poverty [6].

Natural and man-made disasters have continued to wreak havoc on almost everywhere in the world, both in developed and developing countries. However, in developing nations, people have the lesser capacity and fewer resources to resist the impact of hazards such as earthquakes, floods, extreme storms among others [7]. Nigeria is not an exception in this regards, as Adebimpe [8] puts it "Nigeria is a disaster-prone country".

Floods, landslides, storms and extreme temperature are the major disasters that are frequent in Nigeria. Floods are unarguably most frequent and disruptive. In fact, the consequences of the recent floods in the country were enormous and disastrous. According to the Post-Disaster Needs Assessments (PDNA) report, in 2012, Nigeria witnessed heavy downpour that struck the entire country. The impacts of the floods affected more than 7million people; 3, 871, 53 people were displaced, with 363 people killed, and 5,851 were injured [9].

In the same vein, the effects Nigeria's floods on housing were unprecedented. The PDNA report in 12 most affected states shows that a total of 1,337,450 houses were wholly or partially destroyed (Table1) [9]. Also, in 2001, Nigerian Red Cross Society affirms that 280,000 Nigerians were affected by the various degree of disasters, and more than 183,000 people displaced, 3,683 injured and 1,099 died in 2003[10].

Table 1: Number of Totally and Partially Destroyed Houses in the Most-Affected States

States	**Traditional buildings**			**Modern/ sandcrete buildings**			**Total number affected**
	Number totally destroyed	Number partially damaged	Total number affected	Number totally destroyed	Number partially damaged	Total number affected	
Adamawa	117,829	36,134	153,963	-	23,401	23,401	177,364
Anambra	16,186	6,719	22,905	-	95,394	95,394	118,299
Bayelsa	79,730	26,577	106,307	-	26,577	26,577	132,884

Delta	84,834	4,465	89,299	-	-		89,299
Edo	13,153	14,249	27,402	-	-		27,402
Jigawa	11,623	5,230	16,853	-	282	282	17,135
Kebbi	103,048	52,555	155,603	-	-	-	155,603
Kogi	124,085	3,102	127,187	-	16,259	16,259	143,446
Nasarawa	16,326	136,049	152,375	-	5,759	5,759	158,134
Rivers	36,999	4,111	41,110	10,121	192,290	202,411	243,521
Taraba	81,688	32,675	114,363	-	-	-	114,363
Total	**685,501**	**321,866**	**1,007,367**	**10,121**	**359,962**	**370,083**	**1,377,450**

Source: National Emergency Management Agency (NEMA), 2013.

2.2 Disaster, Vulnerability and inadequate housing

Globally, the frequency and gravity of disasters occurrence is on the increase. Both developed and developing countries are significantly affected. However, the most vulnerable to disasters are developing nations as a result of the lesser capacity and fewer resources to prepare and recover. The impacts of disaster may involve injury, loss of life and property, as well as loss of infrastructural services and environmental degradation.

According to the United Nations International Strategy for Disaster Reduction (UNISDR) [11], disaster is " a serious disruption of the functioning of a community or a society causing widespread human,material,economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources". In the last 40 years, natural disasters have killed more than 3.3million people and caused economic damages worth 2.3 trillion dollars [52]. Disaster is categorised as natural and human-induced events[12]. These include earthquakes, storms, droughts, floods, fires and others.

The vulnerability is usually concerned with future danger and potential harm. It refers extent to which a person, groups or society are incapable to anticipate, cope with resist and recover from the consequence of disasters [13][14]. An urban center, system or asset is vulnerable when its features and circumstances make it susceptible to the damaging effects of a risk[15]. Therefore, the vulnerability involves the situations triggered by various phenomena in the form of physical, social, economic, and environmental factors which makes a society or group of people susceptible to natural and man-made hazards.

There are various classifications of urban vulnerability; these include physical, social, economic and environmental factors (figure 1) [15] [11].

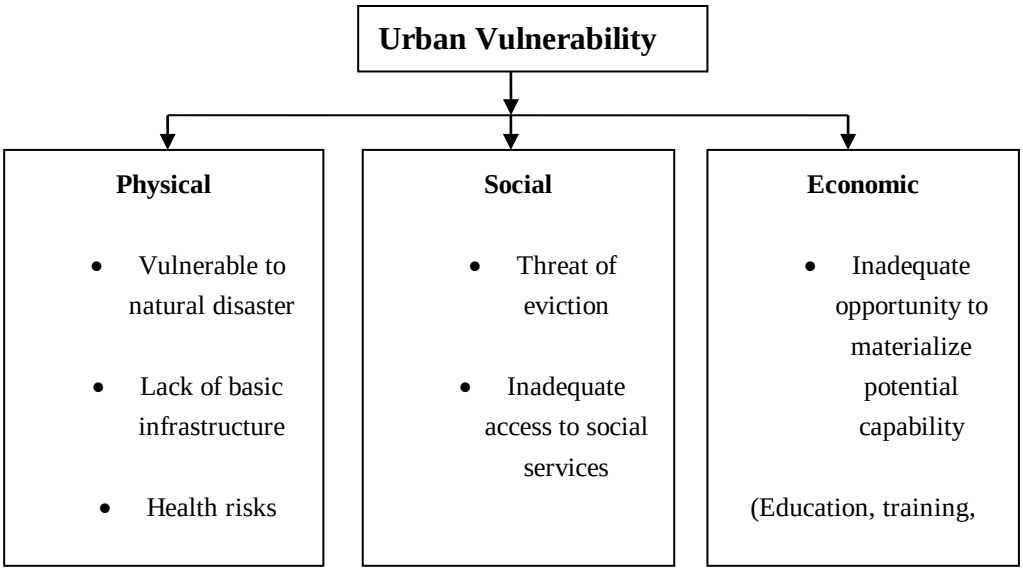

Figure 1: Classification of urban vulnerability

Adapted from Kidokoro, (2008) and UNSDR, (2009)

Housing is an indispensable companion and its relevance to almost every other indicator for human development cannot be overemphasized. As far back as 1948, the United Nations' Universal Declaration of Human Rights states that "*Everyone has the right to a standard of living adequate for health and well-being of himself and his family, including food, clothing, housing…*" [16]. Despite this affirmation, and other commitments by the world leaders, more than one billion people who are urban residents still live in inadequate housing [17].

Inadequate housing is synonymous with housing conditions that are deficient and unhealthy. American Housing Survey(AHS) defines inadequate housing as an occupied dwelling unit that has moderate or severe physical problems such as deficiencies in water system, plumbing facilities, heating, electricity, selected structural conditions (leaking roof, holes in floor or ceiling, broken plaster or peeling paint), and sewer system among others[18]. It is evident that a house is inadequate when the necessary requirements in building codes such as legal security of tenure, functionality, and structural stability, among others are not met. Poor housing becomes unhealthy when occupants are most likely to be exposed to risk related respiratory conditions from poor air quality resulting from dust, dampness, mould, overcrowding, poor ventilation and sanitation.

2.3 The interrelationship between urban poverty, inadequate housing and vulnerability

The issue of urban poverty is multidimensional in nature and extraordinarily complex. UN-Habitat[19] expresses urban poverty in terms of households who are earning less than what is needed to afford a 'basket' of basic necessities, or living on less than US $1 or US $2 a day. In contrary, Wratten [20] believes that urban poverty is multi-faceted, its causes are interlinked with environment, housing, health, income generation, education among others and as such, its definitions varies between individuals.

Urban poverty is best measured in three ways according to Wratten,[20] and Satterthwaite[21].These involve using quantitative approach (poverty line based on household budget) and qualitative approach (analyzes the way poverty affects different subgroups among "the poor" such as family, women, old people and ethnic groups). The integrated development approach combines both features.

Urban Poverty, inadequate housing and vulnerability are closely interrelated with an abundance of evidence. The urban poor living in poverty are more likely to reside on insecure lands with substandard housing quality and poor infrastructural systems.This circumstance makes poor urban residents more vulnerable physically, socially, economically.

The proliferation of low-quality shelters and infrastructural failure witnessed in cities particularly in developing countries are manifestation of urban vulnerability, resulting from less economic fortune, lack of institutional capacity and poor public urban policies[22] [17] [23]. It is a daunting task for people who live in extreme poverty whether in urban neighbourhoods or rural villages to improve their housing conditions. More than forty percent of inhabitants in the developing world are informal settlers [17]. Loewen and David [23] argue that impoverished segments of local populations that are faced with the burden of unemployment, crime, inadequate housing and poor health are trapped in a cycle of poverty.

2.4 Causes of inadequate housing

i. Poverty, Unemployment/Low level of income: Globally, Over 100 million people are homeless today and over a billion people are living in inadequate housing as a result of poverty, unemployment and low-level income. Ward [24] and Calderon Cockburn [25] agree that inadequate housing in Latin America and the Caribbean are mostly attributed to the state of poverty, low household income and unemployment. The International Labour Organization affirms that the number of unemployed people will continue to increase unless policies are changed. Globally, more than 200 million people are unemployed worldwide and expected to rise to 208 million in 2015[26].

ii. Insecurity of Land Tenure: Inadequate housing that is mostly self-made, a squatter or informal settlements with critically poor housing conditions, epitomize tenure insecurity in a very visible form. Raquel Rolink, United Nations Special Rapporteur, affirms *"Access to secure*

housing, and land is a prerequisite for human dignity and adequate standard of living, yet many millions of people live under the daily threat of eviction"[27].An estimated 90 percent and 50 to 70 percent of rural and urban land in Africa are unregistered respectively[28].

iii. Rural –Urban Migration: The rapid urbanisation that we are witnessing is attributed to both natural population growth, and rural to urban migration. This enormous increase amounts to a crisis of unprecedented magnitude in urban shelter [29]. It has contributed to the growth of informal settlements dominated by the weak in the unsuitable deficient physical environment.

iv. Displacement based on natural and man-made disaster: Displacement can be triggered by poor developmental projects, natural disasters, war and conflicts. According to the Centre, for Housing Rights and Evictions, over 18 million people are displaced worldwide. It is as a result of planned forced evictions from their informal settlements between 1998 and 2008.The lack of tenure security on squatter settlements usually coincides with a risk of eviction[30].The occupants of inadequate housing are not only under threat of eviction but are vulnerable to all types of disaster. They are not only psychologically weak, but the situation also discourages them from maintaining or improving their terrible dwellings [31].

2.5 Effects of inadequate housing

i. The incidence of Slums and Environmental Degradation: The formation of slums is attributed to financial incapability of higher population of the urban dwellers to afford decent housing. Slums are manifestations rapid urbanization and the urbanization of poverty [29]. The outcomes of these developmental processes are diverse urban problems ranging from overcrowding, the deplorable environment, substandard living conditions, inadequate and poor infrastructural services, homelessness and other related problems [12].

ii. Ill health: Housing quality and its environment play a significant role in the health condition of the occupants. Substandard housing conditions may trigger poor sanitary conditions that are multidimensional in nature [32]; [33].WHO/Europe [34] affirms *"Ten housing-health linkages are considered to have some evidence for quantifying the burden of diseases"*. These include Physical, chemical, biological, building and sociological factors.

iii. Vulnerability to natural hazards and disasters: Most occupiers of deficient housing and their neighbourhoods that lack basic services such as adequate water supply, sanitation, drainage system among others are highly vulnerable to hazards and disasters. Dayton [35] argues that poor people living in poor housing, often on marginal land are significantly susceptible to disasters. Sadly, in developing a country like Nigeria, savings and insurance are not available to low-income households if a shock hits them.

iv. Social Exclusion and Inequalities: Poor housing and homelessness are good examples of poverty and social exclusion. A geographical area is socially excluded if prevented from participating fully in economic, political and cultural activities of such society. This may likely be as result of combination of linked problems such as unemployment, low income, lack of core competencies, inadequate housing, poor health and high crime environments among others

[36];[37];[38];[39]. Another burden of socially excluded people is the feeling of being neglected, far from public infrastructural services like schools, accessible roads, electricity [37];[40].

3. Strategic framework to address vulnerability of inadequate housing residents

Based on the thorough review of the body of knowledge relating to inadequate housing, urban poor and their vulnerability to hazards. The authors developed a framework in figure 2, which will serve as a guide for addressing the problem of the vulnerability of dwellers in poor housing.

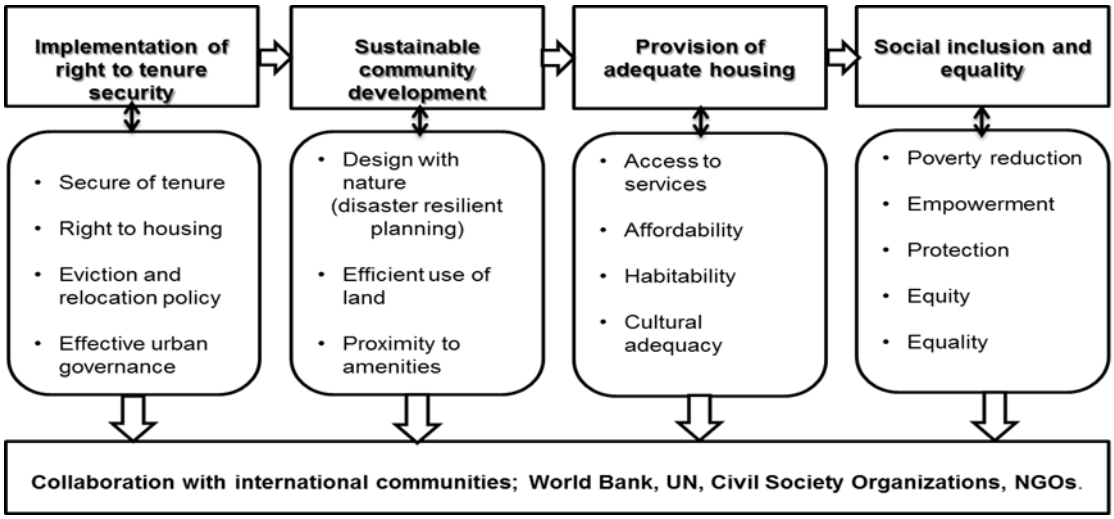

Figure 2.0: Strategic framework designed to address inadequate housing and vulnerability.

3.1 Implementation of right to secure of tenure

More than a billion people worldwide live in terrible housing conditions; millions are homeless while other millions are evicted forcibly or threatened with eviction from their home every year. Despite the approval and recognition of International Human rights law on security of tenure by all countries, the fundamental rights and dignity of poor people are not protected [19].

The access to secure land and housing is a prerequisite for reducing poverty. Granting it alone does not solve the problems of poverty, inadequate housing and the unsafe living environment, though it is one of the necessary steps ensuring successful shelter strategy [41];[42]. The UN-Habitat/UNESCAP [43] affirms, *"Without land, there can be no housing. And without looking at the issue of land, there can be no meaningful discussion about how to solve the problems of housing for the poor in our cities. The inaccessibility of decent, secure, affordable land is the major reason there are so many slums in Asian towns and a contributing factor to urban poverty"*.

3.2 Design of sustainable neighbourhood/community development

An efficient, sustainable community is where a variety of housing types are closer to workplaces, schools, parks, shops and other amenities, making walking and cycling more convenient [44].Hernandez-Moreno [45] also believe that sustainable urban forms facilitate benefits for dwellers, developers and government.

The most useful principles for the sustainable neighbourhood or community planning are highlighted by the US, EPA [44] and UN-Habitat [46].These include:

Adequate space for streets and efficient street networks: The road network should occupy at least 30 percent of the land.

Use of land efficiently: Neighbourhood that make effective use of land limit the spread of suburban sprawl.

Design with nature: To protect the local environmental quality and new development should be planned in a way that is sensitive to its natural settings.

Social mix: The availability of houses in different price ranges and tenures in any given neighbourhood to accommodate different incomes.

Mixed land –use: At least 40 percent of floor spaces should be allocated for the economic purpose in any neighbourhood.

3.3 Provision of adequate housing

Housing is a fundamental human right; the lack of adequate housing has a significant impact on poor people's livelihoods affecting their health, social, political and economic outcomes. It is a catalyst for poverty alleviation that cuts across almost every other indicator for human development [47]; [48].

According to UN-Habitat [19], adequate housing is more than just a shelter or four walls and a roof. These are the features of adequate housing:

Security of tenure – Legal protection against forced evictions and harassment must be guaranteed.

Availability of services and other facilities*:* These include safe drinking water, proper sanitation, refuse disposal, lighting and energy for cooking.

Affordability: The house costs should be compatible with the income levels of the occupant or subsidises.

Proper location: The house should be in proximity to hospital, schools and transport.

Habitability: Adequate space, protection from cold, damp, heat, rain, wind or threat to health should be provided.

Cultural adequacy: The expression of cultural identity and way of life should be guaranteed in an adequate housing.

3.4 Social Inclusion

Social inclusion is a requirement for citizen participation in deliberation, decision making, execution and monitoring of government policies in a society without denying a voice directly or indirectly to be heard [48]. Cappo [49] defines a socially inclusive society as a concept where all members of a community feel valued, their differences are respected, and their basic needs are met so they can live in dignity.

OECD-DAC [50]; DFID [37] and EUC [39] agree that social inclusion can be achieved by tackling social exclusion through poverty reduction. These are summarized as follow:

Economic development - Creations of decent jobs, adequate housing for the all, better livelihoods and higher income.

Human development - Improvement on health status and education advancement without discrimination.

Political development - Creation of legal, regulatory and policy framework that will enhance political participation, empowerment and rights.

Social-cultural development - Recognition of status and dignity of all citizens.

Protective life - Protection of all citizens particularly the vulnerable people from insecurity and risk.

4. Conclusion

Inadequate housing has a significant impact on social, political and economic outcome for the global poor. There is clear evidence that poverty and inadequate housing are strongly linked. While poverty causes inadequate housing, inadequate housing is also a causal factor of deepening poverty and vulnerability. Housing deficiencies such as lack of protection from weather, insecurity, exposure to health disaster, poor day-lighting and ventilation, as well as lack of access to public services limit a household's ability to break out of poverty trap and vulnerability. These deprivations incapacitate urban poor to generate income, secure education for their children and further take away their respect and dignity in their various communities.

Adequate housing is one of the effective means to reduce poverty as affirmed by Adarkwa [51] in his research. He opines that living in an improved housing with good infrastructural system aids poverty reduction and mitigate the vulnerability. Consequently, to address the fundamental

problems about inadequate housing and its vulnerability, a valuable strategic framework has been designed.

It is believed that this viable model will guide all levels of governments, urban planners and stakeholders in effective policy implementation. The paper advocates rigorous investment on adequate housing and infrastructural facilities in towns and cities in Nigeria so as to improve the well-being of the urban poor.

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A Review of Critical Factors Affecting the Performance of Construction Migrant Workers in Reconstruction Environment

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Abstract

The Christchurch earthquakes in 2010 and 2011 created a high demand for construction labour for the post-disaster reconstruction. Given limited resources nationwide, Christchurch attracted a large number of migrant workers from other countries. In comparison with local workers, migrant workers faced personal, technical, organizational, social, external and environmental adaptive problems, which impact on their performance. By using a literature review, this paper aims to identify the critical factors that influence the performance of construction migrant workers. It is found that migrant workers' performance could be affected by various factors including their capability, previous experience, the demands for local training course and requirements of local qualification, the technology and construction methods used in the hosting country, together with varied cultural background and language. Other factors such as organisational management, supports from local authorities, peer support and cooperation also played a part. The preliminary review from this paper provides a baseline for measuring the performance of migrant trade workers in the construction industry.

Keywords: Migrant, trade workers, performance, productivity, reconstruction

1. Importance of Study Migrant Labours' Performance in reconstruction activities

Natural hazards, such as earthquakes, bushfires and floods, throughout the world in recent decades have caused significant life losses and economic losses. Christchurch, the second largest

city in New Zealand's South Island, had been stricken by a magnitude7.1 earthquake on 4 September 2010, which also known as Darfield earthquake, resulted in no loss of life and only a few injured (McSaveney 2013), together with estimated $5 billion for repair and rebuilding works(Parker, Steenkamp 2012). Less than six months later, on 22 Feb 2011, a magnitude 6.2 aftershock struck Christchurch Although the magnitude of this earthquake was less than the Darfield earthquake, the epicentre was shallower and closer to Christchurch business district. As a result, it caused more injuries and loss of 185 lives (New Zealand Police 2012), associated with "over 150,000 homes damaged, 30,000 seriously" (Parker, Steenkamp 2012).

After the two earthquakes, local governments and communities issued many recovery strategies and organized a series of reconstruction works for helping affected residents to backing to their normal lives. Reconstruction and repairing are considered as the primary measures contributing to post-disaster recovery. Because buildings could not only provide the most urgent needs, including water, electricity, and shelter to the affected residents, but also be the measure for maintaining social stability and avoiding social chaos. Furthermore, reconstruction and repair of infrastructures and other public facilities play a vital role in recovery activities in supplying essential services, such as clean water and transportation. Therefore, it is valuable for researchers and scholars to study the performance of various reconstruction activities.

Most developed districts and countries are experiencing a scarcity of labour resources, such as UK, US, German, Japan, Singapore, Malaysia, Chile, and Egypt (Han et al. 2008, MR et al. 2005, Rivas et al. 2011, Shehata, El-Gohary 2011), especially inadequate of skilled workers (Ghoddousi, Hosseini 2012). In addition, due to the diverse rebuilding works in Christchurch, it created a high demand for construction labours. Furthermore New Zealand immigration department has streamlined visa application process, such as the issue of skills shortage list. As a result, Christchurch attracted a large number of migrant workers from other countries participating in rebuilding projects. Since it is widely accepted that construction industry is a labour-intensive industry, trade labours' duty performance could generate considerable influence on success of whole projects. Therefore, the research object of this paper is onsite and trade labours, such as carpenters, electricians, plumbers and machine operators, rather than professions, such as architects and engineers. However, migrant construction labours have relatively poorer performance compared with local workers (Cangiano 2012). Thus the aims of this research are to identify the critical factors that impact on the performance of those migrant trade workers by using Christchurch as a case study.

2. Research Methodology

This paper is composed mainly based on desktop research and gathered all information in a systematic and objective way, content analysis, which is a "research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff 2013).

All possible factors identified in next sector are text units available for analytical efforts. Then, four groups are invented for categorise these variables "to generate knowledge and to increase understanding" (Downe -Wamboldt 1992)
labour performance. Furthermore, an analytical construct is operationalized to sort through these factors based on their properties and existing researches. The next step of the research is to generate corresponding inferences answering questions and supporting hypothesis, the group particular factor belongs to and the importance and severity specific factor bring with. After all analysis processes, the last procedure is to assess and validate the evidence and result, ensure its reliability and validation.

3. Review of Previous Study

Sutermeister (1976) pointed out that individual's overall performance could not be merely and simply measured by "how hard and how well people work". By reviewing the previous studies in relation to the construction workers' performance, factors influencing individual performance could be catalogued four groups. They are *personal factors, technical factors, organizational factors, and social and other external environmental factors*. This section will detail the factors identified from literature review under each category.

Table 1: A group and summary of the factors affecting labour's performance identified from literature review

Categories	Factors
Personal Factors	a. Education
	b. Training courses
	c. Capability, skills and previous working experiences
	d. Individual's level of aspiration, aptitude and personality
	e. Cultural difference including language barrier
Technical Factors	f. Technical development – tools, equipment and plants
	g. Material management
	h. Construction method and work flow
	i. Different products and its degree of mix
Organizational Factors	j. Indirect workers and professionals' management
	k. Physical conditions – including weather condition and secondary disasters – including after-shock
	l. Organization structure and its efficiency

	m. Organization policies –salaries, incentive and punish policies n. Corporate atmosphere, culture, cohesiveness, and cooperation o. Mutual communication – between labours and project managers p. Size of work group q. On-site management – health, safety, congestion r. Common goal s. Leader's relationship – with his own superior t. Leadership – professional capability u. Labours' participation v. Union
Social and other External Environment Factors	w. External physical, political and economic circumstances x. Attitude towards Male / Female workers in the industry y. Governmental restrictions - employment duration, re-recruitment, quota limitation, legal support, complex and complicated procedures for work visa z. Techniques support from local authorities

3.1 Personal factors

a. In measurement of labours' productivity, ***Education*** (Sutermeister 1976, Han et al. 2008) plays a key role because the knowledge they learnt from schools, such as secondary technical education and apprentice programs (El-Gohary, Aziz 2014), enable them to understand practical skills and measures applied in industry. However, it is the reality that most construction labours immigrated developed counties with low education background, leading to slow learning curve, which means they require more time to study related skills and to understand host counties' construction industry (Han et al. 2008).

b. The importance of ***training courses*** regarding local building codes, building acts and popular methods (Dai, Goodrum & Maloney 2009, Kazaz, Manisali & Ulubeyli 2008, Sutermeister 1976) were mentioned repeatedly by previous researches. Regardless of many companies' efforts, training and education programs for improving labours' performance in these companies are ineffective and inefficient (Han et al. 2008). And it is a common phenomenon that currently a lot of countries around the world lack of occupational training programs in construction sector (Kazaz, Manisali & Ulubeyli 2008). For example, construction industry is the economic sector with the lowest formal training programs in the

US (Georgine et al. 1997). Fresh labours those entered the in the construction industry recently are eager to learn related workmanship and technological requirements for their better and more qualified competent performance. Meanwhile, this knowledge is valuable for experienced labours to understand requisite requirements for products in the local industry. Furthermore, besides long period working experience, this is also requisite ability for their future career plan, such as being a foreman and construction manager (Kazaz, Manisali & Ulubeyli 2008). Moreover, company owners are reticent to invest money into providing them with professional training courses because these investments could be completely wasted when employees handed in their resign letter, a common phenomenon in construction industry due to high mobile and high turnover rate. Another on-site training method was proposed by Dai et al. (2009) that younger labours could be trained by and learns knowledge from senior crafts workers. In addition, Alinaitwe, Mwakali, & Hansson (2007) suggested on-site training should be studied and formalised so that labours who learnt knowledge through this training mode could obtain official certificates.

c. Migrant labours' ***capability, skills and previous working experiences*** are the primary elements contributing directly to their performance (Ng, Tang 2010, Jarkas, Bitar 2012, Han et al. 2008, Shehata, El-Gohary 2011, Tsehayae, Fayek 2014a, Sandbhor, Botre 2014). Nasirzadeh & Nojedehi (2013) simulated the labour productivity including related influencing factors in the sector and they believed skilfulness is a considerable factor influenced labours productivity, which contains "current work experience, minimum required work experience and amount of workforce". Compared with white-collar working in high-technology industries, the most important index indicated normal labours' performance on site is how capable they could complete tasks, regardless of certificates they hold. It is undoubted that all companies prefer to recruit skilled labours (Han et al. 2008) because labours without required basic skills and experiences need more time to accomplish the tasks assigned, associated with lower quality of products (Alinaitwe, Mwakali & Hansson 2007, Kazaz, Manisali & Ulubeyli 2008). In contrast, labour with experience working at similar activities is a guarantee for works performed in a definite standard. As a result, corresponding labour salaries and possible reworks could increase the entire project costs and generate profound impacts on productivity (Durdyev, S., Mbachu,J. 2011, Ghoddousi, Hosseini 2012), consistent with findings of Burati, Farrington, & Ledbetter (1992). In addition, it is easier for managers to supervise details and requirements in similar activities. And level of skill and experience were also ranked at first as the factor have highest impact level in the group of personal factors (Durdyev, S., Mbachu,J. 2011, Enshassi et al. 2007), which is further supported by El-Gohary & Aziz (2014) and rated the factor first among all factors impacting labour productivity. In order to accelerate reconstruction in Christchurch it is quite important to continuously attract skilled builders and experienced professionals to participate in recovery projects. However, to ensure both quantity and quality of these reconstructed buildings, it is essential to carry out an assessment of migrant labours' experience obtained in their mother countries for testing its application in host countries and confirming the specific skills and amounts required there. Because another common issue is that experienced labours are usually strongly resistant to learn and adopt popular

construction method in host countries; it takes them a long time to be competent in a new construction environment (Ghoddousi, Hosseini 2012).

d. The speed labours studying techniques and the quality of tasks they performed are considerably depending on their ***level of aspiration, aptitude, moral and personality*** as well (Enshassi et al. 2007, Zuo, Wilkinson & Seadon 2013, Sandbhor, Botre 2014), which is also supported by Ng & Tang (2010) that " labours' spirit/morale would be direct determinant of project success; and Abrey & Smallwood (2014) pointed out that, because of its high rate of work-related illness, poor life quality of construction labours contributed to their attitudes and moral to their jobs. Jarkas & Bitar (2012) pointed out that motivated labours are more "enthusiastic and initiative", work harder and reacted faster. The importance of "craftsperson motivation" is greeted with a chorus of approval by data bank, project management, and trade (Tsehayae, Fayek 2014a).Another very common phenomenon is that labours lack contentment and loyalty to the company (Han et al. 2008) because they would say "goodbye" to their original bosses and even enter another industry if they got a better position with higher remuneration. Labours' attitude towards a job is also very important because, for example, absenteeism (Soekiman et al. 2011, Rivas et al. 2011) is a critical issue, "limiting investment in human capital and constraining efforts to shape workplace culture" (Kim, Philips 2014), due to possible "sickness, fatigue, alcoholism, personal problems, and time for personal activities" (Rivas et al. 2011). And high turnover rate (Soekiman et al. 2011, Thomas, Sudhakumar 2013) of construction labours not only lowers construction labour productivity, but also reflects low loyalty of these construction workers to their companies in another way, commonly due to "disappointed salary, working close to home, lack of incentives, short-term contracts, better work system, and supervisor treatment". It is an interesting phenomenon that worth for attention that, compared with youths, older workers are "more likely to stay continuously" because they have financial pressure for their wives and children (Kim, Philips 2014).

e. ***Cultural difference including language barrier*** is the primary factor contributing to the difficulty for immigrants' integration of local community (Han et al. 2008) and misunderstanding between labour and supervisors (Sandbhor, Botre 2014). Concluded by Dustmann & Fabbri (2003) that proficient language skills positively assist migrant workers in employment probability and those with poor English fluency experienced lower incomes. While communication problems could result in misunderstanding of instructions from site foremen or project manager and unfriendly relationship between them (Enshassi et al. 2007, Han et al. 2008, Thomas, Sudhakumar 2013), employees strongly accept that basic translation service might help them to understand instructions and further accelerate speed of a task and produce positive influence on their performance. Construction workplace hazards vary from one project to another. The communication difficulty not only inhibits migrant labours' integration, but also impedes interpretation of site hazards, which lead to occupational health and safety risk (Trajkovski, Loosemore 2006). Moreover, food, homesick, religious differences and negative attitude toward migrant labour (Han et al. 2008) are also problems they faced in reality.

3.2 Technical factors

f. ***Technical development*** contributing to employees' performance in construction industry normally includes heavy machinery, such as excavator, and tower and mobile crane, which have solved preliminary site preparation works including land formation, drainage excavation, and materials transport within site; as well as electronic tools, such as power saws, nail guns, and wrenches, which have enabled craftsman to perform their tasks perfectly, effectively, and accurately (Rivas et al. 2011, Tsehayae, Fayek 2014b, Sandbhor, Botre 2014). Alinaitwe et al (2007) said in some remote areas, availability of these heavy engineering equipment and vehicles should be improved, at least for hire. Furthermore, compared with nailing by hammer, nail gun and other tools such as power saws and drills prominently improved workers' performance, in terms of products' quality and time saving. In contrast with full-time staffs who are provided with tools, it is expected that part-time and casual workers could bring with their own tools partly (Alinaitwe, Mwakali & Hansson 2007). In addition, breakdown of tools or equipment (Ghoddousi, Hosseini 2012, MR et al. 2005, Soekiman et al. 2011, Thomas, Sudhakumar 2013), due to any inappropriate utilization and maintenance, is a very common reason lowering labours' performance. And it is very interesting that considerable time wasted for searching misplaced tools (Tsehayae, Fayek 2014a). The application of advanced equipment and quick-response to breakdown tools and machinery are not only effective for enhancing labour productivity, but also could placate other issues such as safety (Kazaz, Manisali & Ulubeyli 2008).

g. ***Material management*** is a major issue in quality management of construction companies and also considered as a primary factor influencing construction labour productivity by a lot of researches, which is generally caused by insufficient finance, delayed order, inaccessibility of items, and excessive time expended to acquire them (MR et al. 2005, El-Gohary, Aziz 2014, Rivas et al. 2011, Soekiman et al. 2011, Thomas, Sudhakumar 2013, Sandbhor, Botre 2014). Material and consumables shortage in some districts is the first difficulty encountered (Abrey, Smallwood 2014). It is impossible to accomplish a construction work without necessary materials if there is any material shortage (Enshassi et al. 2007, Ghoddousi, Hosseini 2012, Kazaz, Manisali & Ulubeyli 2008). More serious shortage may occur in some disaster stricken districts (Kijewski-Correa et al. 2012); they have experienced scarcity of resources because local transportation system had been destroyed, such as road, railways and airport (Singh 2007). Although experienced project managers are eligible to ensure sources of material procurement, false delivery is a very common phenomenon on construction site, in terms of size, colour, amount, brand, delay, and etc. On the other hand, in-site material transportation usually has negative impacts on labours performance and productivity. For example, it is sluggish and idleness period if a work has to wait for others moving the material he need or any equipment available for a specific operation (Dai, Goodrum & Maloney 2009). Another less impact reason but indeed commonly appeared in reality is management team is difficult to place an order for specified and enough materials in a short period because to planning and design change (Kazaz, Manisali & Ulubeyli 2008).

h. Numerous studies have pointed out that ***construction method and work flow*** are crucial issues in the whole life cycle of a project (Ghoddousi, Hosseini 2012, Nasirzadeh, Nojedehi 2013), which are mainly because of poor planning and unrealistic design (Alinaitwe, Mwakali & Hansson 2007) and carried out by owner and engineer(Durdyev, S., Mbachu,J. 2011). And unclear and incomplete technical specifications is ranked as first factor (Jarkas, Bitar 2012) for consecutive interruptions and disruptions to whole progress because requesting related clarification is time-consuming. Meanwhile, project time could be, usually very common, delayed remarkably by corresponding reasons, such as variation and revision, which lead to rework, different work arrangement. During tight preparation stage, it even lacks coordination among designers of various disciplines; therefore, incomplete and unclear instructions and documents always make trouble to on site workers. Then, time, quality and costs of the project would be influenced due to these new requirements. Moreover, systematic flow of work has been great impact on labour productivity. For example, any deviation from normal flow of work and pool flow planning could adversely impact on labour productivity (Kazaz, Manisali & Ulubeyli 2008).

i. Because of ***different products and its degree of mix***, which is regularly divided into residential dwelling and commercial building, there are significant differences of requirements between the two groups, in terms of scale, design, technical difficulties, building service requirements, ventilation devices, and safety requirements (Durdyev, S., Mbachu,J. 2011). This is also agreed by the findings of Jarkas & Bitar (2012). In contrast with residential building, commercial projects normally require higher quality standards and involve with more complex system to ensure the particular purpose and functions. As a result, it is improper to simply compare labours' productivity in these two groups.

3.3 Organizational factors

j. A lot of recent researches have focused on ***indirect workers and professionals' management;*** the administrative behaviours occurred in management level and with external professionals including late issuance of construction drawings from designers, frequent variations (El-Gohary, Aziz 2014, Soekiman et al. 2011). This is also supported and further specified by Durdyev, S., Mbachu,J. (2011) and MR et al. (2005) that proper coordination between subcontractors have been most influential on-site productivity constrains. These white-collars' performance including administrative staffs, engineers and experts, results in smooth project coordination, planning, standardization, simplified construction methods and reduced material wastage, which makes invaluable contribution to project and company success. Vice versa, any variation issued by architects or engineers would generate apparent impacts on an entire project; for instance, re-works, redemptive activities and stoppages (Alinaitwe, Mwakali & Hansson 2007, Dai, Goodrum & Maloney 2009, Enshassi et al. 2007, Rivas et al. 2011, Thomas, Sudhakumar 2013, Sandbhor, Botre 2014) come along with drawing errors, architects' instructions and failure to follow specifications. Engineers' stringent inspection and their long responding time of information request (Jarkas, Bitar

2012, Sandbhor, Botre 2014) are also attributed to those factors impact on construction labour productivity.

k. It is broadly recognized that labours' performance could be enhanced and improved by providing them with a comfortable and pleasant working environment – ***Physical site conditions*** (Durdyev, S., Mbachu,J. 2011, Abrey, Smallwood 2014, Alinaitwe, Mwakali & Hansson 2007, Ghoddousi, Hosseini 2012, Han et al. 2008, Kim, Philips 2014, Nasirzadeh, Nojedehi 2013, Tsehayae, Fayek 2014b). In construction industry, all the factors including harsh noise, dusts, fumes, gases, asbestos, sufficient lighting and ventilation especially for working carried out in confined spaces, music or broadcast onsite, statutory rest time and accommodation location, clean drinking water provided and suitable degree of temperature and humidity, weather, overtime, site congestion, shift, are considered as important elements which could generate impacts on workers' performance. The most attractive factor in those is weather, which emphasized by almost all researchers, which could have impact on construction process and duration since most construction activities carried out in open environment, then resulted in delay and over-budget. However, labours could still demonstrate their high loyal and moral attitude towards their duties even within a dirty and messy working environment if the management level prepared all the conditions they need and carried out all activities for improving these physical conditions (Sutermeister 1976).

l. ***Organization structure*** (Sutermeister 1976), which usually reflected by an organizational chart illustrating the hierarchy and interrelationship within a company, have generated considerable recent research interest. A challenge was suggested in 1940s that a "tall" organization structure with many layers and fewer sub-ordinates becomes more popular than a more flat and decentralized conventional structure. However, the tall structure is too centralization and be lacking of confidence in employees (Kazaz, Manisali & Ulubeyli 2008). Accompanied with development of management theories and appearance of larger firms, the two structural patterns have been combined and a new organizational chart named matrix model was proposed and applied extensively in construction industry. In matrix model, while each project manager takes in charge of separate project, relevant departmental employees with specialized knowledge and skills, who are monitored directly by the president, also coordinate with these project managers and other front-line professionals regarding the demands of labours, materials and machines. Therefore, compared with other traditional organization structures, not only front-line labours and foremen can report progress and their needs to the project managers, but also on-site technical and administrative employees can acquire professional advices and suggestions from related higher-level departments of parent company. ***Organization's efficiency*** is important because "if an organization is perceived by the supervisors and employees to be inefficiently run, it would be extremely difficult to motivate them to improve their job performance".

m. Most new employees, when they entering new firms, were intended and motivated to do their best in new positions and desired for a satisfactory performance. However, this kind of passion may be destroyed or destructed by inappropriate ***organization policies***, including ***salary, incentive and punishment system, motivation regulations*** (Han et al. 2008, Kim,

Philips 2014, Thomas, Sudhakumar 2013). Salary is a basic, but also the most important reason why individuals have to work in a job; therefore, the amount paid and timely payment are the two elements individuals care about (Kazaz, Manisali & Ulubeyli 2008, Nasirzadeh, Nojedehi 2013). A case study (El-Gohary, Aziz 2014) pointed out that migrant labours, working in developed districts without any insurance protection, could be motivated and satisfied by a monetary incentive scheme, leading to higher efficiency achievement. This is also consistent with the migrant labours' expectation in construction industry of Kuwait (Jarkas, Bitar 2012). It is a common example that an improper job evaluation system applied, which cannot align duties' difficulty with appropriate wage and salary level, could produce obstacles to the working enthusiasm. However on the contrary, fair and reasonable policies help organizations and individuals to erect a framework of attractive and satisfactory environment. Recent study found that a lot of labours considered "*better salary offers or salary expectations*" as the primary factor for turnover rate in a company (Rivas et al. 2011). In addition, some other factors including "*working close to home, lack of incentives for foreign labours, short-term contracts, and supervisor treatment*" are also important reasons why they want to find a new job.

n. ***Corporate atmosphere, culture, and cohesiveness*** established by the founder, president and other top positions can exert far-reaching influence on the organization and subordinates' perceptions. It is considered as core value in a company as it clarified values and attitudes the company required in routine works. Meanwhile, duties performed by *a cohesive group* may show others their intensive cooperation and strong team spirit; consequently, great social satisfaction could be received. Furthermore, these group members' morale could be enhanced with better performance and improved productivity. ***Cooperation*** relationship between contractors, designers and clients could lead to claims and dissatisfaction (Ng, Tang 2010, Sturts Dossick, Schunk 2007, Durdyev, S., Mbachu,J. 2011). From personal point of view, cooperation is a harmonious behaviour established on trust between teammates, which enables holistic resources and all members' talents could be collaboratively effect on achieving the project success (Ng, Tang 2010, Tsehayae, Fayek 2014b). Furthermore, companionship and good communication between labours and their colleagues including superintendent are also emphasized as employees' motivators. As a result, they may perform much better if they desire to do their work or even crush on the job. Moreover,

o. Another major current focus in labours' performance management is ***mutual communication*** **between labours and project managers** normally due to "inaccurate instructions, inaccurate drawings (Alinaitwe, Mwakali & Hansson 2007), and inadequate information (Dai, Goodrum & Maloney 2009), which will motivate both sides' working performance and attitudes. However, the achieved level of mutual understanding depends on various factors including the relations, contents, communication directions, network used, obstructions of communication.

p. Smaller ***size of work group*** (Sutermeister 1976) facilitates mutual communication and emotion exchange between group members. There is no fixed ratio and it depends on trades' nature, team leader's capability, and opinion of higher-level superior (Rivas et al. 2011).

Moreover, it is likely for teammates to have more knowledge of the relations between their contribution to the job and their incomes, thus it is possible to motivate them to work.

q. ***On-site management*** policies have direct effects on labour productivity, such as *site congestion resolution, feedback and performance review system, work discipline, and health and safety plans* (Ghoddousi, Hosseini 2012, Han et al. 2008, Kazaz, Manisali & Ulubeyli 2008, Rivas et al. 2011, Thomas, Sudhakumar 2013, Tsehayae, Fayek 2014b). Safety is the most important factor during production life-cycle in any industry. Because of the complicated nature of tasks and trades, construction industry is a hazardous sector with various accident types (Liao, Chiang 2012), such as fall and tumble, hit by hard object, and exposure to hazardous substance, and etc. "Lack of welfares" and unfair treatment between local and migrant labours in terms of rest time, accommodations, housing facilities, and medical services may exasperate workers on site and raise unpredictable results (Han et al. 2008). The function of a clear and unambiguous site layout is incredible for both managers and labours to understand the location of tools, supporting utilities, and site offices (Kazaz, Manisali & Ulubeyli 2008). Tsehayae & Fayek (2014b) pointed out that "job site orientation program" for newly recruited labours are a factor with important rank affecting construction labour productivity.

r. A reasonable ***common goal*** (Sutermeister 1976) shared by both leaders and members, which usually influenced by the reaction of the members to their leaders, should include both sides' interests. Therefore, labours' performance and productivity could be improved if the common goal satisfied both parties' needs. For example, publics' perception about the whole construction industry could be negatively affected by poor building quality (Abrey, Smallwood 2014).

s. A group ***leader's relationship with his own superior*** (Sutermeister 1976) is crucial for his leadership style applied in his team. "Behaviour on the part of a supervisor influential with his superior will have a quite different effect on subordinates from the same behaviour by a supervisor who is not influential with his superior".

t. It is undoubtedly that labours' performance at lower level can be affected positively by these managers' successful ***leaders' professional capability*** (Durdyev, S., Mbachu,J. 2011, Ghoddousi, Hosseini 2012, Jarkas, Bitar 2012, Nasirzadeh, Nojedehi 2013, Thomas, Sudhakumar 2013), such as leaders' qualification and experience, setting out reasonable goals for all group members, assigning appropriate positions to suitable person with required skills and/or qualifications, providing regular feedback to labours about their performance, problem resolving strategies and skills for emergent events, clear instruction to labours, and related technical knowledge (El-Gohary, Aziz 2014, Kazaz, Manisali & Ulubeyli 2008, Soekiman et al. 2011). Alinaitwe et al. (2007) revealed that some of the supervisors stopped receiving training since after schools while some others only attained "on-the-job training," any incompetence of supervisors generates negative impacts on other factors. In addition, different types of leadership, which incorporate laissez-faire or free-rein leadership, autocratic leadership, democratic leadership, may cause deep influence on "the activities of

an organized group in its efforts toward goal-setting and goal-achievement". Practically, combination of these leadership types is usually utilized in different environment and period (Sutermeister 1976). Moreover, continues supervision to construction labours and increasing their aware of the existence of inspectors (Kazaz, Manisali & Ulubeyli 2008) are proposed as the most favourable method for avoiding operatives' unproductive activities, such as unscheduled break and wait idly (El-Gohary, Aziz 2014) and possible mistakes carried out by inexperienced labours (Enshassi et al. 2007).

u. ***Labours' Participation*** (Sutermeister 1976) at all levels in a group is proved that it is an effective means to fulfil their egoistic needs and to motivate them in their jobs. The distinction between participation and democratic leadership is that the former type management does not allow employees to set out goals and development directions with leaders; instead, they are encouraged to take part in a discussion with group leaders about the pros and cons of their ideas about problem resolving. Then, decisions could be made by labours and actions could also be carried out by themselves in appropriate way.

v. The impacts of ***union*** (Sutermeister 1976) in an organization can be very divers depending upon if it is strong enough and which country they are in. A strong union could exert its influence almost on all aspects within an organization, in terms of employees' performance, productivity, and technology.

3.4 Social, external and environmental factors

w. A lot of literatures of management theories emphasised the importance of specific environment of a company or plant. In fact, all the factors listed in the table are subject to the specific environment to some extent, such as ***external physical, political and economic circumstances***. Construction industry, which accounts for a considerable proportion of Gross Domestic Product, is a sector matters vital to national well-being and people's livelihood. Any unstable social elements (Alinaitwe, Mwakali & Hansson 2007, Durdyev, S., Mbachu,J. 2011), such as wars, riot, political movement, financial crisis, and boom-bust cycle could influence entire construction industry, in terms of stable resource supply, labour and machine supply.

x. It is no doubt that the whole construction industry is dominated by ***male*** employees, either in developers' companies or design firms, especially in contractors' group because of the property of the sector. However, ***female*** workers have also performed satisfied jobs in some particular trades, such as assistant duties, cleaning works and so on, which could benefit male labours.

y. Because governments in most economically developed countries are apt to prevent foreign labours from being illegally employed for protecting their domestic workers, non-local labours could confronted with a lot of ***government restrictions*** (Han et al. 2008), such as

employment duration, re-recruitment, quota limitation, legal support, complex regulations and lagged supply.

z. ***Techniques support from local authorities*** is also act as directional instructions at Macro-level. For instance, Christchurch Earthquake Recovery Authority (CERA) has been established after 2010 and 2011's earthquake, which issued a lot of recovery strategies including some legislative and/or regulatory changes to disaster management, assist the Earthquake Commission (EQC)'s repair works, technical requirements and building codes. However, it is a critical challenge for firms to comply with New Zealand Resource Management Act 1991, which increased related compliance costs, limitation on activity, stifling of innovation and reduction of efficiency on worksites (Durdyev, S., Mbachu,J. 2011).

4. Conclusion

It is widely accepted that construction is a labour-intensive industry, whose overall success highly depends on labours' performance. However, in some developed countries, that attracted a lot of people from nearby countries and districts, migrant construction labours have relatively poorer performance compared with local workers (Cangiano 2012). This is because they are lack of local experiences, some of them, before they came to hosting countries, even maybe without construction background of education or experience. There is a need for relevant organizations and authorities to plan for the integration of those migrant workers, which not only for improving their performance and skills, but also for providing conditions that enable them to be part of the local communities.

By using a literature review, this paper aims to identify the critical factors that influence the performance of construction migrant workers. It is found that migrant workers' performance could be affected by various factors including their capability, previous experience, the demands for local training course and requirements of local qualification, the technology and construction methods used in the hosting country, together with varied cultural background and language. Other factors such as organisational management, supports from local authorities, peer support and cooperation also played a part. The preliminary review from this paper provides a baseline for measuring the performance of migrant workers in the construction industry.

This paper reports the preliminary findings from literature review for an ongoing research 'Improving the performance of migrant workers in Christchurch during post-earthquake reconstruction'. Based on the findings from the literature review, the next step of the research will focus on designing the questionnaire survey and interview instruments. By using Christchurch as a case study, this study aims to identify the critical factors that influence construction labour performance in reconstruction activities the outcome of this research is expected to develop guidance for creating a platform to improving the performance of migrant workers; and thus the improved workforce development in the entire industry.

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Owner-Driven Reconstruction in India: A case-study of Kosi River Floods in Bihar

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Abstract

An Owner-Driven Reconstruction (ODR) approach was adopted in the Indian state of Bihar, post 2008 Kosi River floods. This ODR was unique as it was piloted prior to policy formation. The paper discusses preliminary observations from empirical investigations conducted in two settlements of Bihar - Orlaha and Puraini, during 2012 and 2014. The aim was to identify 'key processes' or effectiveness of ODR approaches that enhance long-term disaster-resilience of housing and community autonomy. From the case-study investigations, one of the themes – community facilitation is discussed, with its positives and negatives for future replication.

Keywords: Owner-Driven-Reconstruction; Resilience; Participation; Disaster recovery; India

1. Background

1.1 Linkages between disasters and disaster-resilience

Internationally, there is a growing consensus on the linkages between a hazard event and disaster-resilience (IFRC 2004; UN-Habitat, UNHCR & IFRC 2012). Disaster responses offer an opportunity to 'build back better' housing as well as enhance community's disaster-resilience. This consideration is implicit in United Nations Disaster Relief Organisation (UNDRO) guidelines for shelter after disaster and in Sphere guidelines (Davis 1978a; UNDRO 1982). For example, 'Build back better' was first coined by a special envoy and former US President, Bill Clinton in a report to the UN Secretary-General. According to them, the concept suggests improving the living condition of those at-risk to disaster through an effective reconstruction process (Jha et al. 2010, p. 225). In essence, building back better is associated with resistance of housing as a physical product (UNNATI, 2008), as well as, is associated with efficient process. Efficient process of reconstruction involves, for instance, changing the collective mind-set/ memory about disaster-risks (Nield 2011) and shifting unsafe construction practices towards safer ones (Niazi 2001b). These community-based reconstruction process is termed as owner-driven reconstruction (ODR), which is found to be

essential for long-term sustainability of housing against future disasters and hence of its residents (Barenstein 2010, p. 149; Lizarralde et al. 2010, p. 29). Hence, the process of reconstruction is equally important, if not more to the housing product.

1.2 What is an Owner-driven reconstruction approach?

Depending on the role of the households (house owners/ renters/ squatters) in reconstruction of their own houses, two dominant approaches to reconstruction exist, as: (i) top-down or donor driven reconstruction (DDR) and, (ii) bottom-up or owner-driven reconstruction. Since this paper mainly focuses on the variations within ODR approach, DDR approach is not discussed extensively.

In an ODR approach, the survivors are enabled and informed to be in-charge of decision-making for the reconstruction of their own house through all its stages (Barakat 2003; Schilderman & Lyons 2011). This approach to reconstruction is not entirely new, as for the poor and the marginalized people, "it is the fall-back mode when people do not receive external assistance" (Schilderman & Lyons 2011, p. 223). The positives of the ODR approach are that participants have a stronger sense of ownership, satisfaction and are able to sustain the disaster-resilience of their housing over long-term due to their engagement and awareness (Barenstein 2010; Ganapati & Ganapati 2009; Hunnarshala 2007a; Lyons 2010). Moreover, the approach turns out to be quicker, cheaper, has potential to strengthen the social capital and also incorporate livelihood (Davis 1978a; Jha et al. 2010; Schilderman & Lyons 2011). Fundamentally what is under investigation in this paper is the merit (or use different similar word) of ODR over the traditional' DDR approach; the latter dominating disaster reconstruction efforts throughout the world. Investigating the merits of the ODR over the DDR approach is conducted through case studies of reconstruction efforts in four settlements in India (out of which two are discussed in this paper).

1.3 The case of India

India, in the last 15 years, has witnessed some high profile rapid-onset disasters such as tsunamis, cyclones and earthquakes as well as slow-onset disasters such as floods and droughts, which happens on a continual basis. The toll of disasters on human lives and the national economy has risen substantially since 1999 (Guha-Sapir et al. 2012). For instance, in 1999 as a result of the Orissa Super cyclone, 10,000 human lives were lost and over 1.6 million houses were damaged; in 2001 as a result of Gujarat earthquake over 1 million houses were damaged; in 2004 due to the Indian ocean tsunami over 10,749 people lost lives and over 1,39,881 houses were damaged; and in 2008 as a result of the Kosi river floods over 222,754 house were damaged (NIDM 2001, 2011). It is because of India's geographical setting and large population - second largest in the world, that it is one of the top ten disaster prone countries in the world. However, being disaster prone seems to have to do more with the country's endemic poverty, unsafe housing practices (non-engineered and un-scrutinised construction), large informal settlements and illiteracy that contribute to the Indian communities being vulnerable to natural disasters (NIDM 2001; SEEDS 2007). Furthermore, with rising threats of extreme weather events from climate change, the need to enhance resilience in housing and in communities in India is an urgent one.

The Indian government has been progressively evolving its reconstruction approach after a disaster. For instance, up until late 1980s, there was prevalence of relief mode, in which the Indian government gave completely built social housing to the disaster-survivors as a charity (Barenstein & Iyengar 2010). In 2001 after the Gujarat earthquake, an ODR approach was adopted for the first time within a reconstruction policy framework on a large scale. Since 2001, ODR approach was adopted again in 2005 following the Kashmir earthquake and in 2008 following the Kosi River flooding in Bihar; with an exception of a DDR approach after the 2004 Indian Ocean tsunami in Tamil (Aquilino 2011; Barenstein & Iyengar 2010). Not only has there been a shift from charity to enabling approach, but the enabling ODR approach is also evolving since its first application in 2001. For instance, there has been a major shift in India's disaster management from government to governance, which is more inclusive of multiple stakeholders for an owner-driven reconstruction (ODR), which was evidenced in 2008.

Many variations to ODR approach are evidenced in India, in on-ground implementation by agencies. For instance, anthropologist Barenstein's (2010) research in the three Indian states - Maharashtra-post 1993 earthquake, the Gujarat-post 2001 earthquake and Tamil Nadu-post 2004 tsunami, identified the following three variations in ODR a) owner-driven without NGO; b) owner-driven with NGO top-up, and c) participatory (Barenstein 2010; Barenstein & Iyengar 2010). Barenstein's (2010) investigation suggests that household satisfaction and ability to maintain disaster-resilience of their housing was highest in approaches 'c' and 'b', due to greater participation in process and NGO support. This example highlighted variation in disaster-resilience outcomes based on variations in ODR implementation (such as agency support -financial support, awareness-raising) and community participation.

This background to India's disaster vulnerability, highlights significance of an effective ODR 'process' for achieving long-term 'outcomes' of disaster-resilience. Also, highlighted in this background are varying degrees of household satisfaction and an ability to maintain the disaster-safety of their house based on variations in an ODR process. Community-participation and agency support are identified as the key to effectiveness of an ODR approach. This understanding leads to asking the following question and sub-question in this paper:

Research question:

How can post-disaster housing reconstruction projects increase the long-term disaster-resilience of at-risk communities in India?

Sub-question:

What approaches to community participation and capacity-building during an ODR approach, are most likely to enhance the awareness and confidence in decision making of at-risk communities?

The intent of this sub-question is to provide data on the community-participation aspect of an ODR approach that supports the development and adoption of locally based ideas by authorities to promote long term disaster-resilience. The following section provides a description of the research approach used to answer this question. This methodology consisted of a series of interrelated 'steps' that allowed for in-field data to be collected which is then presented in the results section.

2. Method of research

2.1 Methodology and method

A qualitative - interpretive methodology is primarily used in this research as it is concerned with identifying issues that influence "*robust results"* (Robson 1993, p. 119) or "*program improvement*" (Blessing 2009, p. 241). Qualitative research seeks to understand a particular context in-depth, including the complexities of people's subjective opinions, practices and product outcomes (Blessing & Chakrabarti 2009). Though the investigation is predominantly qualitative, some features of a quantitative approach are adopted for this investigation. That is, the measure of effectiveness of community participation in 'known' good-practice ODR projects in India is deduced through interviews with 20 people involved in Orlaha settlement and 18 people involved in Puraini settlement (NIH undated). The details of interviews will be discussed later in Section 2.5. Their respective responses were then categorised, per settlement, into related 'themes' using the content analysis method (as described in Beza 2010). This investigation is also informed through site investigations of the two settlements where the researcher verified comments made by the village respondents. This approach is considered a mixed methods methodology (see NIH undated, p. 4-6, Robson, 1993, p. 143-161)

In addition to this mixed methods methodology a 'case-study' approach to identify and examine good practice reconstruction projects, which are empirically based and support the mixed-methodology (Robson 1993). A case study is defined as an empirical inquiry that "investigates a contemporary phenomenon in depth and within its real-life context, especially when, the boundaries between phenomenon and context are not clearly evident" (Schramm 1971 inYin 2003, p. 13). The strength of a case study comes from its ability to draw upon a variety of evidence such as documents, artefacts, interviews and observations, which is not limited to only qualitative evidence (Robson 1993; Yin 2009).

Multiple good-practice projects of ODR in India have been selected as cases to be studies, to overcome the potential weakness of case-study research. For example, a case-study research method is criticized for its lack of rigor and limited basis for generalization of study's findings beyond immediate case study. Yin (2009) suggests, through 'replication logic' that if multiple good-practice projects with similar or complementing factors (processes) are selected and they arrive at similar results, then it has potential for 'analytic generalization' (Robson 1993, p. 161). For the logic of replication, to identify effectiveness of ODR approaches, multiple good-practice projects were selected, which shares similarity in three key components: (i) disaster-resilience incorporated in housing design and construction; (ii) an ODR approach and (iii) an upfront consideration for capacity building (see table 1 for the case study selection process).

2.2 Selection of case-studies

Despite these similarities in selected case-studies, variation was sought in terms of the multiple-hazard exposure, local housing typology, building practices, years since the completion of the project and agency's setup. Such variation was essential in order to conduct comparative case-study analysis of ODR processes after 2001 Gujarat earthquake and after 2008 Kosi Floods. This paper focuses on the two projects in Bihar, as highlighted in red box in table-1.

Table 1: Criteria for the selection of case-studies (Adapted from Charlesworth and Ahmed, 2012)

	Reconstruction programme	Post-2001 Gujarat earthquake reconstruction program		Post-2008 Bihar Kosi River flooding reconstruction by ODRC	
Key selection criteria	Agencies involved	*Abhiyaan + Hunnarshala*	*SEEDs*	*ODRC (Hunnarshala,* SEEDs, PiC, CEPT etc.)	
	Resilience features explicitly incorporated in housing	√	√	√	√
	Owner-driven	√	√	√	√
	Upfront consideration for capacity-building	√	√	√	√
	Special mention/ awards	UN-Habitat, UNHCR & IFRC 2008			
Variables	Hazard exposure	Earthquake, drought		Cyclone, floods, storm	
	Location	*Bhuj*	*Patanka*	*Supaul*	*Madhepura*
	Project wholly or largely complete	Wholly	Wholly	Largely	Largely
	Years since the project built	12 years old		5 years old	
	Implementing agency setup	NFP	NGO	NFP	NGO

2.3 2008 Kosi river floods and an ODR reconstruction approach

In August 2008, the Indian state of Bihar was severely affected by flooding of the Kosi River. These floods affected over 3 million people, damaged more than 200,000 homes and a significant number of cattle and crops in 1000 villages in five districts of Araria, Madhepura, Purnia Saharsa and Supaul (GoB 2010). Although flooding is a recurring feature in this state (which is covered by a network of rivers and tributaries), the 2008 floods were not usual, as the river-Kosi burst its embankments, upstream – near the Nepal border, changing its natural river course and inundating the so called 'protected area'; which had not experienced flooding for several decades (GoB 2010; UNDP 2009). The result from the flood was a loss of housing and livelihood in the area, figure 1 shows the devastation brought to the crops, cattle and houses in this area by the flood.

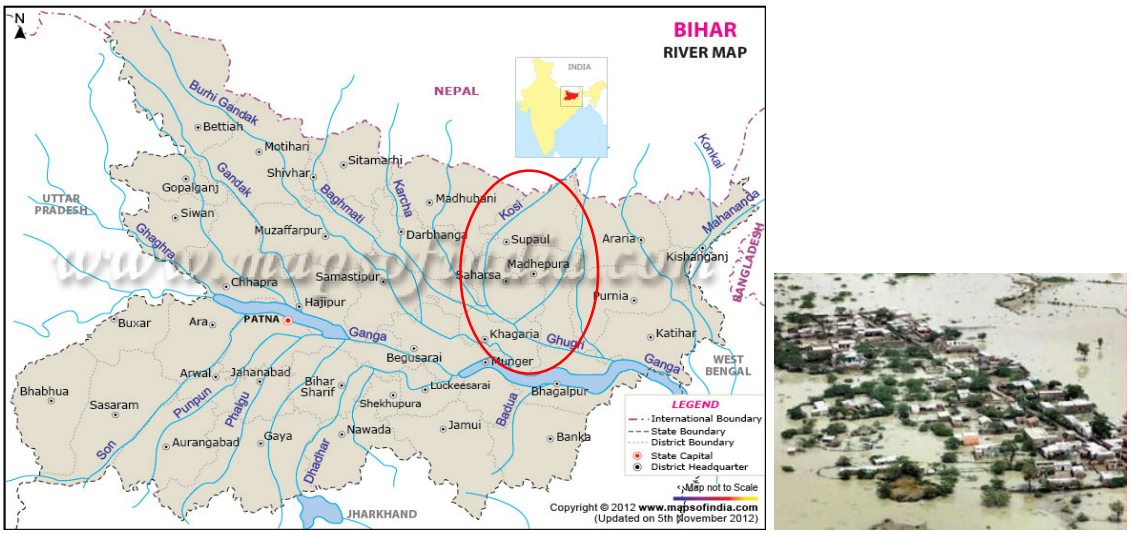

Figure 1: (right) Bihar River map (Source: mapofindia.nationsonline.org);(Left) Devastation by Kosi floods (Source: www.gfdrr.org/indiapdna2008)

An ODR approach was adopted by the Government of Bihar (GoB), in partnership with UNDP, for housing reconstruction in this area, which was implemented by an Owner Driven Reconstruction Collaborative (ODRC). As an element of this ODR process it was piloted in two settlements, prior to policy development which would potentially see it widely implemented throughout the nation. Piloting was conducted because the Republic of India's understanding of ODR has and is evolving in terms of its: i) fundamental properties, ii) in-field use, and iii) mainstreaming in Government policy. The ODRC was comprised of a network of Institutions with experience and expertise in community-led post-disaster reconstruction (Government of Bihar & ODRC 2008; GSDMA & UNDP 2005). Such a collaborative approach to reconstruction, where piloting is done prior to policy implementation, is exceptionally new (there is no reference to support this claim, as not much has been written about it).

These ODR projects were overseen by two Indian development-oriented agencies, these are Abhiyaan and SEEDS. These agencies were selected by the Government of Bihar, to be involved in 2008 reconstruction, because of their history of involvement in developmental-projects since 2001 reconstruction, in the aftermath of the Gujarat earthquake. Hence, it was expected that these two agencies, having worked on ODR projects, would have some insights to share in terms of ODR approaches that worked (or why not), how might and/or how did the ODR approaches change over the years and what are the implications of these changes.

The ODR process was piloted in two settlements of Orlaha and Puraini. The hemlet / tolas (i.e. settlement) of Orlaha was located close to the Kosi dam in the Supaul district and Puraini tola was not in close proximity of the dam, in the Trivenigung block in Saharsa district. ODRC's purpose of selecting two hamlets was "(i) to bring faith back in people that they can do reconstruction", (ii) to ensure that the process need not be completely unregulated and (iii) provide monetary support money via Bihar government's Development Organisation (BDO) (Rawal 2012personal interview). The intention of this pilot project was to construct climate resilient houses, promote sustainable livelihoods and environment through empowering communities to own the reconstruction process (NIDM 2011). To demonstrate an ODR process, the ODRC carried out the following activities in the two pilot-project settlements:

- Damage and needs assessment,
- Building of five demonstration houses, in Saharsa (Lisa 2010),
- Development of technical guidelines for hazard safe and culturally appropriate technology application (Government of Bihar & ODRC 2008),
- The reconstruct of two pilot villages – Orlaha and Puraini in Supaul District, for which a financial package was developed (PiC 2010), and
- The creation of the Kosi Setu Kendra (KSK) (i.e. the bridging between locals and authorities) at the local village level and between the District Management Support Units (DMSU) levels for the realisation of 'social-hubs' that allow for dialogue between these parties (Government of Bihar & ODRC 2008).

Since the completion of pilot projects, recognising the success of this model, the Government of Bihar has up-scaled the ODR process to support the reconstruction of 100,000 houses in the worst affected districts of Madhepura, Saharsa and Supaul (GSDMA & UNDP 2005). To focus the research effort in this paper a discussion of the piloting of ODR process and its outcomes in the two

settlements of Orlaha and Puraini, Bihar are discussed in the following sections.

2.4 Sampling strategies

The method of sampling within the selected multiple cases was based on 'purposing sampling' (Robson 1993). The purposing sampling approach is guided by a theoretical/ conceptual framework, which provides flexibility and guides the researcher to carry out an initial sampling of households and agency members, based on the information from 'gate keepers' or 'key informants'. This information is then used to direct the selection of the final sample site(s) and interview respondents (Robson 1993). In partnership with the site selection approach and a review of literature (i.e. Barenstein, JD & Iyengar, S 2010, Lyons, M, Schilderman, T & Boano, C 2010, 2011, Lizarralde, G, Johnson, C, Davidson, CH, 2010), the theoretical framework/ conceptual focus of this research was positioned around three ODR areas:

1. Capacity building,
2. Spatial design and construction, and
3. Funding mechanisms.

To support and enhance the quality of data provided by the above approach a triangulation method based on Mason (2002) was conducted in the study sites. Hence, information, such as the evidence of housing condition, its cultural appropriateness to the place and community perceptions about safety, was sought from three groups of people implementing the ODR approach in the study sites: beneficiaries, non-beneficiaries and agency members. These groups are conceptually illustrated in figure 2.

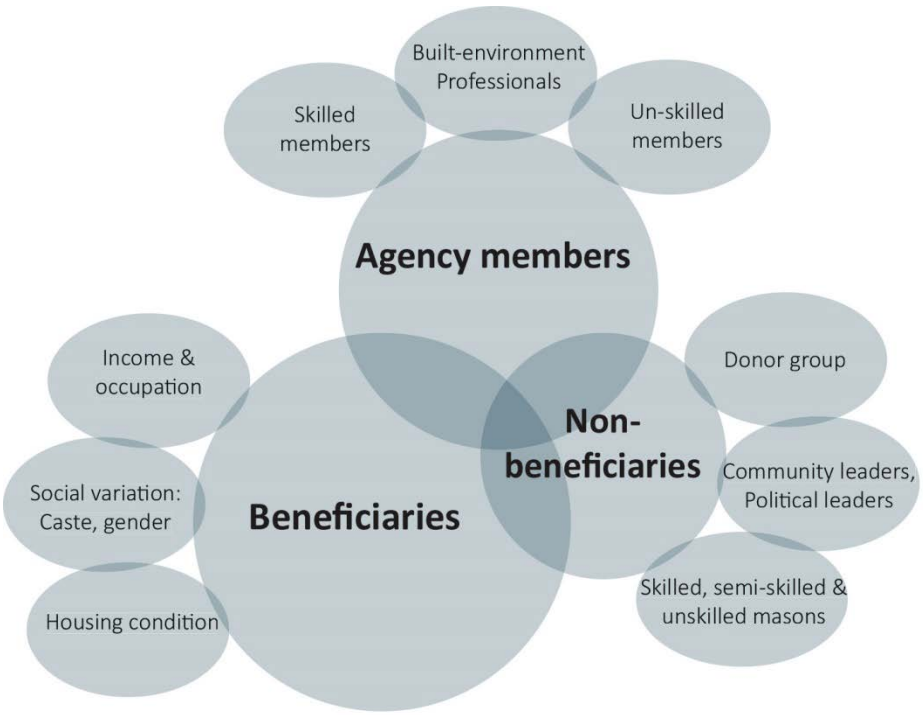

Figure 2: Triangulation of information source samples

In case of Bihar, the key informants were 'local social workers', which were identified during a

stage-1 phase - reconnaissance field trip to India. This reconnaissance trip was conducted in Nov-Dec 2012. From this field-trip it was understood that people in Bihar identify their community based on their caste and economic status. Figure-2, illustrates the variation in beneficiary selection based on their 'social profiling', or their socio-economic status and housing condition. Figure-2 also shows the variation within each group of respondents. The sampling was done inductively, with the support of a key in-field informant, during a second field-trip to the area in November-December 2014. A final selection of appropriate samples of households was done inductively, with support of key-informants (social workers), during a stage-2 field-trip to Bihar in 2014.

Hence, a small sample of about 8-9 households/ beneficiaries, about 3-4 non-beneficiaries and 6-7 agency members were identified as sufficient to give an understanding of the entire project. More beneficiaries were selected as compared to non-beneficiaries and agency members combined due to the purpose of this study, which is to identify the impact of agency projects from the perspective of the households.

2.5 Data collection techniques, analysis and interpretation plan

Qualitative techniques such as face to face semi-structured interviews and focus group discussions with the selected samples, comprised a main aspect of this empirical investigation (Mason 2002; Robson 1993). A semi-structured interview tactic was considered appropriate for this study as it stands halfway between an emergent, open-ended interview technique and a well-defined, structured interview technique (Robson 1993). In some instances, for example, with non-beneficiaries, focus groups were found to be beneficial to the data collection process as compared to one-on-one interviews, as often, people in the surrounding area tended to join in the conversations.

An obstacle to overcome in this research is that many of the respondents in the Bihar area are illiterate and it was fond that conducting small interview surveys were more appropriate than self-administered, postal surveys or questionnaires. In essence, the small survey atmosphere allowed for the researcher to speak with the respondents in their native tongue and to develop a measure of satisfaction with various aspects of ODR approach (on a sliding scale of 1-5). The survey followed the procedure as the semi-structured interviews. Table 2 shows the number of respondents in each survey category.

Table 2: Sample size in settlements of Orlaha and Puraini

Settlement Name	Households	Beneficiaries	Interviewees
Orlaha	110	41	9 Beneficiaries 11 (Agency members + Non-beneficiaries)
Puraini	102	89	8 Beneficiaries 10 (Agency members + Non-beneficiaries)

In addition to semi-structured interviews and small interview surveys, secondary data such as agency documentation/ publications of the project were also used (Robson 1993, p. 269). Other architecture discipline specific visual techniques such as photographs, sketches of houses and settlement (immediately after reconstruction and present day) and were also adopted where found necessary.

A three-tiered approach was adopted for the analysis of data generated in this research. These three stages are not conceived as linear but rather iterative or an on-going process. They are: i) Establish a theoretical proposition / analytical framework; ii) Conduct mixed-method research analysis (inductive + deductive) and iii) Refine the theoretical framework (Yin 2003). The theoretical framework consisted of three conceptual focus areas, as discussed before. For the qualitative data, thematic analysis was used to group the outcomes into key-themes, whereas for quantitative data SPSS software is used. The three conceptual themes that were derived before the stage-2 field-trip (as mentioned above), were amended as noted in table-3, below, due to site-specific circumstances in the settlement areas under investigation. This paper focuses on the preliminary analysis of the qualitative data from the field-trip to Bihar in 2014. Note that due to the length requirements of this paper the quantitative data is not discussed in this work. The key themes that emerged as part of this analysis of qualitative data are discussed in the following section.

3. Key themes – discussion

In context of the research question- 'how can post-disaster housing reconstruction projects increase the long-term disaster-resilience of at-risk communities in India?' four themes have emerged as key-processes during ODR in Gujarat and Bihar. These themes have emerged based on the analysis of the interviews, focus groups and observations of the housing in settlements under investigation.

Table 3: Key themes from ODRC case-studies

Theme-1	**Community mobilisation and facilitation for maintaining effective engagement**
a)	Beneficiary selection
b)	Social facilitation process leading to formation of the "*Kosi* setu kendras" (KSKs)
Theme-2	Disaster resilient house design and construction: Is owner-driven equal to owner designed and built?
	Model house for spatial understanding
	Legalising traditional construction technologies
	Is owner-driven equal to owner-build?
	Incentive based timely completion
	Access to basic amenities – drinking water, sanitation and power
Theme-3	Modes of financial assistance and livelihood incorporation during ODR process
	Land titles resolution
	Financial assistance – in household's control (male and female)
	Livelihood incorporation/ diversification
Theme-4	Participatory governance
	Participatory governance great as a concept – but does it really work?
	Transition from civil society to local government

Table 3 shows these key-themes where Theme-1, for example, was identified as capacity building during the literature review, but was modified to 'community mobilisation and facilitation for maintaining effective engagement' after the field-study. An unexpected result was identified during the field-study and is noted as theme-4 - 'participatory governance', which played a significant role in ODR process's long-term effectiveness. To address the question in this research (How can post-disaster housing reconstruction projects increase the long-term disaster-resilience of at-risk communities in India) and to, adhere, the length requirements of the conference paper theme 1 and its associated two sub-themes are discussed, in context of Bihar.

3.1 Theme 1: Community mobilisation & facilitation for ODR process

Within theme 1 - community mobilisation and facilitation for ODR process, two sub-themes that emerged are: a) beneficiary selection and b) Social facilitation process. Sub-theme 'a' relates to the beneficiary selection (of who gets the house, how many houses and conflict resolution in terms of land-rights or not being on beneficiary list etc. The second sub-theme is about setting up of a team for managing a social mobilisation and facilitation hub (later on, this social hub was termed as "Kosi Setu Kendras" (KSKs)). These social-hubs were formed to enable the local communities to make informed decisions during the process of their housing reconstruction. Both these sub-themes (see table-3) have had either positive and/or negative impacts on community engagement and hence on overall effectiveness of ODR approach adopted in Bihar.

Sub-theme 1: Beneficiary selection

In Orlaha settlement, 41 households, out of approximately 110 households, received housing assistance from ODRC. Despite most of the houses being damaged due to their temporary nature (made from untreated bamboo, grass and mud) and being inundated in flood waters for months, not all received housing assistance. The process of beneficiary list amendment seemed largely irrelevant as one widow in Orlaha could get her name added to the list while the other could not get her name added to the list. Hence, one widow- Kaliadevi Sardar, received a house (of exactly the same size and design as model ODR houses) (see figure 3, left) and another widow – Gitadevi Mandal, despite her urgent need for a house, did not receive housing assistance (see figure 3, right). The reason for the discrepancy was due to the fact that the village people decided in favour of Kaliadevi and not Gitadevi, which came about at a later stage, after the beneficiary list was publicly displayed by GoB in the village during conflict resolution strategy with support of ODRC. Questions may arise as to why didn't everyone receive a house and why wasn't Gitadevi's name added to the beneficiary list?

Figure 3: (left) one of the widows whose name got added onto beneficiary list for housing (right) another widow who missed out on housing assistance, Orlaha, Bihar

In the Puraini settlement, on the other hand, 89 out of 102 households received housing assistance. Despite almost everyone's name being on the beneficiary list, a discrepancy still happened in Puraini, through the number of houses allocated per family. For instance, if one parent had 3 boys, they were given assistance for the realisation of 3 houses; one house was in the name of the parents and the other two in name of two of their eldest children. It was assumed that the youngest son would share the house with the parents and after parent's death, that house would be passed onto that youngest son.

However, some influential people managed to get housing assistance for their parents as well as all their brothers. To everyone's surprise (as suggested in the interviews), the 'panch' or the village leader, did not receive such benefits, as he was not a corrupt man. A central question that arises is, why did this discrepancy occur and was allowed to occur.

Issues of beneficiary selection have emerged time and time again, despite good policies or good intentions of agency. In the case of Bihar, beneficiary selection was the responsibility of GoB, which was carried out by the Block Development Officer (BDO) and the mukhiya (political leader at the block level) (Yadav 2014). The ODRC was not responsible for beneficiary selection. However, the ODRC assisted community members by maintaining transparency by displaying the beneficiary list in the village and by taking a matter of dispute to GoB for negotiation and/or resolution (Virmani & Iyengar 2014). Despite such support, the ODRC could not do much with modifying the beneficiary list. Overall, there was dissatisfaction amongst households (in both, Orlaha and Puraini) and amongst agency members regarding beneficiary selection as housing assistance did not reach some "those who were in real need of a house at that time" (Yadav 2014, p. personal interview).

To investigate whether this discrepancy was based on the socio-economic condition of the locals, the researcher looked at the social-profile of the place. In both the settlements, people identified their communities based on their caste and status, with an established hierarchical structure. Table 4 presents the hierarchical structure in the villages under investigation, with '1' as highest social status and '4' as lowest. There was no evidence of social or caste-based discrepancy in beneficiary list. In fact, one of the widows who is Muslim (whose name was on the beneficiary list prepared by GoB), received housing assistance and land-purchase assistance due to support from the villagers. The evidence of no caste influence was also shows in the fact that no major social tension seems to have emerged amongst various caste-based communities due to the discrepancies in beneficiary list.

Table 4: Caste-based community hierarchy in the settlements of Orlaha and Puraini
(1 = highest social status and 4= lowest)

Social profile of Orlaha	Status (high to low)	Social Profile of Puraini
Mandal (agricultural land owners, contractors)	1	Mandal (agricultural land owners/ Master masons)
Patwa (labourer – agricultural/ construction)	2	Rajput (driver, migrant labourer)
Muslim (labourer – cotton quilt makers)	3	Mehta (land owners)
Sardar (labourer- masons/ bamboo artisans)	4	Harijan (labourers)

Usually, the households with higher-caste, such as Mandals, were also the ones who had financial power. One of the local social worker said that "with money came social power and voice" (Yadav 2014, p. personal interview). It was this power which seems to have played a significant role in discrepancy in beneficiary list. Some households pointed the finger at a local leader, the mukhiya, who was argued to be corrupt by these same household's and took advantage of this opportune moment to make money. The locals who were financially well-off could get more houses or get their names added to the beneficiary list, by paying money to the mukhiya. This example highlights influence, power and corruption as part of the beneficiary selection process during an ODR, led to household dissatisfaction.

To some extent, local ignorance about the reconstruction process also played a role in beneficiary selection. Locals had never in the past witnessed assistance for rehabilitation of permanent houses. So, in initial stages when assessments were carried out to identify beneficiaries, the locals were not sure what that 'processes meant to them. Partly, the reason why people did not know about the process was because they had fled the disaster area and an attempt to make contact with residents was ever initiated by the local government. As a result many locals were not present during the on-site reconstruction discussion, to ensure their names were on the beneficiary list.

Despite the discrepancies in the beneficiary list, it was refreshing to see how resilient the communities were, rebuilding their own houses based on observing an agency-supported housing approach. In future, a social worker pointed out during an interview that there needs to be a system whereby on-ground implementing agency (such as ODRC) should be able to correct + amend the beneficiary list (Yadav 2014).

b). Social facilitation process leading to formation of the "Kosi Setu Kendra" (KSKs)

Within the theme of community mobilisation and facilitation, the second sub-theme is about setting up of a team for managing a social-hub, that is, the Kosi Setu Kendra (KSK). The reporting of this sub-them also addresses this paper's sub-question: What approaches to community participation and capacity-building during an ODR approach, are most likely to enhance the awareness and confidence in decision making of at-risk communities?

One KSKs was provided for every cluster of two or three 'panchayats' or for every 2000-3000 houses, one KSK was provided (Acharya 2014; Rawal & Virmani 2012, p. personal interview). During pilot stage, a group comprising of 1 engineer, 2 social workers, 2 master masons and 1 manager was formed as a 'social-hub'. This group was in-charge of community mobilising and facilitating the reconstruction process. This social-hub played a significant role in enabling community engagement thought out the ODR process.

In preliminary stages of ODR process, the most essential task of social-hub and its team was to gain trust of the local people in allowing an external agency to support them with their own housing reconstruction (also termed as mobilisation). The ODRC had teamed up with a local NGO called Meghpain Abhiyaan and others, to identify and involve social workers and masons who are local - familiar with the local culture, technology and language. The social workers provided support with the task of social mobilisation – going from one house to the other, explaining why it was important for the community members to build disaster-safe housing (Yadav 2014). It was this process of building people's trust in the agency, which was one of the most challenging tasks, but the most important process.

Once the trust was established, all the legal and financial issues were resolved through facilitation process. For example, a process of liaison with banks, opening a bank account and having a man and women's name as joint account holders, was facilitated by ODRC, so the households could receive money for their housing reconstruction. Given that the majority of people in these settlements of Bihar had never had a bank account, as they were illiterate and considered women to be merely a 'housewife', this process was challenging. However, due to an initial trust-building

exercise, people put their faith in the ODRC. Land titles were another major issue, given that it was a rural setting where no legal papers were made for land holdings – it was all informal. For the agencies to support households built a permanent house, land-titles were mandatory. Hence, ODRC facilitated the process of locals getting land-titles cleared and also helped financially to those who did not have any land (Acharya 2014). The team of ODRC thus provided social support to the locals in raising awareness and disseminating information from government and identifying issues and resolving them collectively.

During pre-construction and construction phase, when few different model-houses were built, for finalizing financial package and proposing choices of various construction technologies, the ODRC's team worked closely with the local masons. There was a two-way exchange of information. For example, the technical team learned from the local masons, the use of 'fita' (recycling waste zip material) for tying bamboo, which was a local innovation so that the rope/ fita lasts longer and costs less (Acharya 2014). On the other hand, the social-hub acted as technical skills training centre for local masons to ensure the construction met hazard-safety measures. In this instance, the local masons were trained in rat-trap brick masonry and bamboo-connection refinement for multi-hazard safety (Satyanarayanji 2014). On-ground, the team at the social-hub also provided technical support mechanisms to the locals in purchasing materials, bamboo treatment, monitoring the construction quality and timely access of financial assistance at key construction completion stages.

The process of building the locals' trust or mobilising them, was the most important process as it laid a strong foundation for the effectiveness of the ODR process. During facilitation, a combination of social and technical support to the local construction sector as well as local households ensured their engagement. The KSK team acted as a communication and facilitation node in Orlaha and Puraini, up until the completion of housing and toilet construction, street layout and street-light installation, after which they withdrew from the site. Almost all the households interviewed – beneficiaries or non-beneficiaries, in Orlaha and Puraini were completely satisfied with the consultation process and said that "without ODRC's support, their houses wouldn't have been built in time and of good quality" (Satyanarayanji 2014).

4. Conclusion

The aim of this paper was to identify 'key processes' of the ODR approaches that enhance long-term disaster-resilience of housing and community autonomy. The aim of this paper was achieved by investigating the ODR approach used in Bihar, post 2008 floods, which led to long-term positive outcomes of owner-driven and disaster resilient housing. This paper discussed what the ODR meant in comparison to DDR, presented the case of India with particular focus on 2008 Kosi river floods and its two pilot projects. A case-study approach to research, and a thematic analysis of these multiple case-studies was explained. Four themes have emerged from preliminary investigations of field-study that were conducted during 2012 and 2014, in the settlements of Orlaha and Puraini. Out of the four themes, this paper focused on the presentation of material related to theme 1 - community mobilisation and facilitation for maintaining effective engagement. Two sub-themes within theme-1were discussed, highlighting some of the positive and negative results of processes; which are stated below.

The first sub-theme highlights a need for more equity in beneficiary selection, as that was found to be a disappointing aspect of the ODR process. Time and time again, the main reason that emerged for a discrepancy in the beneficiary selection process is influence, power and corruption amongst local political leaders. Thankfully, due to the presence of the ODRC, an external collaborative, and its social-facilitation allowing for the resolving of community disputes, the beneficiary list issue did not create social tension / divide (which has been evidenced in Tamil Nadu and Sri Lanka, post 2004 tsunami (Mulligan & Nadarajah 2012)).

The second sub-theme, community mobilisation and facilitation, highlights the success of set up of a team dedicated to be nodal agents between government and community (known as KSK). The facilitation process handled by the team was successful at building trust and at providing hand-holding support to the locals and ensuring their engagement, through all stages of the ODR process. This bridging of people from social, technical and management backgrounds, was the key to the success of the facilitation process which was aimed at enhancing local people's autonomy and rebuilding their confidence in building a hazard-safe house.

Hence, the key process that emerged from theme-1 is to have a strong community mobilisation and facilitation team, which is made up of locals – who are aware of the local language and culture. The channel of information and communication from government to the community worked fairly well, however, the process of channelling the local peoples' discontent upstream to the government (e.g. the beneficiary list) did not seem to work efficiently. In Bihar, within theme-1 of community mobilisation and facilitation, these two processes played a negative and positive role in determining peoples' satisfaction and their autonomy in housing resilience.

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A proposed flood risk assessment method for Central Vietnam

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Abstract

Vietnam is vulnerable to multiple hazards, particularly in the central region. It is the most hazard-prone area in Vietnam, where the significant flooding occurs every year and causes huge loss of life and property. This region is impacted by both unfavourable terrain and human interference leading to environmental damage. Roust flood risk assessments are needed to mitigate the extreme flood risk and increase community preparedness for seasonal floods for Vietnam, particular in Central region. Adopting the risk assessment process in AS/NZS ISO 31000:2009 and a risk assessment technique in SA/SNZ HB 89:2013, this paper explores the characteristics of flood in Vietnam, analyses the causes of flood in Central region, and proposes a flood risk assessment method for Central Vietnam.

Keywords: Natural disaster, River flood risk, Flood risk assessment, Central Vietnam

1. Introduction

Disasters cause a 42 million death toll worldwide between 1980 and 2012, of which over 80% occurred in low and middle-income countries [1]. Natural hazards often lead to disasters when they interact with populations and development [2]. Losses from weather related disasters are envisaged to increase because of the increasing exposure of people and assets [3]. Catastrophic natural hazards cause disastrous impacts on community as illustrated recently by Typhoon Haiyan that struck the Philippines in early November 2013, inflicting over 6,000 deaths and US$ 13 billion in economic loss [4].

Vietnam is among the most populous countries in the world, with about 90 million people in 2014, and 71.4% of the population exposed to disaster risk [5:4]. As in many developing countries, this high level of exposure is due to the differential vulnerability of communities and insufficient capacity to cope with potential negative impacts of hazards [6:16]. Vietnam recently ranked seventh in the ten countries most affected by extreme weather events in the 1994 to 2013 period [4] and fourth in the top 15 countries with greatest population exposed to river flood risk worldwide [7]. Located in the tropical monsoon area, with more than 3,450 rivers and streams, and a coastline of 3,260 km, many residents live along waterways and coast; and their lives are heavily dependent on climate. From 1997 to 2006, floods caused significant losses, including 7,500 dead and missing people, and asset damage equivalent to 1.5% of GDP [8:116]. Vietnam has an agriculture economy with about 80% of population living in rural areas [9], and the impact of flooding is particularly devastating poor communities.

The focus of this study is on Central Vietnam, justified by the frequent occurrence of severe floods in the region, mainly owing to its topography [10] and human interference in the hydrological system [11]. Besides the focus of defending against floods such as dike, early warning, it is also necessary to focus on managing flood risks. It is urgently called for thorough flood risk assessments to mitigate the extreme flood risk and increase community preparedness for annual floods in the region.

Vietnam lacks the integrated disaster risk and vulnerability data at national and local scales [8:122] that would form the basis for building a well-defined regulatory management framework for disaster resilience. Adopting the risk assessment process in AS/NZS ISO 31000:2009 [12] and a risk assessment technique in SA/SNZ HB 89:2013 [13], this paper explores the characteristics of flood in Vietnam, analyses the causes of flood in Central region, and proposes a flood risk assessment method for Central Vietnam.

2. The characteristics of flood in Vietnam

Vietnam is extremely vulnerable to flood risk, with over 260 events reported from 1990 to 2010 or with average 12 storms occurring every year [14]. Statistics of annual main storms (from Category 6 to 12) struck Vietnam from 1961 to 2014 (see Figure 1) show that storm frequency is increasing. The storm season extends from May to December, which strikes the Northern part from May to October, the Central from June to December, and the South from July to December (Table 1). Floods caused by rising river water during the rainy season in inland areas or by tsunamis in coastal areas. The communities in rural and coastal areas have all sources of income depending on climate. The flood always affects the low-income communities. People and industrial development tends to largely concentrate in vulnerable areas such as flood-plains and coastal areas, suggesting that the consequences of flood risk will even increase in the future [15].

Table 1: Time of flood season in different regions in Vietnam (Source: Hydrometeorological Data Center http://www.hymetdata.gov.vn/)

Regions	Stating time	Ending time
North	May-June	September-October
North Central	June-July	October-November
Central and South Central	October	December
Central Highland	June	December
South	July	December

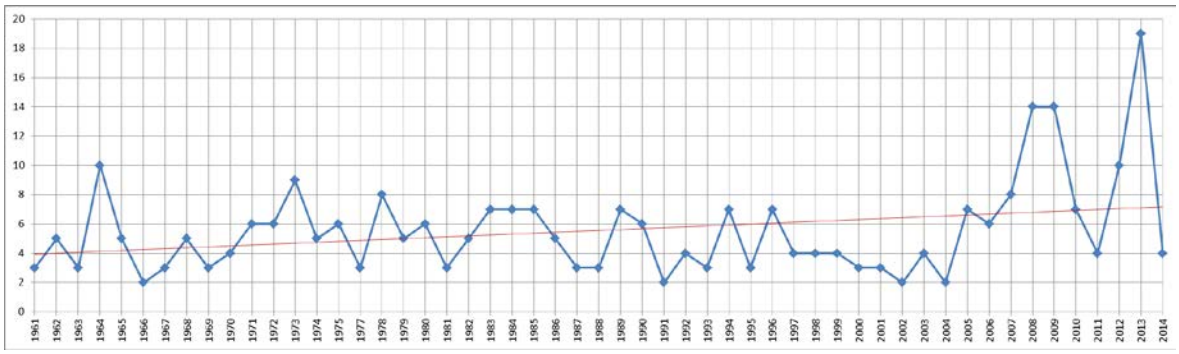

Figure 1: Statistics of annual main storms (from Category 6 to 12) struck Vietnam from 1961 to 2014 (Source: compiled from [16]). (Note: Category 6, 7, 8, 9, 10, 11, and 12 have average wind speed of 39 to 49 km/h, 50 to 61 km/h, 62 to 74 km/h, 75 to 88 km/h, 89 to 102 km/h, 103 to 107 km/h, and 118 to 133 km/h respectively).

Food risk in Vietnam results from the tropical monsoon climatic features, densely river systems, long coastal line, and densely populated in riverine and coastal areas due to advantageous livelihood conditions [17]. Vietnam can be divided into three regions: the North, the Central (including Central Highland) and the South. Due to the topography, each region has its own flood risk. In the North, five largest hydropower plants on Da river basin effectively control floods. Flood control capacity of reservoirs on Da river basin only is 7 billion m^3 per 10.5 billion m^3 of the whole hydropower system. Flooding in the South (Mekong River Delta) is mainly caused by storms, tide and sea level rise [18]. The livelihood in this area is affected by the hydropower development at upstream of Mekong River in China, Laos and Cambodia such as the fisheries, sediment decline and drought [19]. Central part is sloping and narrow. It is divided by rivers which derive from western mountain ranges to the ocean. Due to these conditions, this region is frequently subjected to flood and storm disasters which cause huge losses in human lives and properties [20, 21].

A high percentage of the Vietnamese population lives in flood prone areas, placing them at significant risk of related disaster [22]. We are aware that the developing economies will suffer more disastrous impacts than the developed ones in disasters [23]. The scale of the problem is clearly illustrated by flood damage statistics emerging from Vietnam. The available flood data for 2013 alone (Table 2) suggest that flood disasters have had a severe impact on communities. Between 1989 and 2014, flood resulted in over 14,867 dead and missing (Figure 2) and about

US$11.66 billion in damages (Figure 3). Potential loss of life is considered the most important indicator in flood risk assessment [24]. Meanwhile the loss of human lives remains unacceptably high, with an annual average of deaths and missing people of 572 from 1989 to 2014, and 1997 typhoon Linda alone killed over 3,000 people (Figure 2). The available disaster data suggest that flood disasters have had a severe impact on the people of Vietnam over the years, with little sign of reduction over time, in line with disaster mitigation strategies. The flood damages costs as much as one percent of gross domestic product per year on average (Figure 3); and the costs have exhibited a rapid upward trend. In addition, flooding causes frequent damage to houses, crops, and infrastructure, keeping many rural Vietnamese trapped in a cycle of poverty.

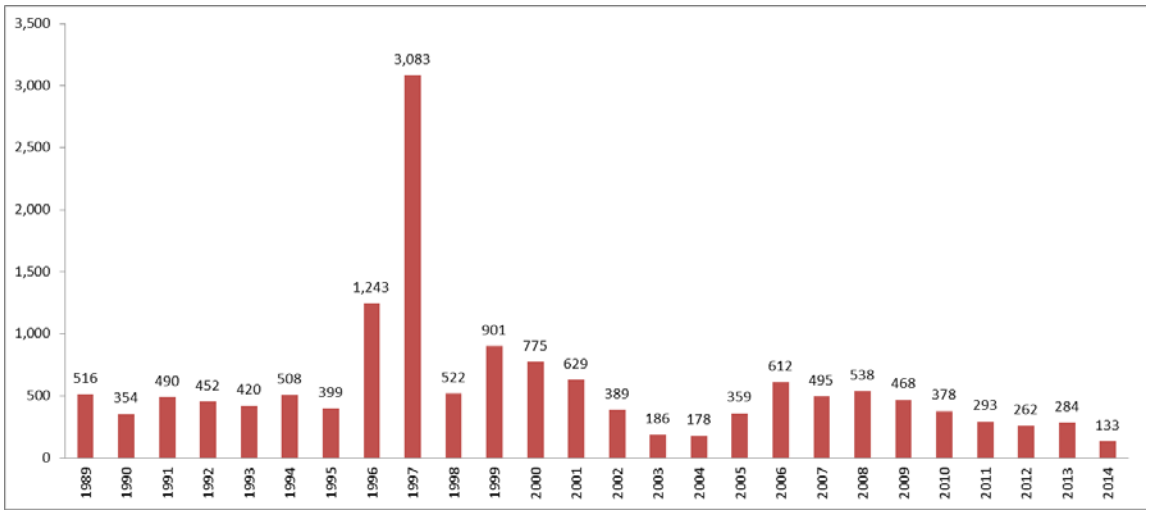

Figure 2: Number of dead and missing people caused by flood from 1989 to 2014 (Sources: compiled from http://www.ccfsc.gov.vn and http://www.gso.gov.vn/)

Table 2: Impacts of flooding and typical storms in Central Vietnam in 2013 (Source: The United Nations in Vietnam http://www.un.org.vn/)

Main damaged items	2013	Wutip (30/9-01/10)	Nari (14-15/10)	Haiyan (8-11/11)	Storm No.15 (14-16/11)
Evacuations	n/a	106,352	123,686	756,022	n/a
Fatalities/missing	277	17	28	14	47
Injured	855	208	116	93	66
Collapsed houses	12,165	528	614	75	414
Damaged/flooded/ unroofed houses	893,317	235,314	109,891	2,526	424,844
Schools damaged/unroofed	n/a	843	21	n/a	n/a
Health centers damaged	n/a	120	n/a	n/a	n/a
Paddy and cash crop damaged	344,745 ha	50,505 ha	21,159 ha	49,412 ha	5,799 ha
Fish/shrimp ponds damaged	n/a	4,724ha	5,603 ha	n/a	151 ha
Lake dams/reservoirs damaged	21 million m^3	75	2	n/a	n/a
Total estimated economic loss	US$ 1,331 million	US$ 647 million	US$ 51 million	n/a	n/a

3. Analysing the causes of flood in Central Vietnam

Vietnam is vulnerable to multiple hazards, particularly in the Central region. It is the most hazard-prone area in Vietnam, where the significant flooding occurs every year and causes huge loss of life and property. The Central region has 1,200 km long coast; consists of 14 coastal provinces and 5 provinces in Central Highland. Truong Son Mountain ranges along with the coast in the Central region, so the plains are fragmented and very narrow. There are many main river systems in the region such as Gianh river in Quang Binh province, Thach Han river in Quang Tri province, Huong river in Thua Thien Hue province, Vu Gia-Thu Bon in Quang Nam province, Tra Khuc river in Quang Ngai province, and Srepok, Sesan, Dong Nai in Central Highland. Most river systems in this region are short and steep with rapid flows [25]. The estuary is often prone to be filled by sedimentation, so the floodplain drainage will be impeded.

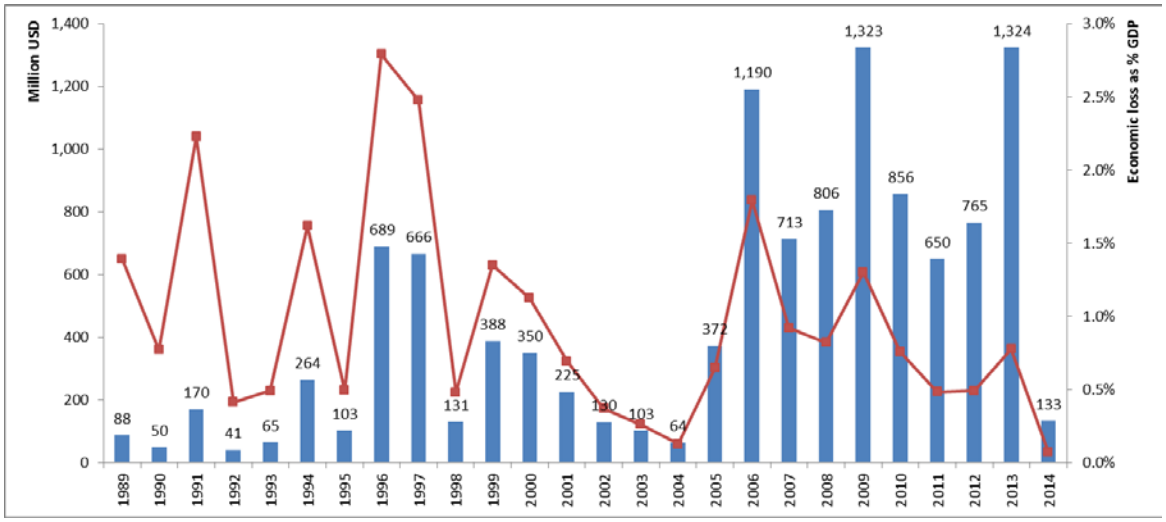

Figure 3: Relationship between economic loss caused by flood and its cost per GDP from 1989 to 2014 (Sources: analysis of damage data from http://www.ccfsc.gov.vn and http://www.gso.gov.vn/; and GDP data from [16])

This region predominantly faces three main types of flooding [25]:

- Riverine flooding, which is caused when river water level rises due to heavy rainfall or storms, and flow onto the surrounding floodplain;
- Flash floods, which occur in the mountainous and highland river basins, are caused by runoff with debris from severe storm in rapid time, with devastating impacts;
- Coastal flooding, which is caused by extreme weather conditions such as typhoons.

Storms affected to Central provinces are often originated from tropical storms and depressions come from the East Sea. Severe storm accompanies by with heavy rainfall, causing river water level rising and flooding the surrounding floodplain. The long and torrential rainfall appears when a storm or tropical depression comes along with a cold front. This may cause serious flood over river basins in the Central Vietnam. Therefore the strategy on disaster management for Central is

to promote flood and storm prevention measures with the government guidelines *'pro-active prevention, mitigation and adaptation'* [26].

The topography of central Vietnam is very steep toward the sea, with few large plains, or forests to contain water, so rapid flooding is a common occurrence. Meanwhile, the construction of large reservoirs, which have the ability to effectively reduce flooding for downstream communities in this region, is limited due to the terrain characteristics. Therefore, the potential for hydropower projects to significantly address flood control tasks in the central region is limited. Specifically, in the Ba river basin, the flood discharge at frequency of 0.02% is 28,483 m^3/s, roughly equivalent to the flood discharge of Da river at Hoa Binh dam. However, the flood prevention capacity of Da river is 7 billion m^3, compared to 165.9 million m^3 at Ba Ha reservoir [27]. This demonstrates that hydropower dams in this region have not effectively controlled the floods. These dams may also generally increase the vulnerability of floodplain communities, particularly when hydropower cascades do not follow strict reservoir operation procedures during flood discharge [11]. Le, et al. [28] report that the operation of hydropower reservoirs on Vu Gia - Thu Bon river basin has not properly followed the multi-reservoirs procedure through simulation data, and surveying of people's experience. As a consequence, the flood control ability of hydropower reservoirs has not effectively performed, which causes disadvantages for the communities at downstream.

Bradshaw, et al. [29] showed a link between deforestation and flood risk at the global scale, a 10% increase in deforestation results in a 4-28% increase in flood frequency or 4-8% increase in total flood duration. Vietnam is still experiencing high rates of deforestation [30] of which the drivers are varied. Forest conversion, which is occurring to allow for infrastructure improvements to support a rapid economic development, is the main drivers. The specific data is shown in Table 3; 3,001 projects have utilised 476,341 hectares of forest from 2006 to 2013. Forest loss in the Central Highland region has the largest portion due to rubber plantation region, industrial development and the cultivation custom among ethnic minorities.

Table 3: Forest loss for other purposes from 2006 to 2013 (Source: [20])

Conversion of forest use to other purposes	No. of projects	Area (hectares)	Proportion
Hydropower development	237	29,582	6.2%
Mining industry	545	15,330	3.2%
Rubber plantation	460	327,205	68.7%
Agriculture production	221	61,964	13.0%
Resettlement	57	5,244	1.1%
National security	99	4,228	0.9%
Industrial zones and ports	73	3,895	0.8%
Tourism and services	122	4,603	1.0%
Irrigation works	80	5,100	1.1%
Rural infrastructure	1,107	19,190	4.0%
Total	3,001	476,341	

The higher intensity of floods was primarily induced by both unfavourable terrain and human interference in the hydrological system. Most of provinces in Central Vietnam are located on floodplains, both inland and coastal. Rapid industrial development, agricultural expansion and population growth have increased vulnerability in riverside areas.

4. A proposed flood risk assessment method for Central Vietnam

Flooding is one of the most frequent and damaging natural hazards affecting societies across the globe [32]. There is a gradual change in flood policy from traditional concept of 'flood protection' towards 'flood risk management' in recent years [33]. The attention in a risk-based approach has been increased; especially the number of severe flooding events is increasing in recent decades [34]. Following this approach, there is emerging trend of integration of risk assessment and Geographical Information Systems (GIS) technology. Meyer, et al. [33] combine multi-criteria decision analysis technique (MCA) with GIS for flood risk assessment of River Mulde in Saxony in Germany. de Moel, et al. [35] build a comprehensive framework for assessing and mapping flood hazard and risk, which is a basic to develop a flood risk based map. Winsemius, et al. [36] present river flood risk assessment at global scale, in which the exposure and vulnerability indicators first are estimated based on population method and land use method, and then are displayed on flood risk maps.

Flood risk poses a common threat to many densely populated areas both in low-lying river basin and coastal region around the world [24]. Flood risk is defined as a combination of a probability of a flood event occurring, and the consequences of that occurrence [1, 37]. Consequences are in turn determined by the level of exposure to that hazard, and the vulnerability of people, property and infrastructure, which are susceptible to, or unable to cope with the impacts [24, 38, 39]. Exposure depends on hazard severity, population size, settlement pattern, land use and networks [36]. Vulnerability can be assessed according to socio-cultural, economic and ecological areas [40]. Flood risk can be measured by determining the likelihood of a hazardous flood and the nature and severity of its consequences.

The application of risk-based approach and GIS technology in flood risk management are widely developed globally. However, there have been only a few application geospatial assessment tools to assess the flood risk in Central Vietnam such as [21], [41], [42], [10], [20] and [43], and lacks of the integration of both approaches. Tran, et al. [21] and Razafindrabe, et al. [10] used standard AS/NZS 4360:1999 for adapting flood risk management framework in Tam Giang-Cau Hai lagoon in Thua Thien Hue province and Da Nang city respectively. However, a specific flood risk assessment was not displayed in these researches. Chau, et al. [20] used a cost-benefit analysis tool for assessment the economic impact upon agricultural production of flood in Quang Nam province. This study showed clearly the economic loss evaluation of flood events. However, this tool is not applicable for risk identification when it does not include ascertaining the causes and sources of risk. Ho and Umitsu [42] integrate a Shuttle Radar Topographic Mission Digital

Elevation Model with a LANDSAT image from flood season to create a flood hazard map for Vu Gia-Thu Bon river basin based on highest flood depth in a flood event of 1999.

Robust flood risk assessments are needed to mitigate the extreme flood risk and increase community preparedness for seasonal floods for Vietnam, particularly in the Central region. A properly designed framework will both enable and ensure an effective risk management, so the risk assessment process is adopted from risk management framework given in Australian and New Zealand risk management standard AS/NZS ISO 31000:2009 [12] (see Figure 4). This is the overall process of risk identification, risk analysis and risk evaluation. The detail of these elements is presented in SA/SNZ HB 436:2013 – Risk management guidelines companion to AS/NZS ISO 31000:2009 [44]. A range of appropriate risk assessment tools are analysed and evaluated in Guidelines on risk assessment techniques SA/SNZ HB 89:2013 [13]. Advice on the general nature and selection of 30 applicable risk assessment tools, are contained in the guidelines. A consequence/likelihood matrix tool, which is strongly applicable for the risk assessment process, is adopted to the flood risk assessment. This tool is used to produce a level of risk based on the combination of a consequences and its likelihood. The flood risk assessment adopted from Consequence/likelihood matrix tool is integrated in a flood risk map through ArcGIS software. Once the context is established, a case study is conducted in a typical province in Central Vietnam such as Quang Nam. The result from a province will be expanded to other provinces because the provinces in Central region have the same characteristics in flood risk. The hazard, exposure, vulnerability and flood risk maps output at local scale are important since they allow planners to identify the most at risk areas, to assess the effectiveness of various adaptation measures, and to have appropriate flood risk mitigation measures.

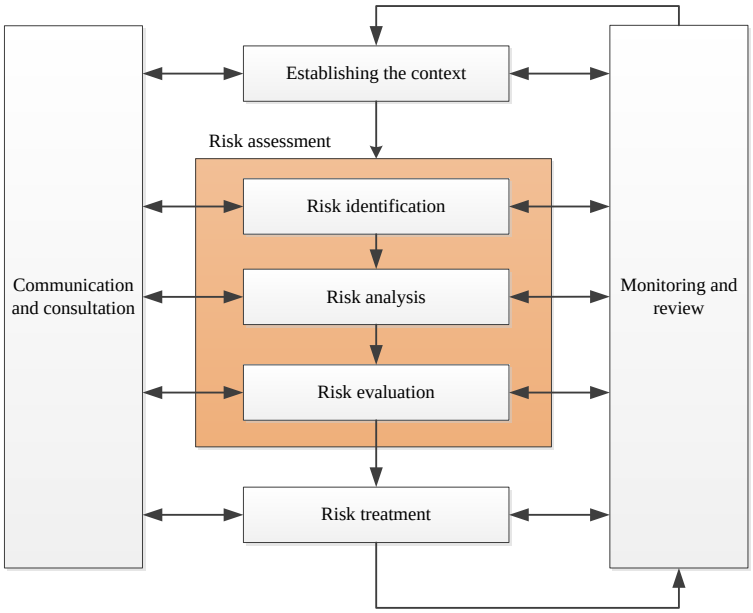

Figure 4: Position of risk assessment within the risk management process (Source: [12])

5. Conclusions

Vietnam is facing with greater frequency and intensity of natural disasters, especially in Central Vietnam. With an agriculture economy and about 80% of population living in rural areas, a series of floods with devastating cause havoc with poor communities. Losing crops and homes in floods and storms keeps many rural Vietnamese trapped in a cycle of poverty. In addition, the loss of human lives remains unacceptably high, with an annual average of deaths and missing people of 572 from 1989 to 2014 and 1997 typhoon Linda alone killed over 3,000 people in Central Vietnam. Therefore, flood risk management should be emphasized on preventing flood events from becoming disasters.

Most of the provinces in Central Vietnam are located on floodplains, both inland and coastal. Rapid industrial development, agricultural expansion and population growth have increased vulnerability. Significantly, Vietnam lacks the integrated disaster risk and vulnerability data at national and local scales that would form the basis for building a well-defined regulatory management framework for disaster resilience. Against this backdrop, an integrated flood risk assessment method, which Consequence/likelihood matrix tool is integrated in a risk map, is proposed for Central Vietnam. The hazard, exposure, vulnerability and flood risk maps output at local scale are a good reference material for planners to identify the most at risk areas, to assess the effectiveness of various adaptation measures, and to have appropriate flood risk mitigation measures.

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Review of Disaster Response Management Challenges from War Operations and Terrorism in Iraq

Paper ID: 339

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Abstract

The entire world is facing an unprecedented scale of disasters with increasing frequency and intensity. We live in a world which has been dominated by crises and natural and man-made disaster. Poverty, epidemics, famine, terrorism, wars, fires, collapsing buildings, volcanoes, earthquakes, hurricanes and floods, are only some examples of many of the crises and disasters which need serious cooperation and solidarity to overcome, particularly in Iraq, which has suffered from military operations and terrorist activity over a number of years.

Although various scholars have researched issues regarding disaster management, few have studied the response management challenges due to the disaster of war operation and terrorism in Iraq. Not much empirical data is available in this field. In this paper, a review of the relevant literature on challenges and obstacles during war operations and terrorism has been conducted by carrying out a comprehensive literature review. This literature includes central and local government ordinances, regulations and reports as well as some research papers.

An attempt has been made to explore the challenges facing disaster response management in Iraq. This exploration focuses on the achievement of the basic functions of management operations (planning, organizing, directing, controlling). The study also seeks to explain various types of challenges facing disaster response management in Iraq.

The findings conclude that challenges and obstacles in Iraq's disaster response management system are concentrated in the planning and organizing stages. This paper also reveals that adequate disaster response management strategies in Iraq are still lacking.

Keywords: Disaster response management, war operations, terrorism, Iraq, planning, organizing, directing, controlling

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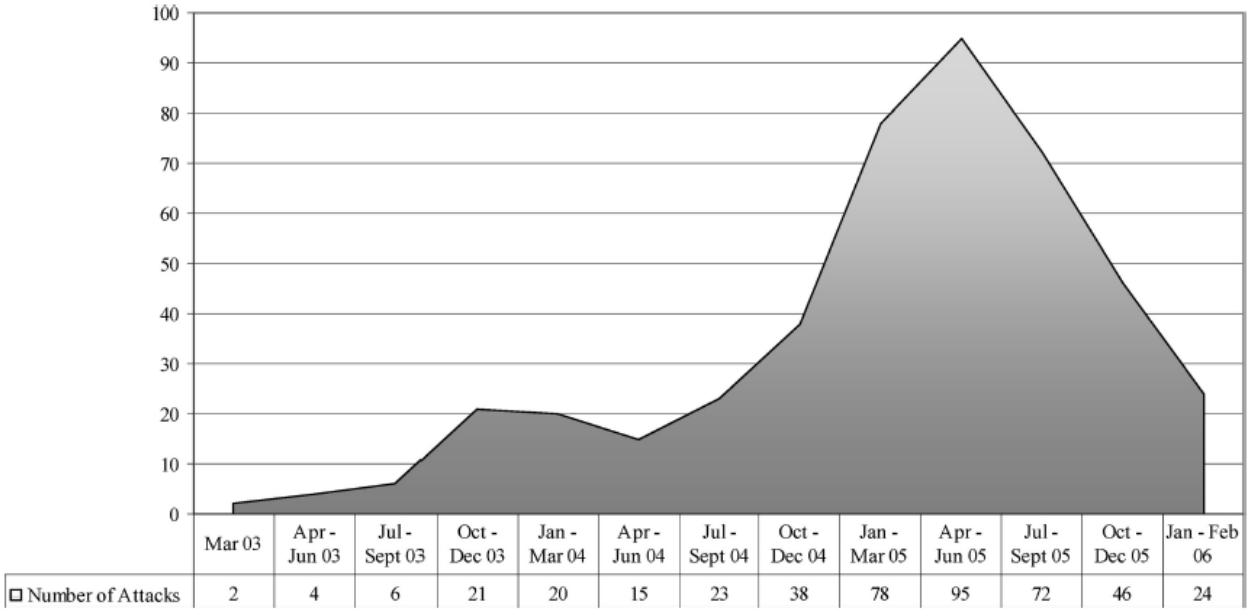
1. Introduction

'Disasters' have become a common word to people all over the world. The entire world is prone to natural disasters as well as to sudden man-made ones, which have been happening frequently in recent history [1]. It is commonly agreeable that there is no way of neutralizing all negative effects resulted from disasters. However, efforts can be made in order to reduce their impacts. In this regard, effective disaster management is a key element in good governance [2] cited in [3]. Because of the increases in the number of natural disasters and terrorist attacks in many countries around the world, Disaster management has gained importance in the policy programs of various countries [4].



	Mar 03	Apr - Jun 03	Jul - Sept 03	Oct - Dec 03	Jan - Mar 04	Apr - Jun 04	Jul - Sept 04	Oct - Dec 04	Jan - Mar 05	Apr - Jun 05	Jul - Sept 05	Oct - Dec 05	Jan - Feb 06
Number of Attacks	2	4	6	21	20	15	23	38	78	95	72	46	24

Figure 1: Number of suicide attacks in Iraq by quarter, 2003–2006 [6 p. 601]

Moreover, continuing terrorist attacks worldwide are likely to sustain attention to disaster response management, particularly in Iraq. Violence in Iraq has also become normalized, ranging from the Iraqi and US military assaults and sectarian militias, threat of suicide bombings, to violent street crime [5]. According to Hafez [6] 443 suicide attacks took place in Iraq between 22nd *of* March 2003 to 20th *of* February 2006. See Figure 1. Furthermore, due to the development of insurgency after the U.S.-led invasion in March 2003, the lethality of suicide attacks has increased significantly. See Figures 2. As a result Iraq was ranked number 1, out of the top 10 countries most at risk of terrorism. As shown in table 1.

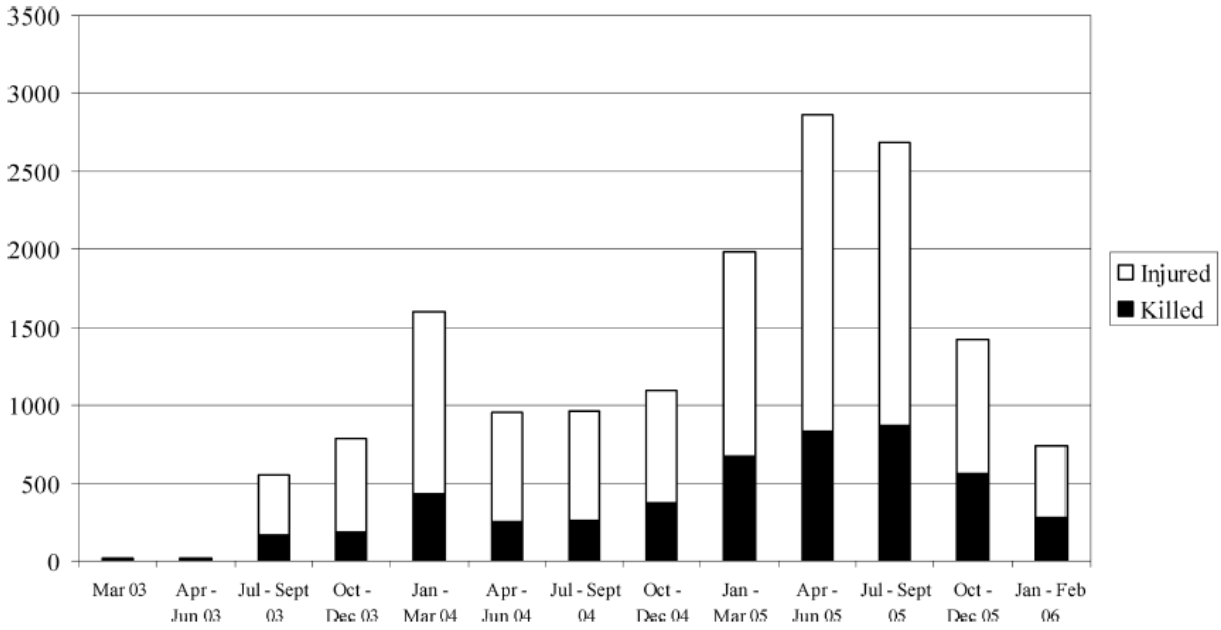


Figure 2: Number of persons killed and injured in suicide attacks by Quater, 2003–2006 [6 p. 606]

According to Goodyear [7] a comprehensive and coordinated disaster management system of risk management is lacking in Iraq which includes a risk analysis based on an examination of hazards and the vulnerabilities and capacities of resident populations and the first responders charged to assist in times of emergencies. As a consequence, stronger infrastructural and technical capabilities within the Government of Iraq (GoI) are needed imperatively to plan for, mitigate and respond to future disasters in Iraq. Furthermore, historically, in Iraq, the response to the disasters have largely remained ad-hoc and reactive in nature [8]. Thus, this paper will first highlight the concept of disaster in general and disaster response management in particular, and then the extent to challenges facing disaster response management in the world and particularly in Iraq will be examined by looking at some examples.

Table 1: Top 10 Countries Ranked by Terrorism Risk, 2010 [9 p. 118]

Rank	**Country**
1	Iraq
2	Afghanistan
3	Pakistan
4	Somalia
5	Lebanon
6	India
7	Algeria
8	Colombia
9	Thailand
10	Philippines

2. Disaster Definitions

In order to better understand the concept of disaster, it is first important to provide the origin of the term disaster. The French word “desastre” is combined of two words ‘des’ meaning bad and ‘aster’ meaning star. Thus the term refers to ‘bad or evil star’ [10]. Many researchers have defined disaster in their research. One of the famous researchers in the field of disaster, Fischer III [11 pp. 2-3] identifies the concept of disaster as “actual or threatened accidental or uncontrollable events that are concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society undergoes severe danger, and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society, or its subdivision, is prevented”. In a similar way, Fritz [12 p. 655] and Lindell [13 p. 797] state that disaster is “an event concentrated in time and space, in which a society or one of its subdivisions undergoes physical harm and social disruption, such that all or some essential functions of the society or subdivision are impaired”.

3. Disaster Management

The following is a brief review on a disaster management definition. Lettieri, Masella, and Radaelli [14 p. 117] defined disaster management as administrative decisions and the body of policy, the actors, the operational activities and technologies that relate to the several phases of a disaster at all levels. Dey [10] and Vasilescu, Khan, and Khan [15] agree with this view, stating that it includes all the activities and the programmes which help to avoid, reduce impact or recover from disaster loss, and these can be implemented before, during or after a disaster.

3.1 Disaster Management Cycle

In order to better understand the importance of the disaster response phase in the disaster management cycle, it is first important to provide a definition of what disaster management cycle are. According to Warfield [16] cited in Vasilescu et al. [15] the disaster management cycle represents the ongoing procedure by which governments, civil society, and businesses plan for and decrease the influence of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Suitable actions at all cycle phases cause better warnings, greater preparedness, reduced vulnerability or the forbidding of disasters during the following repetition of the cycle. He also added that the whole disaster management cycle contains the modelling of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure. Although Iyer and Mastorakis [17 p. 3] point out that the disaster management cycle has four stages, risk reduction, readiness, response and recovery, Gospodinov and Burnham [18 p. 28] divided the disaster cycle into four phases, namely, response, reconstruction, mitigation and preparedness see Figure 3.

Figure 3: Disaster cycle [18 p. 28]

4. Disaster response management

Having defined what is meant by disaster management cycle, disaster response management definition will be reviewed. According to EMA [19 p. 32] response is an "actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support". In the same way, Vasilescu et al. [15 p. 47] defined response activity as initiatives are taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strikes.

4.1 Response management challenges

Much research have dealt with disaster response management, however, some of it reveal many challenges faced disaster response management in different aspect and in various countries.

Beginning with disaster response management framework and factors, according to Cardona [20] the difficulty in achieving effective disaster risk management are due to the lack of a comprehensive conceptual framework of disaster risk which assist a multidisciplinary evaluation and intervention. Cardona [20] emphasis that intervention should be invited because most evaluation techniques and existing indices have not been sufficiently expressed risk and are not based on a comprehensive approach. Similarly, Baker and Refsgaard [21] stated that an adoption of new frameworks was required to make an institutional development in disaster response. Whilst, Baris [22] explained that weak awareness and lack of action of population and institutions is resulted from a lack of knowledge of modern disaster risk factors. Similar to Rudman, Clarke, and Metzl [23] who stated that due to the lack of preparedness standards, it is impossible to recognize exactly what is required and how much it will cost. Pelling et al. [24] added for this concern that devising the tools required for policy makers are considered one of the challenges for integration to make transparent justifications for development policy and the closer operation of disaster. Regarding disaster response program integration, Unlu et al. [4] claim that the success of multi-task response actions rely on the disaster and crisis management integration of programs prepared in diverse disciplines and organisation of a generated cooperation. Chen , Wu, and Lai [25], on the other hand, shed light on the development of supporting ordinances and regulations at different government levels that are needed for the operation of the disaster management system in Taiwan.

A large and growing body of literature has investigated coordination problems. One of this literature Meissner, Luckenbach, Risse, Kirste, and Kirchner [26] study which revealed that in order to save lives and property, disaster response and recovery efforts required coordination and timely interaction of public emergency services. In addition, According to Chen, Sharman, Rao, and Upadhyaya [27], the issue of coordination in the context of emergency response is an understudied research. It is considered an important problem, as it impacts life and property in the affected area. In similar way Unlu et al. [4] describe coordination and management of first-response operations during crises are problematic and ineffective. Particularly, the Turkey system is not designed for different types of crises such as terrorist attacks. While also in Turkey, organizational and institutional problems were found in organizing a suitable disaster management and response system [22]. Whilst, a lack of direct coordination among first responders is considered one of the major operational problems experienced during hurricane Katrina [28]. Moreover, According to Saeed [29] the main problem in disaster response management which lies at the coordination and collaboration of activities of different organizations involved both at the inter- and intra-organization level. Baris [22] argues that the impacts of disasters are dramatically exacerbated due to the absence of a single organizational structure focused on disaster management. Within the same context, Greiving et al. [30] stated that due to a lack of coordination between involved actors; current management of disaster risks is often fragmented. Such fragmentation of responsibilities should be regarded during any coordination of activities. Greiving et al. [30] called this phenomenon as the “problem of interplay” which is defined as a result of the presence of a multitude of actors. Furthermore, IRGC [31] cited in Greiving et al. [30] pointed out problems related to organisational capacities for responding to or monitoring risk as major deficits of current risk governance.

Within the context of hierarchy problems, Baris [22] believed that the abundance of too many units may cause sometimes hierarchy problems when responding. However, Meissner et al. [26] noted that there is a need for both intra and inter organization coordination at several hierarchy levels in order to react not only individually and efficiently, but also in a coordinated manner.

In Pakistan, as regards the coordination between the donor countries and the end beneficiaries, coordination problems have been existed during Pakistan’s 2005 earthquake [32], While in the Southeast Asian region, disaster relief agencies face a number of key challenges that limit their capacity to respond effectively to disasters. Poor coordination between relief agencies and the local government has been resulted [33] from the lack of support from the government of the country struck by disaster. Such lack of support is considered the main stumbling block that hampers disaster relief operations [34]. On the other hand, Fisher [35] stated that the right to deny relief agencies access to disaster-struck country territories has been retained by the government of the disaster-struck country through the primary phase of a disaster relief operation, particularly if the influenced areas are replete with conflict. Relief agencies, in such a situation, have little recourse to international legal preparations to obtain primacy entrance to disaster areas or oblige the government to accept entrance.

In the case of United States, a "gap" happens between the emergent norms that direct social interactions and the bureaucratic norms that dominate governmental activity. It is widely believed

that there is a failure in the relief effort when this gap is large, but when the gap is small the relief effort progresses smoothly, and governmental operations are perceived to be successful [36].

It is widely believed that in the United States the organizational response was typically deviant and chaotic and is unproductive in defeating the long-term goals of the terrorists, though, in Turkey, the institutional organization for disaster management and planning has a chaotic nature, namely the responsibilities and duties of some of the institutions often make confusions [22]. Baris [22] noted that the disaster risk reduction system of Turkey is still mainly centralized. However, Unlu et al. [4] point out that Centralized and decentralized systems have various tasks in various conditions. Despite the centralized organization of the Turkish Crisis Management System provides the government more coordination and control over resource distribution, involvement responsibility with various ministries and national organizations generates a coordination problem [4]. Nevertheless, Smirnov, Levashova, Pashkin, Shilov, and Komarova [37] emphasis on the decision that had been made about future research to concentrate on decentralisation of the decision support system evolution. Smirnov et al. [37] added that such choice can be accomplished through presenting of self-organizing networks.

Regarding planning process, Chen et al. [25] stated that planning process is very critical. Additionally, Planning is essential to being able to take effective and prompt action [38]. However, Saeed [29] noted that the plans of the organizations can be challenged by the unexpected events and dimensions of the disaster. Further, Perry and Lindell [39] pointed out that continuing terrorist attacks worldwide are likely to enhance attention to emergency planning, especially in Western democracies. Whilst, Schneider [36] emphasis that the dependence upon the extent to which post disaster human behaviour corresponds to prior governmental expectations and planning is the key to a successful governmental response. According to Uhr, Johansson, and Fredholm [40] Both the literature and empirical findings indicate that sometimes response operations diverge from existing plans when adapting to an event and its consequences. In the same context, Saeed [29 pp. 3-4] explained that due to the dynamic situation in a disaster, new activities (which have not occurred before) may be required apart from those already planned. So the system should allow ad-hoc creation of activities and dependencies by the command centre or the field teams. Saeed [29] added that new plans have to be made and incorporated with old plans and plans of other organizations. Based on the magnitude of the disaster, one organization might establish more than one command centre. There can be one or more field teams controlled by a command centre. Within the same context, Banipal [28] noted that dependence on the central dispatch centre is considered one of the major operational problems experienced during hurricane Katrina. Banipal [28] explained that due to highly dependent on the central dispatch centre to coordinate emergency response, it is not only prone to human error but also to the events that can influence the command centre including disruption of power, floodwater damage to the building and wind damage to communication antennas, leaving the field officers on their own as it happened in New Orleans.

In the context of creating plans for terrorist incidents, in the US, two problems have arisen. Firstly, the assertion on the existence of a plan as a document rather than an assertion on the planning procedure brings positive outcomes for the threat. Secondly, the literature on planning

for technological and natural disasters has a general lack of awareness in terms of policy actors, elected officials and law-enforcement officials who guide much of the terrorism plan creation [41] and [42] cited in [39 p.336]. However in Taiwan, Chen et al. [25] found a phenomenon that is very analogous to the findings of Lindell, Whitney, Futch, and Clause [43] and Lindell and Perry [44] that lacking full time staff support had significant impact on the effectiveness of the Local Emergency Planning committees in the US. Moreover the planning process doesn't include other organizations, let alone community contribution. Many supporting organizations don't even know what their jobs in the disaster management technique are. Lindell et al. [43] and Lindell and Perry [44] had analogous findings on this matter in the US. Consequently, According to McLoughlin [38] there are opportunities to improve future responses invariably once a government responds. Evaluations are critical to such improvements and should be conducted shortly after the incident while memories are still fresh. The conclusions from these evaluations should be fed back into the planning process.

With respect to providing the right relief supplies for people in need at the right time, it is considered one of the most difficult steps in responding to disasters and emergency situations, as shown by Practice. At the same time sending wrong or too many supplies means losing resources and time [37]. In addition, the effective mobilization of response to extreme events on a large scale is considered one of the least understood problems in public management. So the knowledge base to support response operations in such an event needs to be scalable [45]. Larson, Metzger, and Cahn [46] also states that local first-responder resources are often overwhelmed by large-scale emergency incidents, such as acts of terrorism, human-caused accidents, and acts of nature. While the delays in deployment and mis-targeting of aid concerned is considered one of the shortcomings in federal emergency response, precisely by the Federal Emergency Management Agency, FEMA, during the 2005 Katrina flood [21]. Thus, If the nation does not take immediate steps to better identify and address the urgent needs of emergency responders, the next terrorist incident could have an even more devastating impact than the September 11 attacks [23].

On the other hand, effective response to both natural and man-made disasters requires assessing information prior to, during, and after potentially catastrophic events as well as initiating activities that will lessen their impact upon society [47].

As regards communication, during the 2005 Katrina flood, Failures in communication is considered one of the shortcomings in federal emergency response [21]. However, Banipal [28] found that the inter-operability issue was a major operational problem experienced during hurricane Katrina. Because of the existing system was not scalable enough to support hundreds of additional users, the out of state volunteers were unable to use it. Consequently, to manage the disaster response processes effectively and efficiently the support of ICT is considered a desirable feature [29].

Regarding the financial resources, according to Rudman et al. [23 pp. 1-3] America's emergency preparedness efforts are hampered by some obstacles. Funding for emergency responders that was stalled and sidetracked is considered a major obstacle due to:

a) The slow distribution of funds by federal agencies.
b) A politicized appropriations process.
c) Bureaucratic red tape at all levels of government.

However, Taiwan local government did not have enough budgets to perform all four phases of disaster management [25]. While in Turkey, strong financial resources are needed to agencies responsible for DRR (disaster risk reduction) activities. Such resources are become inadequate when distributed between several units [22].Whilst in Europe, funding is fragmented because fragmentation phenomenon was appeared, in prevention of risk caused by natural hazards, between spatial planning and civil protection [48] cited in [30].

In the domain of disaster response, minutes of delay can cost lives and property, so speed is typically essential. Nevertheless, speed of response must be balanced with good planning and smart assessment to avoid actions that are precipitate and probably counterproductive [49]. Perry & Lindell [39] agree with this view by pointing out two important points. Firstly, quick reactions based upon wrong hypotheses or inadequate information can lead to insufficient protective measures. Secondly, threat assessment is critical and must be performed constantly, even during stages of disaster effect. Moreover, Banipal [28] noted that quick response to disaster has the potential to significantly reduce total loss. Nonetheless, Quarantelli [50] has argued that appropriateness of response is much more crucial than speed.

According to Baris [22] Despite the education about disaster risk is offered in primary and high schools, there is no organized educational program for the general public. There was no consideration for developing standards for community organizations and public education, reaching the public at active, large participation, producing of training materials and training the trainers. However, Harding [51] concluded that social development strategies and human rights principles should be promoted by professionals through political practice and within social work education to face man-made disasters. As a result a social work would be given a central role in avoiding human-made disaster and in reconstruction and development following disaster.

5. Conclusions

It is widely acknowledged that new kinds of catastrophes around the world display that the old-fashioned disaster management style does not work effectively. New catastrophes for instance terrorist attacks and big-scale natural disasters induce governments to design a disaster management that is more effective. Specially, the September 11 terrorist attacks had a major influence on other countries' disaster management paths. Iraq one of these countries which had a lot of wars and terrorist attacks in the last few decades. To have an overall picture about the challenges facing Iraq's disaster response management, an overview for literature has been conducted to highlight the challenges facing disaster response management around the world. Such challenges will set out the next step in PhD research way.

This paper revealed that more challenges facing disaster response management had appeared around the world. Planning and organizing stages in disaster response management have a majority of these challenges. Regarding response planning stage, it is widely acknowledge that the divergent of response operations from existing plans are considered one of the key challenges in this stage. While, there is a lack of knowledge of modern disaster risk factors. Further, supporting ordinances and regulations at different government levels should be developed. Furthermore, to reach integration in disaster management, multi-task response actions should be obtained as well as strong financial resources are needed. However, in terms of response organizing stage, organizational and institutional problems such as coordination and collaboration of different organizations "problem of interplay", hierarchy problems, coordination between the donor countries and the end beneficiaries and deviant and chaotic nature in institutional organization are considered the key challenges in organizing stage. Whilst the dependence on the central dispatch center and communication's failures are considered major operational problems in Response directing stage, the effective mobilization of response to extreme events on a large scale is considered one of the least understood problems in response implementation stage. However, in terms of response control stage, evaluations should be conducted to improve future responses.

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The influence of the social dimension in planned relocation outcomes

Paper ID: 405

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Abstract

Disaster response activities are generally well funded but do little to break communities out of disaster cycles. Actions that reduce exposure or vulnerability to hazards are particularly needed across the Asia-Pacific region where countries swing between pre and post disaster phases of the disaster cycle with a worrying regularity. These cycles make it hard for populations to save, to acquire insurance, and reduce opportunities to move above poverty thresholds. Instead communities living in hazard prone locations are forced into distress sales of assets or are pushed from being in the near-poor to extreme poor when a disaster hits. This paper deals with the question of how to conceptualise relocation in a way that will prevent impoverishment risks usually associated with development induced displacement. It suggests that relocation efforts will be most successful where implementing agencies accurately conceptualise and respond to the social dimension of involuntary resettlement. With a better understanding of the social dimension, hazard prone communities could reduce disaster risk through planned relocation without experiencing impoverishment.

Keywords: Planned Relocation, Resettlement, Risk Reduction, Resilience,

1. The Case for Risk Reduction

1.1 Introduction

This paper explains the social dimension of planned relocation or resettlement (the terms will be used interchangeably for the purposes of this paper). It draws upon decades of lessons learnt by international banks and governments' through their experiences displacing and relocating populations as part of 'development' projects. In doing so it suggests that the poor track record of resettlement is due largely to an excessively process-focused approach. This approach perceives of resettlement as linear and pursues safeguard reform and improvements in templates for resettlement plans in the mistaken belief that outlining requirements in sufficient clarity will magically result in compliance where it has not to date. In this process-focused paradigm impoverishment risks associated with resettlement are viewed as able to be nullified through

ensuring a certain amount of meetings are held with communities or that calculations for compensation are made in accordance with apparently objective/independent criteria [1]. This technical pre-occupation with planning results in increasing efforts to better structure resettlement plans and post project evaluations that focus on the strength of the plan or its implementation as opposed to the less tangible but critical influence of the social dimension in project outcomes. Despite the ongoing challenges in the field of development induced displacement, resettlement is being used as an effective tool of disaster risk reduction in some regions and countries. To further encourage relocation where there are no other reasonable options for risk reduction, this paper demonstrates how the social dimension is a key component in project outcomes.

1.2 The Social dimension

The 'social dimension' of resettlement is defined as the interplay of social factors including power, culture, attitudes and values, of stakeholders involved in relocation. One aspect is the attitudes of groups to resettlement. Each group approaches the project harbouring a view as to whether forced relocation is justifiable, and on what basis. Power also forms part of the social dimension as differences in levels of power can result in distrust, misinformation and polarisation of viewpoints. Values are a core component of the social dimension and heavily influence resettlement outcomes. The failure to consider the extent of the influence of values has resulted in a variety of resettlement project failures. For example, the conservation induced removal of villagers from Petra in Jordan involved a lack of value placed by authorities in community consultation. This led to the consequent impoverishment where compensation did not account for gaps in time between evaluation and relocation [2]. Similarly following the Manjil Earthquake if authorities had valued the community's livelihoods and engaged in adequate consultation, they would have incorporated animal husbandry needs of villagers into home layout preventing impoverishment [3]. Such issues are not resolved through better planning but through the prioritisation of communities needs during project implementation.

The chances of post relocation impoverishment are also increased by governments that see a linear process where once all resettlement plan boxes are ticked the project is 'complete'. What is needed is a conceptualisation that correctly views relocation as cyclical with some parts requiring further interventions such as the institution of ongoing social safety nets for relocated communities. Valuing shared decision-making is an integral element of successful relocation and acts to prevent misinformation. The social dimension also demands an understanding of the value in offering a place at the negotiating table for civil society representatives. Rather than viewing civil society as an ongoing threat of involvement of the ombudsman or Inspection Panel, civil society representatives should be valued as partners in assisting communities to recover from displacement. The influence of the social dimension as defined, is routinely overlooked due to the excessive focus on improved planning as a panacea to resettlement failure.

1.3 Relocation and Resettlement

There are a variety of forms of involuntary resettlement, except for preventive resettlement, most have been widely discussed and compared across a range of academic literature. These include; conservation induced resettlement [4] conflict induced displacement and resettlement (CIDR) [5] and development induced displacement and resettlement [6]. Post-disaster resettlement has also been considered and compared to other forms of resettlement such as CIDR and DIDR [7]. International Finance Institutions (IFIs) involuntary resettlement policies may not be applicable to post-disaster resettlement due to the lack of time to implement comprehensive planning [8].

'Preventive resettlement', 'post-disaster relocation', or 'planned relocation', all refer to the process of planning for the removal of a group of people living in a defined, exposed area to either prevent future losses from hazards, or because the sustainable livelihood options no longer exist within an area following a disaster. As noted by Brand, development induced displacement provides a greater, and more political "push" than post-disaster displacement [9]. Planned relocation has been described by Ramirez as, 'a measure for intervention that seeks to address the exposure that is one of the components of vulnerability, and it results in nullification of the risk condition' [10]. It is based on the removal of an individual, group or community from a particular risk where the level of exposure is considered extreme, or where recurrent damaging events are so regular as to trap communities in a recovery cycle.

The challenge is mainstreaming relocation to be part of local and regional disaster risk reduction strategies despite its controversial connotations. Where levels of global displaced populations are in the tens of millions, planned relocation before a disaster event can stem the flow of global displaced persons, save lives and reduce future disaster risk. Over the past decade it has been increasingly carried out with consideration of the need for affected communities to participate in the process. The challenge remains to ensure those implementing resettlement projects have a robust understanding of the culture and values of communities that are to be relocated in addition to understanding how their own background and values influence their attitudes and decisions. Implementing projects must look beyond the technical aspects of the resettlement action plan and demonstrate an appreciation of how the social dimension influences resettlement outcome

1.4 Asia-Pacific region

The Asia-Pacific region presents a suitable priority area for planned relocation to reduce exposure to hazards. This is due to it having substantial levels of disaster risk and clear examples of poor land use planning [11]. Natural hazards are abundant as are concentrations of populations living in highly exposed and rapidly growing urban megacities. Social and economic vulnerability throughout developing countries in this region compound physical exposure leading to largely unabated upwards trends of disaster risk [12]. Despite calls for risk-informed investment through the *Sendai Disaster Risk Reduction Framework 2015-2030,* there is still a lack of understanding and willingness to plan for disaster recovery that involves corrective land use planning. This is because involuntary resettlement is a complex and highly politicized area with a poor track record where undertaken for development projects. In spite of it having been

undertaken as a risk reduction measure in a variety of countries including the Philippines Japan, New Zealand and South America with encouraging results [13].

The risks associated with planned relocation can be gleaned from a study of resettlement caused by development projects. Although it nullifies disaster risk, the potential impoverishment risks associated with the uprooting an individual, or household are well known [14]. It has therefore become the overarching condition of resettlement that is should only be undertaken as a measure of 'last resort' [15].

Key resettlement principles, have been developed largely over the past 35 years of World Bank and other multi-lateral financial institutions aiming to prevent those risks eventuating. Since 1980 a large amount of work has been undertaken to improve practices related to development induced displacement [16]. Improvements to involuntary resettlement requirements or standards have been demanded as community attitudes acceptance of forced displacement for 'development' has weakened. As Cernea notes the key question asked has been whether 'the cost of reducing poverty for some be paid by impoverishment of others?' [17] Attitudes have evolved from seeing resettlement as a necessary side effect of development, to requiring due diligence processes aimed at ensuring displaced populations are not worse off following resettlement. Although impoverishment risks do not necessarily eventuate, in the past they usually did and today require strong resettlement expertise to avoid. This expertise must include those with a strong understanding of the influence of the social dimension and those that can ensure it is incorporated into the implementation of projects.

1.5 The usefulness of an inter-disciplinary approach

Understanding how to prevent impoverishment in resettlement can be enhanced through an interdisciplinary approach. The findings of this paper are based on a consideration of a wide range of primary and secondary sources documenting relocation due to conflict, conservation, disasters and development. Although each type of displacement has differences such as the time available for planning or possibility of return, they are all linked by the fact that they cause involuntary individual and household uprooting. As Colson notes there is no advantage in maintaining the arbitrary separation in disciplines apparent between forced migration and development induced displacement literature [18]. The commonalties across types of displacement would be worth greater investigation due to the fact that human behaviour is to some extent predictable. Colson writes, '[o]nly the most determined relativist would exclude the possibility of looking for commonalities across experiences and responses' [19].

A commonality between conflict induced and post-disaster displacement arises due to the protracted nature of many current global conflicts, which renders conflict induced displacement more or less permanent and therefore similar to post-disaster resettlement in impact. Despite the differences in reasons for, or lengths of displacement, all types can offer useful advice on how to understand how humans cope with forced migration and relocation. The method of providing aid and ongoing social safety nets for refugees, or internally displaced persons, offers useful lessons for the planning for holistic support following displacement due to development or disasters.

While various types of resettlement exist (refugee, development or disaster) they are rarely linked together to consider how the influence of the social dimension across types of resettlement. An inter-disciplinarian approach is also most likely to lead to a more holistic understanding of, and approach to, project implementation, monitoring and review.

2. The influence of values on resettlement

There are a number of studies into the reasons for the failure of post-disaster relocation including the 2004 Indian Ocean Tsunami [20] and 1985 Lake Nyos Disaster [21] and 1990 Manjil Earthquake [22]. Although each one may have stated reasons for failure such as the lack of culturally appropriate building design, the underlying reasons are often related to the lack of value by implementing agencies in the welfare of those they relocate in comparison to value placed in building homes or following the technical steps of the resettlement plan. This is often demonstrated by the failure to properly invest in resettlement and lack of adequate and ongoing consultation. Consultation by definition means and opportunity to influence decisions and must include an opportunity to alter choices about project implementation. Valuing the wellbeing of those being displaced would mean ensuring that consultation provides real choices to displaced persons at each step of the process.

Stakeholder attitudes regarding right what is ‘right’ or ‘wrong’, permissible or inexcusable during a resettlement project are influenced by their underlying values. These values are based on the context and background of the person undertaking the resettlement. The failure of all parties to resettlement projects to admit their own bias, whether they do not believe resettlement is ever justified, or believe that broader development benefits justify displacement, has negative impacts on project outcomes. Experts such as Gamaathige have noted that ‘resettlement plans often include aspirational programs that are only included to obtain the consent of all parties participating in the project [23]. An example is where implementing agencies value livelihood restoration programs less than the construction of a dam or road. In such cases these programs can end up without resources for implementation. Gamaathige suggests they result from the competing requirements between donor and local resettlement laws [24]. This may be a factor but it also demonstrates the lack of value and priority given to the livelihood restoration aspect of the program by those implementing the resettlement.

It is not through better frameworks or plans that resettlement projects will become successful in their ability to avoid impoverishment. Accepting that different values of parties involved in resettlement influences actions during resettlement, would enable the opening up of an honest, transparent process, and would reduce the potential for damage caused by distrust and misinformation.

2.1 A sociological basis for safeguarding resettlement

As resettlement is based upon a series of interactions between people, sociological theories and perspectives have much to offer in enabling an explanation of the role of values, behaviours and attitudes during project planning and implementation. As outlined by Berger in his *Invitation to Sociology*, 'The Sociologist tries to see what is there. He may have hopes or fears concerning what he might find. But he will try to see regardless of his hopes and fears' [25]. It is clear that most resettlement studies fail to see what is there. Evaluations comment for example, on the lack of adequate consultation or compensation, or diagnose improper coordination or implementing agency capacity in carrying out a comprehensive socio-economic survey, as the 'reason' for failure [26]. For example, in a recent Asian Development Bank analysis on resettlement Gamaathige commented on the lack of effectiveness of implementation of resettlement frameworks in preventing or mitigating known impoverishment risks. Reflecting the process-bound paradigm of resettlement, Gamaathige perceived the solution to be the 'strengthening' of guiding policies and frameworks [27]. This focus on process to solve complex social issues will ensure resettlement projects continue to fall short of development objectives.

Sociology and anthropology have a lot to offer the study of resettlement. Sociologists have considered the impact of relocation on groups such as the elderly [28] or on common features of communities such as generalised reciprocity [29]. Interestingly Najarian found that those that remained and did not resettle out of Gumri following the 1989 Armenian earthquake were traumatised by daily reminders of the event [30]. Colson outlined the large number of anthropological examinations of displacement in the context of forced migration, identifying that 'uprooting' caused a number of social issues including distrust of government [31]. There is a need for greater collaboration on the social dimension and its influence on resettlement outcomes across all forms of displacement because resettlement at its root is about human to human interactions.

The current lack of understanding of how the social dimension influences resettlement outcomes, has resulted in the consistent failure of safeguard reform to improve the global track record of involuntary resettlement of development projects. Only recently in 2015 has the World Bank's President publicly admitted this propensity to fail when undertaking such reforms [32]. Yet the focus on fixing problems through planning prevails as evidenced by the comments of World Bank President Jim Yong Kim, who stated *"we haven't done a good enough job in overseeing projects involving resettlement; two, we haven't implemented those plans well enough; and three, we haven't put in place strong tracking systems to make sure that our policies were being followed. We must and will do better"* [33]. The failures spoken about are the realisation of the following impoverishment risks homelessness, joblessness, landlessness, marginalisation, morbidity, social disarticulation and loss of access to common property [34].

Planned relocation due to disaster risk, has had more success (for example in the Philippines, Japan, and Christchurch and throughout South America) [35]. The reason for the increasing success of planned relocation due to disaster risk is that it by nature is more cognizant of the social dimension, and there is arguably a stronger ethical basis in moving households to save lives

as opposed to expanding a railway, road or dam. Previous events or hazard mapping offer scientific support to the decision to forcibly displace communities. Most importantly, and as a starting point planned relocation to save lives requires implementing bodies to consider the best interests of those they are resettling. Whereas those implementing development induced resettlement, act with a sense of duty to 'make amends' for displacement, with the provision of basic restitution treated as no more than a condition precedent to obtaining funding from international institutions.

2.2 Power

In addition to values, resettlement processes are heavily influenced by power – who has it, who doesn't, and particularly by the actions of those who feel disempowered. Disempowered groups may not engage in participatory processes due to perceptions that they are unlikely to be listened to, and have no ability to alter a resettlement process seen as moving forward regardless of the viewpoints of those affected. In rural Mexico in 2002 the local government attempted to displace farmers without any consultation on the quantum of compensation. In exercising its power to refuse to consult, the government was faced with protests, escalating violence and the involvement of the national media. Although a 700% increase in compensation was eventually offered, it could not prevent the farmers from rejecting the offer such was the level of antagonism they had faced [36]. The project then collapsed. Should the government have understood the disempowerment the farmers felt, they could have prevented the project failure. In contrast, Gomez details the resettlement of the town of Nueva Esperanza in Bogota, Colombia where the local government demonstrated a commitment to consultation and inclusivity. Shared responsibility pacts were signed with those needing to be resettled from areas of high risk. Despite some noted resentment by the host population, significant efforts were taken to ensure a partnership approach and Gomez outlines the relocation was a success [37].

The obligation on those implementing resettlement is to do their utmost to invite in, and listen to the voices of those being displaced, including the marginalised and vulnerable. Correa describes how in South America many displaced groups were able to construct their own new homes with assistance in the provision of materials and technical assistance [38]. In Grantham, Australia following flash flooding in 2011, resettlement was socially focused as it was carried out with; extensive weekly consultation, leaders chosen from within the community, ongoing participation of locals, use of local suppliers, and independent provision of a ballot for determining new building sites [39].

Understanding consultation means recognizing that beyond two way dialogue, it involves a willingness to be influenced in decisions, and in doing so sharing power. This is often missing where consultations are treated as a box ticking exercise. It is not enough to have a plan or safeguard that says communities should be meaningfully consulted if implementing agencies do not understand what consultation is and are unwilling to be influenced in any decisions. Provision of choice and meaningful consultation are heavily influenced by the social dimension. Perceptions by resettlers regarding the motives of implementing agencies, or the fairness of a project as a

whole, are largely based on interactions with implementing agency representatives, or assumptions made through their failures to interact. They are based on a variety of information sources including increasingly active civil society groups acting to protect resettler interests. Understanding the social dimension means that civil society groups, where representing the interests of displaced persons, are brought into the process in a transparent manner. Attitudes and values of implementing agencies would also be addressed to ensure ongoing, honest and flexible consultation with all parties. Decisions that have been made would be communicated to all stakeholders. Where these considerations are made there is little space for disinformation and distrust to spread.

2.3 Understanding culture

When implementing agencies carry out resettlement they are required to 'engage' with communities on how they live currently in order to be able to restore community well-being post-displacement. This requires obtaining an understanding of the culture of communities which in turn requires genuine investments in time to build relationships. Failure by planners to understand local cultures can be the difference between successful and unsuccessful resettlement projects.

Zaman described the lack of cultural understanding by the implementing agency during the build of the Kulekhani dam in Nepal which resulted in a community with a lack of experience with cash in being given cash compensation without support [40]. A prior effort at understanding how the local people obtained goods and services would have prevented such a mistake. Another example of the influence of cultural understanding of resettlement outcomes was identified by Gaillard who examined the differentiation in coping and adjustment post-resettlement following the Mt Pinatubo eruption. Considering the lengths of time each ethnic Aeta group had resided in the region and indicators of reintegration such as voting in the new region, Gaillard found the groups with a strong attachment to their ancestral lands were the least able to reintegrate into new communities and recover [41]. Noting these differences Gaillard outlined 'integrating ethnic factors requires a fine understanding of the local context'. The experiences of groups such as the ethnic Aeta of Mt Pinatubo and those displaced by the Kulekhani Dam both provide examples of the influence that culture has on resettlement outcomes. It is imperative that more effort is taken to learn how communities live, to understand their cultural context in order to be able to restore both livelihoods and a sense of well-being.

2.4 A non-linear Process

The treatment of resettlement as a linear process represents a failure in the conceptualisation of the social dimension by implementing agencies. The resettlement cycle has a number of activities generally following an order (project identification, planning, implementation and review) that induce those approaching the topic to treat it as a linear process. Each involves its own set of governance processes, with opportunities at each step, for miscommunication, poor co-ordination or mistake. The steps are by no means evenly spaced phases in time as identification and planning

known to drag on for decades before implementing authorities begin to carry out a project. The challenge with seeing resettlement as a linear process, is that when the project is designated 'complete' and all payments made, those displaced are presumed to have been adequately compensated and are left to rebuild their communities and livelihoods. The truth is that resettlement is rarely complete when a project finishes. For the people impacted by the Lake Nyos Disaster the treatment of the project as linear meant that impoverishment cause by displacement was never revisited. Bang et al wrote *'despite the dire social condition of disaster survivors, the governments' management was 'skewered more towards technical management than social mitigation measures'* [42]. The Cameroon government failed to acknowledge the endemic poverty, and social vulnerability of those in the Lake Nyos region. There was a clear need to provide ongoing social safety measures in support for livelihood restoration

Through a sociological lens, resettlement could not be a linear process or set of risks to be managed, as Scudder previously contended [33]. It cannot easily be carried out without detailed knowledge and understanding by implementing agencies, of the inherent values and attitudes through which they approach a resettlement project. Resettlement is a cyclical process requiring multiple rounds to get to an end point, where communities have improved their lives, or at the least are not worse off than prior to the move. As communities are heterogeneous entities, and implementing agency personnel bound by their own contexts and cultures, restoring networks of generalised reciprocity and re-established livelihoods may take multiple rounds of interventions. There may be further costs that arise due to the indirect impacts of resettlement and interventions that are only identifiable in the years following physical resettlement.

Where implementing agencies focus on resettlement plans rather than the social dimension they see a linear time-bound process which risks project failure. Over decades a planned resettlement may start, stop, change and recovery may not be until years after physical relocation. On this view, it may take five, ten or more years before a community arrives at an end point and can be said to be effectively resettled. Kunbar, a development economist, affirms the ongoing nature of recovery from displacement suggesting 'generalised safety nets' should continue beyond compensation payments [34]. It is clear that were implementing agencies to understand the social dimension of resettlement, they would identify the need for support beyond the implementation of the resettlement action plan.

3. Conclusions

It is clear that resettlement can be a success and is more likely to be successful where populations are moved to save lives as opposed to other reasons. Considering how and why resettlement causes impoverishment suggests a continuing lack of understanding of the extent of the influence of social dimension in project outcomes. This paper has defined the social dimension as the interplay of values, attitudes, culture, and power. Each element has been addressed and a range of examples have been provided aimed at describing the link between the lack of consideration of the social dimension and project failure. Although knowledge would be enriched if there was more research on the social dimension across different categories of displacement. This paper has

stressed the need to move beyond a process-focused approach towards a socially-focussed approach to resettlement. Such an approach would view the management of displacement as cyclical and not linear. Through this conceptualisation funding arrangements would enable ongoing interventions or social safety nets where necessary to enable genuine recovery of displaced communities.

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The significant need for end users' involvement in post-conflict conditions

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Abstract

Conflicts and wars cause loss of life, human suffering and major damage to many physical infrastructures such as hospitals, schools, telecommunications, roads, airports. They have long-term impacts and, unfortunately, there is no sign of decline. The most severe impacts occur in countries which are trapped in war, especially developing countries, such as Afghanistan, Bosnia, Ethiopia, Iraq, Kosovo, Lebanon, Sudan, Sri Lanka, Somalia and most recently, Syria and Libya. This clearly shows the significance of developing an effective reconstruction approach that accounts for end users' requirements and needs in the aftermath of war in order to turn tragedies into opportunities. However, the review of the literature indicates that end user requirements and needs are ignored and perceived as not being relevant during, and throughout, the post-disaster reconstruction stage in many countries, especially developing countries; this, in turn, hinders the progress and the successful outcome of the reconstruction process(es), as already demonstrated in many countries such as Iraq. Hence, there is a significant need for the requirements and needs of the affected communities to be included as a key element and in the post-conflict reconstruction technique(s). Limited study has been done into developing comprehensive post conflict reconstruction approaches that account for end users' requirements and needs; this early stage research project presents progress thus far in developing an integrative asset-management framework for infrastructure facilities in adverse/high-alert conditions using a multitude of North African case-study locations. Secondary research only is presented in this paper that illustrates the consequences/impacts of not including end users' requirements and needs as a key element in any post-conflict reconstruction approach, specifically, in the case of this research, ultimately, towards the incorporation of end users' requirements and needs into an integrative asset-management framework for infrastructure and civil engineering assets.

Keywords: Civil Engineering, Post-Conflict, End users, Affected Community requirements and needs, Reconstruction techniques, Infrastructure, Asset Management

1. Introduction

Conflicts and wars cause loss of life, human suffering and major damage to many physical infrastructures such as hospitals, schools, telecommunications, roads and airports (El-Masri and Kellett, 2001). They have long-term impacts and, unfortunately, there is no sign of decline. The most severe impacts occur in countries which are trapped in war, especially developing countries, such as Afghanistan, Bosnia, Ethiopia, Iraq, Kosovo,

Lebanon, Sudan, Sri Lanka, Somalia and, most recently, Syria and Libya. According to Hewitt (1997), there have been about 150 wars since the end of the Second World War. Some of these wars have occurred recently (in the 1990s) and they have lasted for more than a decade resulting in considerable human suffering as well as severe damage to all kinds of public infrastructure. This clearly shows the significance of developing an effective reconstruction approach in the aftermath of war in order to turn tragedies into opportunities.

The importance of post-conflict reconstruction stems from its positive contribution to peace building, and increasingly it is recognized around the world by international organizations, political leaders and field experts (Buckland, 2005). Moreover, it has also been seen as an opportunity to rebuild in a better way (Amaratunga and Haigh, 2011). However, the review of the literature indicates that there are some risks associated with post-disaster reconstruction. One critical aspect is end users' dissatisfaction with the project outcomes (e.g. Davis, 1978; UNDRO, 1982; Oliver-Smith, 1991; Dikmen, 2010; Barenstein, 2008). This is mainly because of the absence of end users' participation in the reconstruction approach. In other words, end user requirements and needs are perceived as not being relevant during, and throughout, the post-disaster reconstruction stage in many countries, especially developing countries; this, in turn, hinders the progress and the successful outcome of the reconstruction process(es) (Bouraoui and Lizarralde, 2013). Consequently, there is a clear and critical relationship between user participation and project performance. As can be seen in Table 1, this relationship strongly emphasizes the importance of listening to end users' requirements and needs (effective user participation), as they have a positive contribution to make towards successful project performance (Barenstein, 2008; Arslan and Unlu, 2001; Oliver-Smith, 1992; UNDRO, 1982).

Table 1: Relationships between community participation and project success post disaster/ conflict conditions in developing countries.

Author	Independent variable (IV)	Dependent variable (DV)	Results
UNDRO (1982)	Local community participation	Success of reconstruction projects	Positive relationship
Choguill (1996)	Community participation	Project success	Depends on the efficient practice of community participation and involvement
Alexander (2004)	Consideration of users' physical, emotional and economic attachment	Project success	Community participation increases the chances of Project success
Ö zden (2006)	Community involvement	Success of reconstruction projects	Significant positive relationship
Lyons (2009)	Users' active participation and involvement	Users' acceptability	Users' active participation and involvement
Lizarralde et al. (2009)	Users' participation	Project performance	Weak positive relationship (project performance is more affected by strategic aspects)
	Project performance	Users' satisfaction. Successful project management	Depends on the context
	Decentralization decision-making		Positive relationship
Maskrey (1989)	Community participation components	Successful implementation	Positive relationship

Davis (1978, 1981)	Community participation	Users' satisfaction	Positive relationship
Oliver-Smith (1992)	Effective community participation	Community satisfaction	Significant positive relationship
Enginö z (2006)	Users' participation	Users' satisfaction	Positive relationship
Barenstein (2008)	Users' participation	Users' satisfaction	Significant positive relationship
De Baar (2009)	Top-down approach	Users' dissatisfaction	Positive relationship

Adapted from Bouraoui and Lizarralde (2013)

As can be seen from Table 1, Özden (2006), for instance, found that community involvement has a significant positive impact on the success of reconstruction projects in post-conflict situations. This finding has been supported by many author researchers such as Choguill (1996), Maskrey (1989) and De Baar (2009).

Also, international experiences of post-conflict reconstruction have clearly revealed the failure of typical top–down approach es, which neglect the users' requirements and needs as they largely concentrate on the urgency to re-house the affected community. Consequently, such approaches frequently ignore the complexity of the built environment, the local conditions, and users' needs and desires (El-Masri and Kellett, 2001). On the other hand, many research studies have found bottom–up approaches to be more suited to post-conflict reconstruction (e.g. Cockburn and Barakat, 1991; Aysan and Oliver, 1987; Landewijk and Shordt, 1988; Anderson , 1985; Cuny, 1983; UNDRO, 1982; Davis, 1981).

Bottom–up approaches clearly emphasize users' involvement as an essential principle in dealing with reconstruction after conflict or disaster. These approaches, if carefully planned and implemented, can offer substantial advantages as they are better tailored to the needs and means of the users and to their abilities and aspirations (El-Masri and Kellett, 1992; Cuny, 1981). However, this approach is not totally holistic as it lacks the accommodation of whole life cycle values as well as flexible change management strategies, especially with regard to design and specification.

Barakat (2003) identified that reconstruction programs often fail to take into full account the requirements, needs and desires of disaster-affected populations. If proper attention is not given to the needs of affected people there is a possibility that newly constructed facilities become obsolete from the day the construction is completed (Oliver-Smith, 1991). Hence, reconstruction strategies should be implemented after studying requirements, needs and desires of affected people (Shaw, 2003). Thus, the aim of this paper is to evaluate the extent of the inclusion of the affected community's requirements and needs post adverse conditions.

2. Secondary research: an examination of end users' requirements and needs post adverse conditions

The secondary research discussion below reviews studies which have sought to examine post-conflict reconstruction failure. The most recent and devastating experience of post-conflict reconstruction failure is best described in the case of Iraq. One of the main reasons behind this failure was the exclusion of the affected communities in the reconstruction approach (es). The report, named Hard Lessons, published in 2009 by the Special Inspector General for Iraq Reconstruction (SIGIR), aimed to examine the reconstruction effort which was carried out in Iraq from 2002 to 2008. The report was based on interviews with hundreds

of key players in the Iraqi reconstruction experience as well as a review of thousands of relevant documents. In addition, the report utilized SIGIR's audits, inspections and investigations as well as reports drawn from other agencies and investigative bodies. The report established two main causes of reconstruction failure: a clear lack of planning, and the exclusion of the affected communities from the reconstruction procedures. Because end users had been excluded from the reconstruction procedure, multiple re-programming of reconstruction priorities, additional maintenance expenses, employee turnover and higher material costs were incurred. The report concluded with a clear message that affected communities' requirements and needs in the reconstruction approach need to be included.

A similar conclusion was drawn by Dikmen (2010) who studied the post-disaster reconstruction of permanent housing in both new and existing settlements in the villages of Çankırı Province, Turkey. Based on questionnaire surveys with both the permanent users of the post-disaster houses and the beneficiaries who refused to move to the new settlements, Dikmen found that most of the beneficiaries refused to move to the new settlements because of: lack of user participation in the decision-making process; little consideration of the life style of the users; overly quick decision-making; and inadequate site-selection criteria. This study emphasized the need for considering end users' requirements, needs and desires before making any decisions regarding resettlement or post-disaster housing reconstruction.

Also in Africa, Awotona (1992) reviewed the post-war rehabilitation, resettlement and reconstruction programs (the development plans) for the period 1970-1974 in Nigeria. Awotona found that the development plans adopted by the Nigerian Government were not sufficiently comprehensive and holistic. One of the main causes was the absence of active participation of the affected communities in the establishment of planning programs and changes in priorities and plans. In other words, the plans the government created did not reflect the genuine needs and requirements of the affected communities in the war-damaged areas.

Similarly, Bouraoui and Lizarralde (2013) examined the relationship between the organizational structure of a specific team that had conducted a post-disaster reconstruction project conducted in 2003 in the village of Bousalem in Tunisia, and the satisfaction of end users. Based on qualitative analysis of several interviews with end-users, Bouraoui and Lizarralde found that there is a need to decentralize decisions at a level that: optimizes the efficiency of local stakeholders; facilitates the participation of end-users; and allows an appropriate distribution of responsibilities and risks among stakeholders. This is because certain decisions may affect the match between the project initiators' capacity to provide an adequate solution and the users' expectations and requirements after the disaster. This study, like Dikmen, Awotona, and SIGIR, clearly demonstrated that there are many drawbacks incase that a participatory approach is neglected in favour of centralized decision making. Some of the drawbacks were: hindering the ability to collect information and concerns from end-users; and reducing the ability to integrate end-users and local actors in strategic decision-making.

Arguing further for community involvement, Kage (2010) stated that this involvement would help expedite society-wide contribution to the identification of needs and priorities, and would, in addition, assist implementation, and provide effective monitoring. On the other hand, without the involvement of the affected community, especially after a civil war or high alert conditions, post-war conflict or disaster reconstruction efforts, he argued, are unlikely to succeed. Similarly, Ahmed (2011) found that a key element to post-disaster reconstruction

success is the understanding of local conditions gained from community-based consultative and participatory processes. Ahmed, like Kage, emphasized the role positive contribution from community consultation and participation could play in post disaster reconstruction success.

Carrying on the theme of post disaster reconstruction, Ophiyandri et al. (2013) examined the critical success factors (CSFs) of community-based post-disaster housing reconstruction projects during the pre-construction stage. Through extensive literature review and interviews, Ophiyandri et al. identified a few factors contributing to the success of community-based post disaster housing reconstruction projects. Four out of the 12 identified factors emphasized the need for identification of needs and community participation. These factors were: gathering trust from the community; a significant level of community participation/control; involvement of all community members; and successful beneficiary identification. The establishment of the critical success factors, the researchers concluded, helps key stakeholders to identify factors that must exist and be well managed during pre-construction in order to ensure the success of the program.

A similar study by Arthur (2011) found that the success of the reconstruction efforts post-conflict conditions would, to a great extent, be influenced by the ability to build and develop capacity and skills that are needed to help reconstruct and endorse the development goals of the countries. In other words, a successful reconstruction approach must be comprehensive; account for end user requirements and needs; provide well developed training programs; and create economic and security guarantees.

Also, King and Mason (2006) examined the post-war recovery of Kosovo, and found that the international community had failed to accomplish sustainable project outcomes in rebuilding Kosovo after the conflict. Apart from other causes uncovered by King and Mason (such as lack of local unskilled staff, corruption, limited economic opportunity, lack of sustainable employment opportunities), community members' views and requirements were not considered in the post-war reconstruction recovery process. Consequently, crucial infrastructure was not reconstructed. King and Mason suggested that, in order for any post-war recovery process to be successful, the rule of law must be established; then there must be a clear set of goals after identifying the community requirements and needs, as part of a comprehensive post-war reconstruction recovery approach.

Keeping the focus on Kosovo, a more recent study by Earnest (2011) found that there was poor quality planning as well as poorly implemented post-conflict reconstruction projects. Incompetent staff and corruption were perceived to be other critical factors. Another significant discovery was that both local and international aid organizations did not work in a community service delivery setting. Earnest's study clearly revealed that the success of post-conflict reconstruction planning depended on the government's ability to appreciate the community needs and requirements as well as the complexities of the political environment and its ability to coordinate this critical stage in an operational manner.

A further study conducted by Addison and McGillivray (2004) aimed at, through extensive literature review, evaluating the effectiveness of aid to conflict-affected countries. Their study revealed that there was agreement among many researchers and policy makers on the fact that aid would not be effective without proper measures being taken to achieve security, especially in developing countries. These measures include developing long term planning techniques as well as endeavouring to have early involvement of the local community after the conflict.

Another study, undertaken by El-Masri and Kellett (2001), evaluated the reconstruction of war-damaged villages destroyed during the civil war that had occurred between 1975 and 1991 in Lebanon and compared top-down and bottom-up techniques to post-war reconstruction. A detailed case study of one Lebanese village, namely, al Burjain, was chosen as a case study. This study was based on fieldwork, which utilized a qualitative approach. El-Masri and Kellett found that the best way to approach post-conflict reconstruction was by applying bottom-up techniques as they require the involvement of end users, offer empowerment, call for the adoption of up-to-date technology, and incorporate rebuilding and development as essential measures in dealing with reconstruction after conflict or disaster. This conclusion has been supported by other researchers who have strongly suggested a bottom-up approach for post-conflict reconstruction (Cockburn and Barakat 1991; Landewijk and Shordt 1988, Aysan and Oliver 1987; Anderson 1985; Cuny 1980; UNDRO 1982; Davis 1981). Unlike top-down techniques where local conditions, and users' needs, desires and requirements are ignored, resulting in frequent project alterations, the bottom-up approach offers superior benefits if appropriately and comprehensively planned and carefully implemented and monitored. The critical success factors of the bottom-up technique, they stated, were the inclusion and appreciation of end users' requirements and desires. El-Masri and Kellett concluded, too, that, given the destruction that wars and conflicts leave behind, a careful consideration of pre- and post-disaster conditions, better identification of community needs, desires and requirements as well as an appreciation of opportunities and constraints are crucially needed in order to create economic opportunities, to maximize the use of available resources and strengthen social collaboration.

The World Bank Group published a report stating some lessons learned from Ukraine; they argued for the need for a long-term approach, good management techniques as well as end user involvement. These lessons, Lawrence (2008) stated, were:

1. Create a strategy that goes somewhere;
2. Let the program run its course;
3. Talk to your donors;
4. Get input from your people;
5. Look after your staff.

Lawrence concluded that getting inputs from the community along with a good strategy, sound management plans, and well-executed programs can help considerably in adverse conditions.

The importance of the inclusion of end users' requirements and needs into the reconstruction approaches for post-conflict situations stems from its positive contribution to peace building. To prove this, Ben-Meir (2009) investigated the decentralized development approach that had been utilized in Iraq and the Palestinian occupied territories. He found that decentralization processes help create productive partnerships among national officials, civil organizations and private groups, resulting in strengthening both local community and national autonomy. This approach, he stated, if applied, could have helped resolve conflicts in Iraq and other countries as it seems to be more efficient and costs less than typical development assistance programs (donors). This is because, as can be seen from the Iraqi case, people do not destroy (as many have done in the past) reconstruction projects that they determine and manage themselves. Participatory decentralized development, Ben-Meir concluded, would assist in building national sovereignty by empowering communities to manage their own development. This conclusion was supported by Sugiura (2010, 99), who stated that 'people considered reconstruction as an opportunity to create a better society,

which would help to avoid the problems of the past and respond positively to future development'.

McKeen et al. (1994) examined the effects of four contingency factors (complexity, system complexity, user influence, and user-developer communication) on the relationship between user participation and project performance. Based on the analysis of 151 independent system development projects in eight different organizations, the study found that user participation has a direct relationship with project performance. In addition, the four contingency factors were found to play key roles within this relationship.

There are other studies which have supported the same conclusion, that end users' participation has an impact on the project success. For instance, Alter (1978) found that end users were much more likely to resist system/projects in situations where they had neither initiated the project nor participated in its development. Oppelland and Kolf (1980) mentioned that active user participation facilitated better problem understanding and resulted in helpful contribution for systems design. Baroudi et al. (1986) stated that end user participation in systems development had led directly to both user satisfaction and project success/system usage. Another study by Straub Straub and Trower (1988) established a correlation of 0.28 between user participation and project success. Table 1, mentioned earlier, also provides studies which clearly acknowledge the need for community participation in post conflict settings. The summary of the literature review is presented in Table 2.

Table 2: Literature Review Summary

Author(s)	Method	Post-conflict reconstruction failure cause
SIGIR (2008)	Interviews with hundreds of key players and document analysis.	• A clear lack of planning; • The exclusion of the affected communities from the reconstruction procedures.
Kage (2010)	Based on quantitative data	• Lack of effective measures for identification of needs; • Lack of efficient implementation and monitoring;
Ahmed (2011)	An extensive literature review on post-disaster housing reconstruction in developing countries	• Failure to understand local conditions.
Ophiyandri et al. (2013)	Extensive literature review and interviews	• Absence of end users involvement
Dikmen (2010)	Questionnaire surveys	• Failure of restatement due to lack of user participation in the decision-making process
Awotona (1992)	Interviews and document analysis	• the absence of active participation; • Changes in priorities.
Bouraoui and	Qualitative analysis of several interviews	• Centralized decision making

Lizarralde (2013)		approach;
Arthur (2011)	Extensive literature reviews	• Lack of long term approach; • Absence of involvement of the affected community; • Lack of training programs.
King and Mason (2006)	Case study	• Failure of the international community to account for end users' requirements; • Corruption;
Earnest (2011)	Case study, interviews as well as survey	• Poor quality planning; • Failure of both local and international aid organizations to work in a community service delivery setting.
Addison and McGillivray (2004)	Literature review	• Lack of long term vision; • Absence of proper measures to achieve security; • Failure to endeavour to have early involvement of the local community.
El-Masri and Kellett (2001)	A detailed case study	• The utilization of centralized approach (Top down approach); • Desires and requirements of the affected community have been ignored.
Ben-Meir (2009)	Literature review	• Lack of participatory decentralized development.

This literature review has demonstrated that, in post-disaster/conflict settings, project development and success requires the appropriate users' participation in the project at the appropriate stage and in a manner that enables a meaningful contribution. User participation in project development activities should lead to greater commitment, involvement, acceptance, use, and, ultimately, greater satisfaction. The exclusion of consideration of the requirements and needs of the affected communities post conflict/ adverse conditions have clearly hindered progress in reconstruction in many countries such as Iraq. Hence, there is a significant need for the requirements and needs of the affected communities to be included as a key element in the long term comprehensive post-conflict reconstruction approach (es).

3. Objectives, method and potential significance

The main aim of this on-going (early stage) project is to develop Integrative Asset-Management Framework(s) for Infrastructure Facilities in Adverse (post-conflict/ disaster-zone/ high-alert) Conditions, using Libya, Egypt, Tunisia and the surrounding region as a representative locations; this framework will account for end users requirements and needs, and will form the basis of workable and flexible sets of comprehensive procedures able to be

amended with regard to specifications, design, standards, human resources and legislation (when appropriate) as well as accommodating the cost of whole-life values.

The Department of General Infrastructure for Libya sits nicely as a suitable location for case study (five branches throughout Libya are available, namely Tripoli, Benghazi, Misurata, Sabha and Sirte) as well as the main infrastructure departments of border countries such as Tunisia and Egypt. Specifically, the objectives of the project are as follows: (i) with regard to post-conflict reconstruction techniques: to examine the reconstruction approaches that have been applied to post-conflict situations; to investigate how man-made disasters have been dealt with; to identify key challenges, failures in reconstruction as well as success factors. (ii) with regard to end users' requirements and needs: to evaluate the importance of end users' requirements and needs post adverse conditions; to evaluate the extent of the inclusion of the affected Libyan community's requirements and needs (***the aim of this paper***). (iii) with regard to economic-evaluation-techniques: to examine various economic evaluation techniques; to determine the current economic evaluation techniques utilized by nations in environments of flux, specifically, Libyan (five main cities), Egyptian and Tunisian main infrastructure departments, to determine the barriers, if any, preventing or slowing the adoption of the most efficient and effective techniques in these countries. (iv) with regard to asset-management techniques: to examine the major current asset-management frameworks utilized in developed and, alternatively, newly developing regions; to determine the current asset-management techniques utilized by the infrastructure departments in (high-alert) zones of interest such as Libya (five cities), Egypt and Tunisia; to identify factors, if any, preventing or slowing the adoption of AM techniques (***already published in the 4th international conference on building resilience***); (v) with regard to change-management: to examine the standards, specifications, design and regulations that have been set by the main infrastructure departments in the regions identified above addressing crisis management; and, identify how case-study departments of infrastructure deal (/dealt) with required change. The above objectives, it is hoped, lend themselves to populate input for the development of a flexible change-management structure able to be amended with regard to design, standards and legislation in adverse situations and then to be incorporated into a proposed integrative asset-management framework, while at the same time acquiring for end users' requirement and needs.

4. Conclusion

Management of infrastructure is changing as a result of growing difficulties triggered by technical/software-input expectations, economic-imperatives, environmental stabilization after (natural) disaster, socio-political adversity and conflict, and resource challenges in conditions of skill shortage and enhanced asset/facility need. This clearly shows the significance of developing an effective reconstruction approach that accounts for end users' requirements and needs in the aftermath of war in order to turn tragedies into opportunities. The immediate post disaster/conflict stage requires end users' involvement in order to provide for their requirements and needs. However, the review of the literature indicates that end user requirements and needs are ignored and perceived as not being relevant during, and throughout, the post-disaster reconstruction stage in many countries, especially developing countries; this, in turn, hinders the progress and the successful outcome of the reconstruction process(es), as already demonstrated in many countries such as Iraq (Bouraoui and Lizarralde, 2013)(Bouraoui and Lizarralde, 2013)(Bouraoui and Lizarralde, 2013)(Bouraoui and Lizarralde, 2013)(Bouraoui and Lizarralde, 2013) (Bouraoui and Lizarralde, 2013).

Hence, there is a significant need for the requirements and needs of the affected communities to be included as a key element in the post-conflict reconstruction technique(s).

Limited study has been done into developing a comprehensive post conflict reconstruction approach that ***accounts for end users' requirements and needs***; this early stage research project presents progress thus far in developing an integrative asset-management framework for infrastructure facilities in adverse/high-alert conditions using a multitude of North African case-study locations. A study addressing adverse conditions (post-conflict; disaster-zone; and high-alert locations), while at the same time accounting for end users' requirements and needs, is somewhat absent from current academic studies; this work strives to fill this present gap.

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An exploratory study of food system resilience in southwest Victoria

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Abstract

This paper explores resilience in non-urban food systems through a case study of southwest Victoria. Building diversity in regionalised food systems is an important strategy for enhancing resilience in non-urban areas. Frameworks for food system reform support resilience based efforts. This exploratory study piloted the Urban and Regional Food Charter (Food Alliance, 2014). A snowball sampling technique was used to identify food producers (6), innovative food distribution coordinators (2) and governance sector participants from local government, welfare, catchment management and strategic planning (8), totalling 16 participants. A two-phase data collection strategy involved semi-structured interviews and then a focus group in order to identify and prioritise ecological, economic, political and cultural considerations of food systems. While diversity was a locally appropriate concept for resilience building efforts, a lack of diversity characterised the region, and this was consistent with other indicators captured through the Charter demonstrating eroded resilience of food systems. A critical appraisal of influences shaping the trajectory and possibility of reform efforts is required as part of resilience building efforts. The need for an enabling environment to unite and coordinate food system reform efforts is highlighted from this case study. Further research is required to ascertain whether existing structures can be modified to undertake this work.

Keywords: non-urban food systems, diversity, resilience, imaginaries

1. Introduction

Food system reform is becoming topical for a host of health, environmental and economic reasons. This paper connects this range of interacting socio-ecological determinants to concepts of resilience. The idea of diversity is central to building general resilience in a system, and is a helpful descriptor in thinking about food system reform in rural and regional areas, defined here collectively as non-urban. When viewing food as a regionalised system, a lack of coordination and resourcing is evident between the various institutions involved in governance. Social networks have been identified as important in non-urban areas, and their functions in a non-urban setting are considered. Frameworks for food system reform represent one means of uniting fragmented and silo-ed governance institutions and network activities However, it is also argued that more abstract influences are involved in shaping the trajectory for change, such as those of *imaginaries*. The utility of frameworks to food system reform activity requires a recognition and critical understanding of these influences.

2. Resilience and non-urban food systems

The theoretical conceptualisation of food as a system, brings together all stages of production, through to distribution, consumption and waste (Pearson, 2012), and locates this within a particular boundary, often a spatial one (Cash et al., 2006). The re-regionalising of food systems (Donald et al., 2010) attempts to consider this integration within a regional spatial boundary. Resilience is defined as the ability of a system to absorb shocks and disturbances while maintaining essential function and structure (Walker & Salt, 2006). In resilience terms, systems are seen as dynamic and responsive to social and ecological feedback (Beilin, Reichlt & Sysack, 2013), leading them to be described as complex adaptive systems (CAS). Resilience theory provides an approach to assessing and positively effecting change in food systems through adaptive management (Folke et al., 2005). A 'command and control' response has characterised the historic management of natural resources, with interventions aimed at dealing with singular variables (Folke et al., 2005). In contrast, resilience approaches seek to enhance general system resilience through strategies such as diversifying food systems.

Social and ecological factors are identified as negatively impacting on system resilience. For example, food production concerns include long-term degradation of soil and water resources and biodiversity declines (Edwards et al., 2013); and emerging challenges associated with climate change and declining oil reserves (Turner et al., 2013). The majority of Australian food moves through a highly concentrated and centralised food supply chain that has negative environmental impacts (Freedman & Bess, 2011), and operates on a 'just in time' principle of food movement (Edwards et al., 2013), rendering it vulnerable to shocks and disruptions. Consumption issues pertain to health impacts of overconsumption and poor nutritional choices, such as diabetes and obesity (Caraher et al., 2013; Edwards et al., 2013). Accessibility and cost issues have also been identified in relation to food security (Turner et al., 2013).

When viewing food as a system, a key issue relates to the "fragmented and siloed" nature of institutions governing the food system (Caraher et al., 2013), creating significant governance mismatches. Governance is defined in this paper as including the structures, processes and relationships involved in decision-making about food systems (Brown & Bellamy, 2010). The complexity of this governance is deepened further by the changing nature of governance toward more complex arrangements (Christoff & Ekersley, 2013) including reapportioning roles and responsibilities among new arrangements of state and non-state actors. Developments in the region are driven by neoliberal policies of 'competitive productivism' with rural restructuring in the 1980's shifting from integrated rural planning toward market led development marked by individually driven enterprise (Lawrence, Richards & Lyons, 2013).

Whilst beyond the scope of this project to describe in more detail, it is important to note that when considering non-urban food system reform, the complexity of these fragmented and shifting governing arrangements interacts with other changes in non-urban areas. These changes include declining populations and services, reduced political power (Beer, 2014) and dynamic shifts in rural land ownership to include foreign investment, corporate management and 'non-productive' ownership (Lawrence et al., 2013; Mendham & Curtis, 2010). This complexity makes it difficult to unpick cause and effect, and in this, systems-thinking is useful because it recognises the likelihood of various interrelated elements emerging in non-linear ways.

2.1 Social networks and resilience in non-urban settings

The role of alternative governance arrangements, such as social networks, in building resilience in non-urban areas has been identified (Beer, 2014; Hirschi, 2010). Folke et al. (2005) note their utility in times when conventional governance structures are unable to respond to rapid change.

Their importance is suggested to lie in their ability to create space for innovation, diversity and connection (Bodin & Crona, 2009). However, this depends on the resilience of the network itself (Hirschi, 2010; Moore & Westley, 2010). For example, maintaining a degree of autonomy from the bureaucratic demands of formal institutions has been identified as important in network resilience, described by Pelling et al. (2008) as 'shadow networks'.

Process aspects are also significant in determining resilience in social networks (Beer, 2014). Moore and Westley (2011) emphasise the importance of strategic agency as informed by organisational management. They identify strategic agency as necessarily involving social engagement as Emirbayer and Mische (1998:963) suggest: "informed by the past, oriented to the future with the capacity to contextualise these orientations into present contingencies". This capacity for temporal-scale literacy provides reflexivity in dealing with complex and uncertain futures (Leviston et al., 2014). However, others describe a tension in these processes (Brower, 2013; Levy & Spicer, 2013). They involve subjective, dynamic reconstructions of actors' orientations to the past and future in response to emergent events.

Levy and Spicer (2013) argue that resilience based efforts require attention to be given to less conscious processes influencing change. *Imaginaries* are held by large groups of people in the form of widely shared socially constructed narratives (Levy & Spicer, 2013). Critically appraising imaginaries involves a need to see "environmental problems as socially and politically embedded phenomenon fundamentally linked to patterns of production and consumption and the ideological assumptions that underpin the economic system and our collective sense making processes" (Wright et al., 2015:648). The strength of imaginaries associated with neoliberal framings of food reform include the continued expansion of food production, food deficiencies met through importation, higher levels of foreign direct investment and the commoditization of resources (Lawrence et al., 2013). All of these can limit consideration of other possibilities. Importantly in thinking about imagination, the idea of the 'stunting' of time emerges, where the impacts of these imaginaries actually 'thin' out our sense of past and future (Wright et al, 2013). This leads society towards a future of short-term market based impacts and creates a strong drive to continue current ways of living.

2.2 The Urban and Regional Charter for Food System Reform

One approach attempting to unite fragmented governance and network structures includes the development of frameworks. The Urban and Regional Charter is a framework developed by the Food Alliance (2014), a food policy body seeking to facilitate transformation in food systems (Caraher et al., 2013). The framework is based on the premise that sustainability challenges arise from "*conflictual elements within interconnecting economic, ecological, political and cultural domains*" (Magee et al., 2013:229). The framework seeks to balance top down rigor with regional context and community engagement (Magee et al., 2013).

3. Case Study: Food systems in southwest Victoria

This research explored understanding of food systems and pathways for reform, by piloting the Urban and Regional Food Charter in a case study of southwest Victoria. The project focused on the sub-regional area of Moyne, Corangamite and Warrnambool Shires in southwest Victoria, Australia. The area is largely defined by agricultural production, with dairy and beef in the south, and sheep and grain farming in the north. Corangamite and Moyne Shires include significant residential townships with the regional city of Warrnambool acting as the main service centre for southwest Victoria. The coastal areas of all three shires are major tourist destinations (SWPCP, 2009).

A purposive sampling strategy was initially used to locate participants. Additionally, due to the limited study scope and to follow up on resilience building concept of diversity, sampling of food producers was restricted to those with some degree of diversification in their enterprise compared to the locally dominant forms of agricultural production. Diversity was 'defined' by the type of product being farmed, or vertical integration of farming practises to include value adding manufacturing processes, or to include those selling some of their products locally.

In order to capture experiences of social networks, and impetus for food system reform, a snowballing technique was used to identify further participants, with participants prompted to recommend other people to approach. Participation involved voluntary consent, and contributions were anonymous, identified by a pseudonym and participant category code. In total six food producers (FP), two people involved in innovative food distribution initiatives (FD) and eight people from within governance networks (FG) were involved, totalling 16 participants. Producers ranged from a background as a conventional dairying family farm, to being new to the region and farming. The length of time spent farming ranged between 1 and 46 years. Governance participants held positions in local government, strategic planning, welfare, and catchment management. FD participants were involved in food swaps and farmers markets.

A two-phase data collection strategy was utilised to demonstrate a process of developing indicators for food system reform. In the first phase semi-structured interviews were guided loosely around key economic, environmental, cultural and political considerations affecting food systems. In the second phase, interview material was summarised into domain areas and presented to a focus group. Participants were asked to rank the most important issues in each area, to add their views and then be part of a general discussion on each area. A brief summary of findings from each domain is presented in this paper, with particular emphasis given to the prioritisation and clarification of issues identified by the focus group.

4. Findings

4.1 Ecological Domain

Participants talked about a range of ecological themes. Producer participants described a range of ecologically sensitive practises, particularly at the farm scale level, ranging from water efficiency practises, to organic farming techniques and the use of composting. Although many producers identified using organic practises, certification was not pursued. The idea that healthy soils related to healthy ecosystems was recognised, with three participants linking their farming venture with biodiversity gains more generally. A shift in emphasis in Catchment Management initiatives to encourage an understanding of soil health, correlated with a broad shift in the region toward more wholistic farming practises. However, the realisation of ecologically sensitive practises conflicted with economic pressures. This tension was ranked as the second most important ecological consideration by the focus group. These practises were associated with increased labour demands, production costs, complexity of operations and lower short-term returns. However benefits such as taste, quality and long-term ecosystem health were identified.

The focus group ranked the lack of diversity in the region, as the most important ecological consideration. Diversity initiatives were identified primarily at the scale of backyard production, voluntary-based community projects and a few producers involved in tourist-aligned artisan, paddock-to-plate production. Fresh food was predominantly purchased from supermarkets, creating accessibility and transport issues for those in more remote areas of the region. Importantly, the region was regarded as having potential to expand diversity in both production and distribution. Mixed opinions existed regarding barriers, including a focus on large food manufacturing and a lack of structural support in the region for more diverse producers.

4.2. Economic considerations

Equity issues were the most frequently mentioned economic theme, and also ranked by the focus group as the most important economic consideration. These issues related to increased requests for food relief, the overall median income in the region declining, food security related access issues, rising food prices, the risk and debt associated with conventional farming and the difficulties making a living from smaller diverse farming enterprises. The community food security programs that were identified as working were largely volunteer based efforts, and participants recognized this created viability issues.

The equal-second most important economic consideration ranked by the focus group was a growing awareness of the need to revalue agriculture. The following quote links this to cultural considerations: "*We think we've overlooked the role agriculture plays in our regional economy and downplayed it, or perhaps treated it a bit as wallpaper, happening in the background. And not really had any concerted effort to support it.…there's a sense that agriculture is something you only do if you can't get another job*" (Veronica, FG)

The need for governance bodies to be strategic in their support was rated as the other second most important consideration in the economic domain. Diminishing budgets, and increasing competitiveness of funding processes, meant that available time and resourcing was incredibly limited. Governance participants identified a need to devote more time to developing partnerships with industry to attract funding. Several participants identified involvement in producer networks as being an effective way to justify local government and industry support.

4.3 Political Domain

Producer participants talked most often about their experience with local government and this varied across the case study region. Local governments were perceived as holding legitimate responsibility, but operating with increasingly limited means. Participants talked about state and federal government less frequently, but generally in a negative light. Issues identified by participants were barriers to flexible land use planning arising from state directed legislation, the uneven nature of competitive grant applications favoring larger enterprises, and difficulties associated with payroll tax and penalty rates for smaller food related businesses. These barriers were ranked as the second most important political consideration.

The short term nature of political cycles and project funding periods was identified by the focus group under a 'what's missing' category, as creating a disjuncture between long term planning needs associated with food system reform. Most governance participants talked about the Great South Coast Group (GSCG), a regional coalition of key business, government and industry leaders, as an important structure to facilitate longer-term regional change. The coalition structure created a united approach to regional development and capacity to leverage state and federal funding. Involvement in coalitions was ranked as the most important political consideration. However other participants raised concerns about whether the GSCG had too strong an emphasis on economic development. Participants also had concerns about the ability for diverse production efforts and regionalised food security pathways to be represented on such a high level strategic body.

4.4 Cultural Domain

The cultural domain area of food system reform included a wide range of issues considered important by the focus group. A growing importance of food traceability to consumers was identified, but was not seen as impetus enough for consumers to support food initiatives such as a regular farmers market at levels of significant scale. Consequently most producers directed products to Melbourne or supplied just a few retail outlets and restaurants in the region. The tourist industry was again identified as playing an important role in creating support for artisan food

trails and festivals in the region. While these festivals and trails created opportunities for both visitors and residents in the region, the challenge articulated was to direct new food pathways to support accessibility of supply and choice for lower socio-economic groups.

The role and strength of networks was a strength identified in the region and ranked as an important cultural consideration. Connection to networks included those operating informally and formally within the region, virtual-based networks and networks outside the region based on products and distribution. Accessing informal networks within the region was identified as requiring strong individual initiative as described by Hannah: "*…there is support around…if you actually pick up the phone or go and visit someone there is…. you've just got to put the leg work in and go and meet people and network, network, network.*" (Hannah, FP)

One participant pointed to the need for the health benefits of food security initiatives to be articulated more clearly as a means toward secure future funding opportunities. This was affirmed in the focus group conclusion, with initiatives such as food swaps recognised for their role in building community and wellbeing.

5. Discussion and Conclusion

This discussion focuses on two concepts relevant to building food system resilience; diversity and the idea of an enabling environment. Participants from each category talked about diversity in relation to ecological, economic and cultural domain areas. The concept seemed particularly important to non-urban areas for its capacity to build include a range of producers incorporating differing degrees of diversification in their enterprise (Gerlach & Loring, 2013; McEntee, 2010). The idea of a portfolio approach of multiple pathways, based on locally and ecologically appropriate data is highlighted in the following quote: "*…I'm a big believer in diversity, that we need to maintain access in lots of diverse ways, but I think we need to get out of our traditions and cultures that say, 'ok we need something lets go to the supermarket….wouldn't it be good also if they went to a food swap every month, or to a farmers market.*" (Olivia, FD)

The region was identified as having potential to incorporate more diversity in production, distribution and accessibility. However, beyond an apparent enthusiasm for diversity, a lack of penetration of the concept characterised the region, particularly in terms of feeding local people and creating prosperous farming enterprises. Participants said that diversified initiatives were often isolated entities, with the exception being those connected to tourist-aligned food artisan networks. These opportunities created pressure to produce high end artisan products and this maintained barriers to equity as articulated by Russell: *"…need for good nutritious food to be available to all, not just to those making a lifestyle choice."* (Russell, FG)

Diversity stands in contrast to the dominant, monocultural thrust of 'productivist' industrialised agriculture (Lawrence et al., 2013). This highlights the difficulty of encouraging diversity at a regional scale, when forces operating at broader scales are working to create opposing outcomes (Christoff & Eckersley, 2013). Levels of debt associated with dominant farming practises were identified as problematic in the region. These were expressed as creating a domino effect - as preventing the adoption of ecologically based land management decisions, led to less secure livelihoods, increased food relief requests and arguably created barriers for young people considering entering farming. The inherent contradiction of productivist approaches leading to less resilient systems highlights the role of abstract influences such as imaginaries. Levy and Spicer (2013) noted that initiatives more closely aligned with dominant productivist imaginaries were likely to be embraced in a process akin to 'the path of least resistance'. Further research is required to determine how to create space for critical appraisal and resistance to dominant imaginaries, while stimulating divergent imaginaries that convert to on-ground change in resilience building efforts.

An imaginary emerged among the focus group participants of an 'enabling environment' that could consolidate and coordinate fragmented initiatives. Importantly, while participants all expressed clear ideas for the development of regional food systems, there was an identified lack of overall structures to capture these perspectives. While participants noted that while diverse producers engaged with informal networks, they operated largely as isolated individual entities. This lack of integrated planning was identified by one participant as a key barrier arising from the historic division of responsibilities for integrated planning that local government held until the early 1980's, "*…we split those functions away and gave them to separate authorities. So there's no structure to deal with the mega issues like landcare or climate change.*" (Peter, FP).

This fragmentation also created issues for communication and coordination, with one participant expressing frustration at how difficult it was to find out about food related initiatives through internet or local media. The need for forums to enable communication and coordination were reflected in the following comments, "*Building community and having a hub or some sort of way to access all of this."* (Monique, FD) and "*Yeah so if we can get people in the same room talking then that's 80% of the job done because it's started"* (Ian FG, 11.3.15). Further research needs to address whether this can occur through regionalised planning structures already established in the region such as the Great South Coast Group.

The existing Food Charter framework could support an enabling environment through its ability to capture and contextualise the complexity and interaction of underpinning ecological and social variables. Through the identification of key themes, a regionalised context for food system reform began to emerge and a process of ranking issues in each domain area was piloted. However, a limitation of current research was the small focus group size. Repeating the process with a larger, more representative body of stakeholders, including food manufacturers and retailers, is necessary before more representative indicators can be developed. An additional limitation lay in the lack of capacity to assess where food system reform stood in relation to other regional issues, and how best to integrate these issues for food supply chain change.

In conclusion**,** this paper explored food systems in a non-urban setting. Diversity was affirmed in this exploratory research as an accessible concept in building resilience through multiple pathways in regionalised food systems. This paper argues the importance of creating and sustaining enabling environments so that more substantive change can be supported in the region. Some of the tasks required for such change include stakeholder forums that focus on new food supply chain innovation and building diversity for local supply within the region. Structural tasks associated with coordination, and sustaining multiple pathways toward more equitable production and accessibility are also required. Importantly, cognitive activities that create resistance to the dominant mode of supply as being the only one possible; and in contrast, influence new imaginaries, will be central to determining diverse regional livelihoods.

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Life Cycle of Disaster Relief Shelters

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Abstract

The life cycle of disaster relief (DR) shelters plays a vital role for survival in natural disasters especially for large-scale events. DR shelters are essential to providing clean, green, private, and secure places for people who have left or lost their usual accommodation to live. A review of the literature, case studies, and reports relating to the design of DR shelters, indicates that their provision and performance are not currently as effective as they could be. A lack of adequate consideration with regard to climatic conditions, locally available materials and skills, cultural and social issues, delays, cost constraints, and poor location selection for DR shelters, have each been identified as sources of poor performance contributing to an unacceptable standard of living. Moreover, there seems to be a lack of sufficient consideration with regard to the design of DR shelters for future storage and re-use. This paper will draw out a life cycle for disaster relief shelters to ensure shelter provision and performance are effective. In addition, this paper will help stakeholders to manage their decisions while providing them with information to consider about environmental, economic, technical, and sociocultural factors that might be taken into account in the design processes of such shelters.

Keywords*:* disaster relief shelters, natural disasters, life cycle for DR shelters, and survival

1. Introduction

There has been much recent interest in disaster relief shelters for evacuees following disasters such as earthquakes, hurricanes, typhoons, tsunamis, and floods. In 2010 approximately 42 million people were forced to leave their homes due to natural disasters across the globe,

nearly twice the number that were displaced during 2009 [1]. Although the provision of DR shelters is a necessary component of response and recovery efforts, it is not clear which type of shelter is most appropriate in the various circumstances that can occur [2, 3]. As a result, several environmental, economic, technical, and sociocultural issues can affect survivors when their shelters are designed improperly. Environmental issues arise when changes in climatic conditions are not taken into consideration by designers, such as when simple tents are provided to survivors in a winter season [4]. Other issues include poor quality of water and air, overuse of local materials and resources, and making a considerable amount of waste. Economic issues include when a temporary housing unit costs more than rebuilding a permanent house. Experts claim that such units can be up to three times more expensive [5, 6]. Technical issues include lack of space, complexity in design, and planning for storing units and materials [7]. Finally sociocultural issues include cultural differences between aid suppliers and survivors, which can create misunderstandings when certain solutions are not suitable for users[2]. Nevertheless, most of these problems occur in underdeveloped countries.

In this work, a new life cycle for DR shelters will be presented, explaining several stages when planning and designing shelters such as setting up the committee, considering the design factors, understanding variations in DR shelters regarding usage, materials, structures, and resources; however, it should be noted that the first three stages should be done before the disaster happens. When the disaster is imminent, or has already happened, the committee should have a clear vision and be ready to respond to the disaster, identify the needs and ambitions of the survivors, conduct an assessment, and implement the final decision for providing type(s) of shelter(s). At the results stage, feedback should be given to the first stage to upgrade the current guidance, by reflecting on the lessons which were learnt. It is intended that the life cycle of disaster relief shelters will help those who are responsible for preparing, planning, designing, providing, and managing DR shelters to decide which shelter can best assist in meeting survivors' needs and also to improve the quality of life for displaced people as well as maximizing value for the money spent on shelters.

2. Disaster relief (DR) shelters: terminology

A DR shelter is a habitable, covered living space. The provision of DR shelters is a continual process and requires monitoring [8]. A DR shelter is part of emergency relief, and must be accompanied by clothing, blankets, mattresses, stoves, fuel, and access to services such as water and sanitation. DR shelters offer a covered, liveable space which is clean, green, private, secure, and humane for the people using it as their shelter in a disaster situation, until they are able to move to regular housing [9]. Typical examples of DR shelters include plastic sheets, tents, prefabricated housing, public community buildings such as leisure centres, university halls of residence, places of worship, sports venues, and private rentals.

3. Disaster management and its phases

Disaster management is a cyclical process since disasters are considered as reoccurring events, consisting of mitigation, preparedness, response and recovery [10]. Nevertheless, Jeggle [11] believes disaster management requires proper planning, resources, and organisation to coordinate all efforts, including public, private, and voluntary resources, so that the response efforts are as effective as possible. The important part of disaster management phases are helping to get survivors back to their daily life, so erecting houses would be the main goal. They also aid in maximizing opportunities for the affected population to begin to regain their livelihoods [6]. However, each author describes different phases for disaster management. There are four standard stages as follows:

3.1 Preparedness and Early Warning

Included in the preparedness and early warning stage are several steps, including disaster mapping and its effects, the monitoring and prediction of expected outcomes, the communication of these outcomes to the relevant communities and authorities, and timely responses to these warnings [10].

3.2 Emergency Relief Stage

The emergency relief stage is the time when emergency assistance is provided in the midst of a situation, or just after it has struck so that rapid rescue and evacuation efforts can save as many people as possible. It also means providing people with food, shelter, and water. Regnier [12] estimates that it is globally agreed that the most important phase in post-disaster emergency assistance occurs in the initial weeks and, in a few cases, months after a disaster.

3.3 Rehabilitation Stage

The rehabilitation stage is one of the initial response stages, and it is the phase between relief and reconstruction. It typically lasts five years, and it is the stage when reconstruction and infrastructure rebuilding is undertaken, restoring things to normal [13]. It is also recommended that during this stage a thorough disaster assessment be carried out – surveys

and information-gathering efforts to provide a better understanding of the effects of the disaster [14].

3.4 Reconstruction Stage

This phase is an important step in managing disaster. It is said that in this phase, affected people can restore their livelihood by constructing new infrastructures and houses so that it is considered to be an opportunity to rebuild and enhance life for the community [15]. During this phase, if the houses and infrastructure are reconstructed in good quality, it will impact the next disaster vulnerability [15]. Amin and Goldstein [16] believe the reconstruction phase, which includes people's livelihoods, revenue generation and grassroots needs, needs to target reconstructing infrastructure and returning to normal life before disaster strikes. Additionally, it is added that this phase is a long-term recovery as well as a slow process of disaster management [16].

4. Research methods

A desk research was used to conduct this research. There are several techniques used in this study for gathering data. First of all, a literature review has been conducted to discover the information available; for instance, determining what life cycle of DR shelters is currently available and identifying what the main problems are for the design, provision, and performance of shelters. Secondly, several case studies have already been analysed briefly through video documentaries published by the BBC, Al-Jazeera and International Geographic. It answers queries of "how?" and "why?". For instance, earthquakes in Turkey (1999), Italy (1976, 2009 and 2011) Greece (1986); Tsunami in Japan (2011) and Indonesia (2004); floods in Saudi Arabia (2009 and 2011), Pakistan (2010) and UK (2012-13); Hurricane Katrina (2005) and typhoon in Philippines (2013 and 2014), in order to discover which guidance if any was followed and explore several problems and issues related to the use and the approach to shelters.

Finally, documents on DR shelters have been analysed in order to understand how such shelters have been constructed in the past, what kind of shelters were involved in certain disasters, and what the environmental, economic, technical, and sociocultural context of the

disaster was. There are two types of documents, such as public and private documents, as shown below.

Public documents: Emergency Response and Recovery , HM Government [17], Evacuation and Shelter Guidance, HM Government [18, 19], Humanitarian Assistance in Emergencies, HM Government [20] and United Kingdom's Department for International Development (DFID) and UKaid and Shelter Centre [21]

Private documents: Guidance Note Recovery Shelter, International Recovery Platform (IRF) & United Nations Development Programme India (UNDP-India) [22], Post-disaster Shelter: Ten Designs IFRC [23], Shelter Kit guidelines, IFRC [24], Transitional Shelter Guidelines, International Organization for Migration (IOM), Transitional settlement: displaced populations, Oxfam [25], Collective Centre Guidelines. Camp Coordination/Camp Management [26], Minimum Standards in Shelter, Settlement and Non-Food Items. The Sphere Project [27] and Transitional Settlement Displaced Populations, University of Cambridge, Oxfam Shelterproject [28].

5. Life cycle of disaster relief shelters

The life cycle of disaster relief shelters is developed through analysing several documents related to disaster shelters such as guidance, reports, journal papers and case studies. It is also analyses other life cycles such as the project management life cycle by Smith [29]. The life cycle of disaster relief shelters should be used through a special committee of stakeholders who are involved with and have dealt with sheltering survivors before, during and after disaster events. Nevertheless, this life cycle should also be regularly upgraded in consultation with third party external members. The life cycle contains several stages as shown below in Diagram 1.

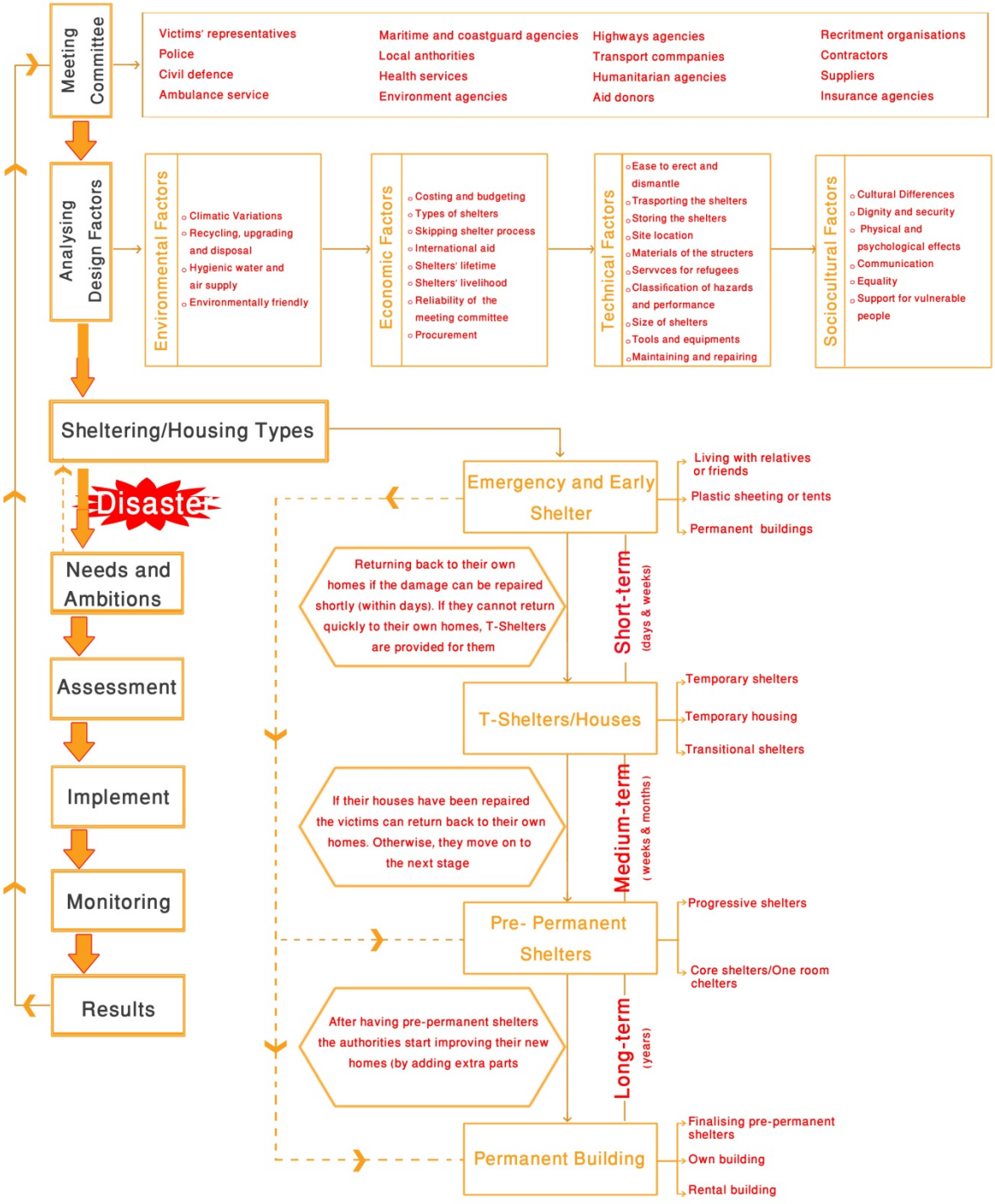

Diagram 1: Life cycle of disaster relief (DR) shelters

Stage 1—Meeting of Committee

Successful provision of DR shelters requires a well-co-ordinated multi-agency response [17, 18]. Coordination is required to improve consistency between organisations and between sectors of response within organisations that have access to resources. For example, long term shelters should not be built without drainage, so coordination of water sanitation and

hygiene promotion activities is required. Shelters will also require access to community infrastructure and income-generating activities, so coordination of employment, health, and education sectors is required.

A large number of organisations must work effectively together to ensure that people are advised to leave their homes and move to secure places with support and protection until they can safely return to their permanent homes. It is important that the response is managed locally first, with local people because they are familiar with local circumstances, and choose their leaders who is competent by experience, knowledge, skills, and willing to organise and manage. After that, local authorities must engage with and communicate with the victims' communities--and with other national and international stakeholders who are responsible for the provision of aid--about what they should and can do following a disaster, particularly to provide shelter to enable the victims to help themselves and others. The stakeholders to be part of the committee include:

- Representatives of affected people (e.g. mayor neighbourhood)
- Police and civil defence
- Fire and rescue authorities
- Health organisations
- Ambulance services
- Health and safety executives
- Maritime and coastguard agencies
- Local authorities
- Environment agencies
- Highways agencies
- Transport providers
- Humanitarian agencies
- Consulters
- Designers
- Suppliers
- Donors
- Employment agencies
- Educational institutions
- Care centres
- Insurance agencies
- Telecommunications
- Media
- Others

Stage 2—Analysing Design Factors

After the committee has been formed, it is important to discuss the various factors including environmental, economic, technical, and sociocultural factors as shown below. Also, each person and organisation in the committee should be clear about and know its tasks and responsibilities in advance, before disaster strikes, such as what they're to do, how, when, and where.

2.1 Environmental factors are climatic variations; recycling, upgrading, and disposing of materials; hygienic water and air supply; and the need to be environmentally friendly. Considering environmental factors for DR shelters will improve air and water quality, minimise energy and water consumption, and reduce waste [30]

2.2 Economic factors include costing and budgeting; types of shelters; the process of skipping shelter types; international aid; and the lifetime and livelihood of the shelters.

Considering economic factors will help to decrease the costsand improve the quality of DR shelters, as well as improving their long-term value.

2.3 Technical factors include the ease of erecting, dismantling, and transporting the structures; size, materials, and storage of the structures; classification of hazards and performance of the structures; availability of construction tools and equipment; ease of maintaining and repairing the structures; location of the evacuee camps; and services for evacuees;.

2.4 Sociocultural factors are cultural differences; dignity and security of the inhabitants; physical and psychological effects of disasters; communication; equality; and support for vulnerable people.

Stage 3—Sheltering/housing types

Shelter/housing types are a very important productive asset, providing a space in which to work and rest, care for children and elderly people, store tools, allow affected persons to concentrate on other livelihoods-related needs [6]. Choosing a proper type of DR shelter requires careful consideration of all factors. These types of shelters can be divided into three categories: short-term, medium-term, and long-term. Each term has its own type of shelter as shown below. It is not necessary to follow all these phases; stakeholders can swap between the phases depending on the situation.

3.1. Short-term shelters

3.1.1. Early preparation and emergency shelters

In this phase shelters are used for brief periods of time to deliver life-saving support and are the most basic kind of shelter support [23], aside from staying in another permanent building such as relatives' or friends' houses, or renting buildings orhalls (to be used for a temporary period) for a single night to a few days during an emergency [4, 5, 7, 31-33]. This kind of shelter commonly does not allow for the extensive preparation of food or prolonged medical services.

3.2. Medium -term shelters

3.2.1. T-shelters/houses

3.2.1.1. Temporary Shelters

This type of shelter may be used for short-term as well. A simple tent or a public mass shelter used for a few weeks following a disaster can constitute a temporary shelter [4, 5, 7, 31-33]. According to the IFRC/RCS [23], the duration of stay in such shelters may be limited, and therefore, prioritising speed and limiting costs should be taken into account when constructing this kind of shelter.

3.2.1.2. Temporary Housing

This type of shelter is often distributed for certain periods such as six months to three years. Temporary housing such as prefabricated units allow people affected by a disaster to return to their normal daily activities [4, 5, 7, 31-33]. In many cases, temporary houses are installed on temporary land.

3.2.1.3. Transitional Shelters

This type of shelter is usually developed by displaced individuals themselves following a disaster, and such resourcefulness and self-management should be supported [23]. Transitional shelters are commonly relocated from a temporary site to a permanent location, upgraded to become part of a permanent house, resold to generate income to aid with recovery, recycled for reconstruction, and reused for other purposes [21]. Such transitional shelters are expected to serve for many months or years [9].

3.3. Long-term shelters

3.3.1. Pre-permanent shelters

3.3.1.1. Progressive Shelters

This type of shelter is designed and built to be more permanent and upgradeable in the future through alterable structural components [23]. It could also be an upgraded version of a transitional shelter.

3.3.1.2. Core Shelters/One-Room Shelters

This type of shelter is designed and built with the intent of being permanent housing in the future, and it includes a foundation and all or some of the key services, such as plumbing and various utilities [21]. The goal with this type of shelter is to build at least one or two rooms to meet permanent housing standards and facilitate. However, these shelters are not intended to be a fully-functioning permanent house [23].

3.3.2. Permanent Housing

Permanent housing may be upgraded from a progressive shelter, a core shelter, or even a new house to rent or own [4, 5, 7, 31-33]. Such houses should be resistant and resilient to future hazards and disasters.

Stage 4—Needs and Ambitions

When there is a prediction of a natural disaster the committee should alert the people that will be affected. If the area is not safe, the committee should make a decision to evacuate the people to a safe area as soon as possible. On the other hand, if the disaster–such as an earthquake, hurricane, typhoon, tsunami or flood–has already struck, the committee should identify people's needs and ambitions. After that, they must make a decision as to which

type(s) of shelter they will use, and how long it/they will be used for–that is to say, whether it/they will be used short-term or long-term.

The committee will determine and address the needs of affected people through the elements of the shelters' design, location, facilities and services, and also the people's long-term ambitions for their future lives. At the end of the analysis, the committee will make an initial decision of which shelters are suitable according to the victims' needs and ambitions.

Stage 5—Assessment

In the assessment phase, the committee should assess the initial decision, and reach a final decision for providing shelters to displaced people by reconsidering factors regarding needs, organisational capacity, community capacity, strategy and coordination, skills and staffing, land and settlement, materials and alternatives, hazards, logistics and distribution, time, project planning, and implementation and monitoring and evaluation [23].

Stage 6—Implementation

The implementation stage is the doing stage, and it is important that the momentum of construction is maintained. In this stage the committee should execute the final decision of the suitable structure(s) of DR shelters which maximise fitness for purpose and improve people's quality of life, as well as ensure receiving value for money spent on shelters. Also, this stage needs huge support in terms of training, labour, kits, materials, and resources.

Stage 7—Monitoring

Monitoring the DR shelters during and following the implementation stage is important. Both the DR shelters and survivors must be monitored. In addition, designs should recognise that people occupying shelters will make extensions, upgrades, and alterations. Ongoing life cycle and monitoring is required to ensure that these alterations do not compromise the structure [23].

Stage 8—Result

All the results obtained since the committee meeting phase must be gathered. The benefit of this stage is to gain information and lessons from the provision of DR shelters, and to upgrade the guidance for future use.

6. Conclusion

Everyone has a right to adequate shelter. In other words, shelters should be suitable to live in as clean, green, private, and secure places. Shelter also should ensure protection from rain, cold, wind, heat and other threats such as illness, disease, and structural hazards. Good, habitable shelter provides clean water and washing facilities; an accessible location to materials, resources, and facilities; energy sources for cooking and lighting; and safe access

to schools, healthcare services, childcare centres and other social facilities and to livelihood opportunities. All those factors can be addressed and achieved in the life cycle for DR shelters by considering through all the stages such as meeting of committee, analysing design factors, sheltering/housing types, needs and ambitions, assessment, implementation, monitoring and result as described above which will ensure providing an efficient, rapid, and practical way to shelter displaced people. This life cycle also analyses the specific elements such as environmental, economic, technical, and sociocultural to ensure good value for money is achieved, and that time is saved. In addition, it helps stakeholders to make a decision to choose from different types of shelters which fit with intended purposes.

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Skills Shortages in the Christchurch Subcontracting Sector

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Abstract

In the aftermath of the Canterbury earthquake, the construction industry was confronted with intensified resource competition, a constrained pool of labour, unmet demand for accommodation and instabilities in workload outlook. Subcontracting is an integral part of the Christchurch reconstruction. Therefore, subcontractors' capability and resource capacity are pivotal to the project success. Despite the subcontractors' domination in the construction industry, there is a little exploration of their resourcing capacity in the post-disaster environment. This paper explores the subcontracting sector challenges in resourcing for the Christchurch reconstruction. Difficulty in matching skills to demand has heightened the importance of training and skills development within the subcontracting companies. The effort at attracting skilled employees to remain engaged was made through incentive programmes; however, employees' departure is still evident. The inability at satisfying the workforce demand may result in a major interruption to the reconstruction time frame. This paper provides an understanding of the current resourcing challenges for the subcontracting organisations.

Keywords: Christchurch Rebuild, Skills Shortages, Subcontracting, Post-disaster Reconstruction, Resource Management, Resourcing for Post-Disaster Reconstruction

1. Introduction

The Canterbury earthquake sequence of September 2010 and February 2011 was a significant catastrophic event in New Zealand's history (Stevenson et al., 2014). Occurring as a series of events including September 4, 2010, and February 22, 2011, the earthquake had claimed 185 lives and caused extensive damages to the city. The earthquake has had an enormous economic and fiscal impact on the region and New Zealand (Doherty, 2011). Stevenson et al. (2014) reported that two percent depopulation was detailed between June 2010 and June 2012, besides deficiency of building stocks and disruptions to built environment development. Shortage of construction resources and alternatives, inadequate accessibility to resources and limited source of resources were the perceptible resourcing obstructions in the post-disaster reconstruction projects (Orabi et al., 2009; Chang et al., 2010).

The present status of the Christchurch reconstruction signifies an escalation of resource pressures that emanates predominantly from the inadequate workforce supply and the applicability of training provision (Piri et al., 2014). As the Christchurch reconstruction proceeds, resourcing strategies are perceived as a vital determinant that shapes the Canterbury's long-term economic outcome (Stevenson et al., 2014). Even though resourcing has been recognised as a recurring issue in post-disaster reconstruction environment, its complexity is still under-researched to allow for industry-wide dissemination (Chang et al., 2010). The Christchurch reconstruction is pacing steadily, and the escalating workforce demand has led to a competitive skill acquisition among the subcontractors. This paper discusses subcontractors' responses in tackling the resourcing shortages. It details the current skills availability for the Christchurch reconstruction and the workforce resourcing strategies used by the subcontractors to overcome skills shortages.

2. Subcontracting in the Construction Industry

Subcontracting is an integral part of the construction industry (Stinchcombe, 1956; Eccles, 1981; Lai, 2000; Edward, 2003; Loosemore and Andonaki, 2007; Hartmann and Caerteling, 2010; Dainty and Loosemore, 2013). Subcontractors execute significant roles in the construction activity (El-Mashaleh, 2011), dominating approximately 90 percent of the physical execution of a construction project (Hinze and Tracey, 1994; Shash, 1998; Kumaraswamy and Matthews, 2000; Karim et al.; 2006). Reliance on subcontracting is preferred by main contractors as it provides flexibility and specialist expertise (Loosemore and Andonaki, 2007). Subcontracting serves as a means for the main contractors to survive the volatility of construction business cycles (Dainty et al., 2001).

Costantino et al. (2001) discussed factors for using subcontracting practices, such as its ability to minimising contractors' liability risk; reducing overhead, construction, equipment and maintenance cost; improving the contractors' survival; enhancing the speed of construction; and achieving better workmanship through the utilisation of specialists. Kim and Paulson (2003) discovered that the inability of the subcontractors to resource adequately may jeopardise their performance and create work disruption in the project.

3. Skills Shortages in the Construction Industry

The underlying causes of skill shortages in the construction industry have been well researched. Dainty et al. (2004) ascertained the factors are demographic shrinkage in the size of youth cohort entering the labour market; the fragmentation and poor image of industry; rapid development of mechanisation and new technologies; the expansion in self-employment and utilisation of labour only/sub-contractors; the reduction in training investment; and the workforce movement into other sectors. Lobo and Wilkinson (2008) discovered recruitment diversifying, salary increases and reinvigorating on training requirements are the workable solutions in tackling the skill shortages.

Skills development demands a sustained effort in understanding the practical realities of skills provision at a project level (Chan and Dainty, 2007). Oyegoke et al. (2009) suggested three dynamics in escalating construction skills development. The dynamics are the establishment of equilibrium between construction demand and supply capacities; building competencies to address skills shortages; and addressing the skill gap that derives from knowledge deficiencies. They suggested that the long-term skills development for small construction organisations is attainable through:

i. Strategic capacity planning that combines retention strategy, continuous training and balanced construction demand and contractor's supply capacity over a long-term,
ii. Upgrades the knowledge base of the supply chain through conferences and training schemes,
iii. Strategic investment in workforce through training, vocational and higher degrees, and
iv. Strong networks with different sources of finance.

There has been a demonstrable prioritisation in attracting and retaining quality people within construction organisations (Yankov and Kleiner, 2001). The skills crisis in the construction industry calls for a better understanding of the relationship between the industry's employment and human resource management practices (Dainty et al., 2004). It is, however; minimal consideration was positioned on the human resource aspect, and most projects are managed as technical systems instead of behavioural systems (Alzahrani and Emsley, 2013). The actualisation of a structured workforce management programme in the construction industry is still in its infancy and casually conducted in the form of on-the-job training (Brandenburg et al., 2006). Its implementation is supported by minimal available resources at the project level in enhancing further workforce training and development.

4. Research Methodology

This research employs a case study method as it facilitates the development of descriptive understanding of managing resources in the post-disaster environment. Case studies act as a beneficial tool for supporting deeper and a more detailed investigation of response on how and why questions (Rowley, 2002; Yin, 2003). In this research, in-depth interviews were conducted with thirteen subcontracting organisations that have been involved in the Christchurch reconstruction.

A purposeful sampling scheme was utilised to examine the subcontractors' experiences in resourcing for the reconstruction works. Patton (2002) elucidated that the strength of purposeful sampling strategy relies on the information richness of the selected case. The sample group investigated was of small to medium-sized subcontracting organisations with the number of employees ranging from 1 to 100. The selection was made based on the subcontractors' involvement in the Christchurch reconstruction projects and their willingness in providing access for interviewing. Data retrieved from the interview provides qualitative insights on the subcontractors resource planning, problematic resources and the resourcing strategies in meeting the rebuild demand. The profile of the interviewees is presented in Table 1. Access to data collection is in compliance to the University of Auckland Human Participants Ethic Committee on a reference number of 7520.

Table 1: Profile of Interviewees

Subcontractor	Nature of Business	No. of Employees
S1	Roofing, plastering, painting subcontractor	35
S2	Civil construction and drainage works	30
S3	General civil subcontractor	20
S4	General earthwork and civil subcontractor	50
S5	Building services installation	18
S6	Civil construction subcontractors	200
S7	Steel and mesh specialist	60
S8	Commercial buildings and residential builder	65
S9	Civil contracting and drainage subcontractor	50
S10	Civil earthworks and civil construction subcontractor	36
S11	Building façade specialist	85
S12	Drainage subcontractors	8
S13	Geotechnical and civil construction specialist	100

5. Findings

5.1 Availability of Skills

The volatility of the labour market, coupled with instabilities in the rebuild workload outlook, generates greater challenges in acquiring specific skills. The Ministry of Business, Innovation and Employment (2014) forecasted work to be at peak in December 2016 and the reconstruction

works hike up requires 38,000 construction workforces. Consistent demand for certain roles has been reported in 2014 within the subcontracting organisations in Christchurch (Chang et al., 2014). The revealed job vacancies were the skills of drain laying, welding and machine operating. Chang et al. (2015) further discovered prominent skills shortages in the supervisory and management skills; apart from general labouring within the subcontracting sector. The low job-filling rate serves as an indicator that reflects on the tight labour market situation in Christchurch. High dependency on skilled labour and the paucity of a qualified workforce have restricted the subcontractors' accessibility to reconstruction opportunities. A majority of the interviewees encountered difficulties in attracting potential employees to fill certain roles in their organisations. The interviewees agreed that a continuous effort to recruiting and retaining specific trades had become a necessity. The list of skill shortage vacancies across case study organisations is tabulated and presented in Table 2.

Table 2: Skill Shortage Vacancies

TRADES	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13
Carpenter	√							√					
Designer and draftsman											√		
Digger driver										√			
Drain layer				√					√				
Drainage operator						√						√	
Drainage foreman						√							
Machine operator		√	√									√	
Painter	√												
Pipe layer		√	√										
Plasterer	√												
Project manager											√		
Site engineer						√			√				
Site supervisor			√										√
Site staff installer					√						√		
Skilled asphalt operator						√							
Technical top roles							√	√					
Truck driver				√						√			

5.2 Recruitment and Retaining Strategy

Direct and international employment were the recruiting alternatives opted by the investigated subcontracting organisations. A prioritisation of local skills was evident in the attempt to achieve long-term employment. Realising the importance of keeping the workforce to be trained throughout the organisation life-cycle, the subcontractors offer competency development opportunities to their recruits. Consistency in development support is complemented by an active managerial support and the creation of a collaborative working environment. Other than that, the employment relationship is enriched by the recognition of wellbeing needs and the management openness. The subcontractors perceived that acknowledgement of employees' need and expectation acted as a strong enabler to engender the employees' trust, loyalty and support. Encouragement of work operation diversification was permitted, aiming to unlock the inherent

potential of the workforce. A majority of the investigated subcontractors emphasised the importance of balancing extrinsic and intrinsic incentives. As such, the monetary reward and job promotion are simultaneously executed with the employees' intrinsic needs (responsibility recognition and expansion, skills and abilities development and challenging task assignment).

It was found that 11 interviewees employed international workforces as a response to fulfil their organisation skills need. International employment was pursued due to the limited availability of the local skills to meet the rebuild demand. A general agreement was retrieved from the interviewees on the effectiveness of the alternative at solving the immediate recruitment difficulties. The international employment preferences are from Australia (S1, S5, and S7), China (S6 and S9), Chez Republic (S1), England (S1, S2, S6, S8, S11, S13), France (S9), Germany (S9), Ireland (S1, S2, S6, S8, S9, S10, S12, S13), the Philippines (S1, S2, S5, S8, S9, S11), Scotland (S13), South Africa (S9) and the United State (S5).

5.3 Skills Development Strategies

The sector's buoyant labour market has driven to proactive training activities by the investigated subcontractors. Demand for specific skills remains to be erratic, and the cyclical fluctuations in the construction industry are obstructing sufficiency in the supply of skilled labours. The findings serve as a great deal of evidence to suggest that consistency in training and skill development enables subcontractors to safeguard the sustainability of their skilled workforce. It was highlighted in the interviews that employees are the drivers for productivity improvement and preserving the organisations' competitiveness. To preserve the relevance of employees' competency, the subcontractors demonstrate a robust effort in upskilling existing staff; training new entrants; initiating apprenticeship schemes and enhancing mentoring practices among the workforce.

6. Discussions

The skilled labour shortage has been frequently cited by the majority of the interviewees, confirming the existence of acute skill deficits within the Christchurch subcontracting sector (Chang et al., 2015a; Chang et al., 2015b). Disconnection of the workforce supply and the rebuild demand creates a constrained pool of labour and intensified competition among the subcontracting organisations. The demanding necessities for rebuilding Christchurch lead the subcontractors to allocate their labour resources flexibly. This scenario reflects the need for a systematic workforce planning and escalates the importance of empowering the subcontractors skilled labour resourcing. The success of resourcing skilled labour depends on the quality of skills available, proactive recruitment and retaining activities and skills enhancement within the subcontracting organisations. These three elements have been illustrated in all thirteen case study organisations as mechanisms to strengthen the competitiveness of the organisations, motivate employees' commitment and enhance the organisations' productivity. Their effectiveness, however, relies largely upon the managerial implementation power and acceptance from the employees.

Figure 1: Empowerment of the Subcontractors' Skilled Labour Resourcing

Employees' recruitment, retention and improvement of skills were key topics for interviewees and becoming priorities in all the investigated subcontracting organisations. The finding is parallel with the exploration of Khoong (1996) that discovered the importance of equipping organisations with a balanced manpower through appropriate conceptualisation of recruitment, retention, career progression and training schemes. A majority of the interviewees agreed that the labour market fluctuations create the struggle for their organisations to meet the workforce requirements. Therefore, an enhanced understanding of the competing factors that shape the labour market is needed in the attempt to circumvent the consequences of skills shortages (Dainty et al., 2005). Figure 2 is the summarisation of the response strategy to skills shortages used in the investigated subcontracting organisations.

Figure 2: Subcontractors Skill Shortages Response

Table 3 exhibits the findings retrieved from the literature and interviews.

Table 3: Factors for Skills Crisis and the Skills Shortages Response

General Themes	Scholars' Perspectives	Subcontractors' Perspectives
Factors for Skills Crisis	• Poor image of the construction industry • Demographic shortfall in the numbers of people entering the labour market • Mechanisation development • Lack of training • Growth in self-employment • Reliance on specialist and labour only sub-contractors ***(Dainty et al., 2004)***	• Greater labour demand for the Christchurch rebuild • Low unemployment rate; inadequate supply of workforces in the New Zealand labour market • Difficulty in sourcing skilled labour to fill the skills shortage vacancies • Fluctuation in the workflow outlook
Recruitment and Retaining Strategy	• Diversity in recruitment system • Remuneration increment • Introductory of a feasible and quality training regimes ***(Lobo and Wilkinson, 2008)***	• Direct employment • International employment • Managerial roles • Work diversification • Balancing extrinsic and intrinsic incentives
Skill Development Strategies	• Building up the employees' competencies through training and education systems • Fostering a continuous learning environment • Assimilation of retention strategies, skill development	• Upskilling the existing staff • Training the new entrants • Initiating apprenticeship schemes • Mentoring practices among employees

strategies and the subcontracting business capacities. ***(Oyegoke et al., 2009)***

The findings show that the strategies implemented by the case study organisations are of ad hoc nature. The preference for casual arrangements is not surprising; as the inclination towards arbitrary, ad hoc and individualised workforce management within construction organisations has been evidenced in previous studies (Cardon and Steven, 2004; Brandenburg et al., 2006; Lobo and Wilkinson, 2008). Thus, while an ad hoc solution is reliable at curtailing immediate issues concerning the labour force management, little has shown the formulation of long-term planning of workforce resource management within subcontracting organisations. A subcontractors' workforce planning framework is suggested as a solution to be incorporated into the subcontracting organisation strategic planning decisions. The framework enables subcontractors to maximise resource utilisation efficiently, classify a precise workforce needs, enhance the workforce career development and attain a better visibility on the future employment. Figure 3 displays the proposed framework, aimed at refining the subcontractors' workforce management processes.

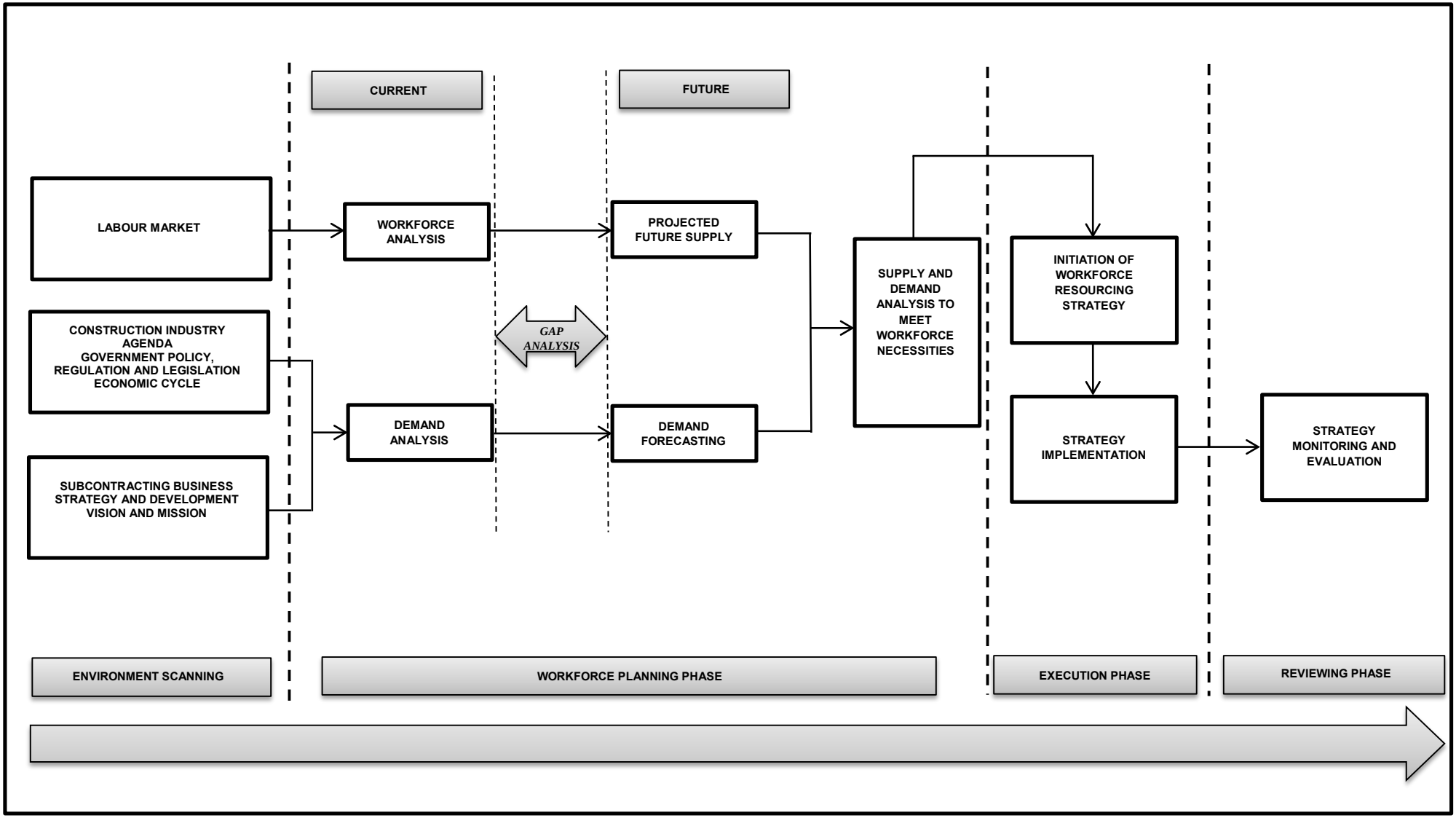

Figure 3: The Proposed Subcontractors Workforce Planning Framework

7. Conclusions

The skills agenda has emerged within the Christchurch construction industry as the Christchurch reconstruction proceeds. Skills shortages have been a perennial issue due to the insufficiency supply of workforce to satisfy the demand of the rebuild. In order to meet the demand, subcontractors are expected to be flexible at allocating limited resources to multiple projects under the fluctuating post-disaster environment. Consequently, deteriorating in the skill possession among the available workforce was identified as a contributing factor to the skills problem besetting the Christchurch construction industry. The persistence of the skill issues signifies inadequacy of research (Chan and Dainty, 2007), specifically in the exploration of the subcontractors' influences at alleviating skills challenges (Dainty et al., 2001; Asgari et al., 2014). This research aims to formulate a framework of resourcing best practice for subcontractors. The framework seeks to enhance the subcontractors' resourcing capacity in the face of increasing challenges to adequately resource projects in the aftermath of catastrophes.

The impediments in resourcing for Christchurch show the need for employing workforce planning in response to the skill shortages. Equipping the subcontractors with a systematic workforce strategy makes optimal utilisation of the organisations' human resources and enhances their competitiveness in meeting the future demand. This research shows that the workforce resourcing success depends on the integration between the management of human resources and human resource development. By understanding the subcontractors' skills shortages responses, this should enable the establishment of a collaborative strategy between the government agencies, tertiary institutions and training providers in the planning of long-term labour resourcing management.

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Lessons From Nature: Defensive Designs for the Built Environment

Paper ID: 426

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Abstract

Recent natural disasters make a compelling case for defensive designs in support of our built environment. The resulting human, physical, and economic cost justifies any real or perceived additional cost. This paper surveys the latest extraordinary weather events and devastating seismic activities, and offers examples of how nature's work can be imitated for self-defensive measures. The human body can serve as a model to emulate. The skeletal system, its bones, joints, ligaments, tendons, muscles, and cartilage interact to provide strength and facilitate movement. In particular, the femur is offered as an adaptation model for building design and construction. Its hallow cylindrical shape supports the upper body and all of the strain and weight that endures from standing, walking, running, and jumping. The multilayered bone fibers of the femur are also key to this strength. A parallel between the human skeleton and building design can thus be drawn.

Keywords: Biomimicry, natural disasters, protection of human lives, resilient infrastructures

1. Introduction

There is evidence that erratic and extreme weather is becoming a common occurrence, and even predictions that this will become even more frequent and more severe [1]. It also appears that the severity of earthquakes is intensifying. Some observers believe that human conduct has given reasons for such change; others attribute this to environmental and geological cycles. However, as some physicists, environmental scientists, politicians, and others continue to debate the connection between weather events, seismic activities, and climate change, other scientists, engineers, and urban planners are exploring how can our habitat become more responsive and resilient to such phenomena. There are a number of recent instances of nature's destructive events that provide basis for the development of defensive measures.

2. Recent Extraordinary Weather Events

Extraordinary weather events have become commonplace and, to varying degrees, many parts of the world experience such dangerous storm systems. Depending on where they occur, these may be referred to as hurricanes, typhoons, or cyclones. Different names, but the same weather phenomenon with identical behavior and consequences: unusually strong winds, heavy rainfall, large waves, and coastal and as well as inland flooding characterize such hazardous storms. While the frequency of these weather systems is noted, unfortunately the severity of some makes them memorable events. The following section provides important facts on three recent dangerous weather systems.

2.1 The 2005 Hurricane Katrina

Hurricane Katrina, a category 5 storm, was one of the strongest and deadliest to ever hit the United States in August of 2005. Over 1,800 people died during the hurricane and the flooding that followed seriously impacted the states of Louisiana, Mississippi, Florida, Georgia, and Alabama, with Louisiana and Mississippi suffering most of the causalities. New Orleans, Louisiana, in particular, paid a heavy price with the highest death toll and largest number of people left homeless. The storm surge severely compromised the city's levee system and left many roads in and around New Orleans damaged. Katrina's wind intensity was nearly 175 mph at its peak, which leveled many homes and left all types of other buildings completely destroyed.

2.2 The 2012 Superstorm Sandy

Superstorm Sandy, striking in October of 2012, was the largest Atlantic hurricane on record. A category 3 storm, its peak intensity was reached offshore as it hit Cuba and the Caribbean, but it reserved its most devastating force for the United States. Sandy ravaged nearly half the states in this country, from Florida to Maine on the east coast, and from Michigan and Wisconsin inland, with a particular brutality inflicted on New Jersey and New York. As soon as Superstorm Sandy made land fall in New Jersey, near Atlantic City, the streets began to flood as homes crumbled. With 115 mph winds at landfall point, uprooted trees and knocked down power lines were a common sight, leaving much of the State in darkness for days, weeks, and, in some places, months. Given where it made contact with land, much of the State's shoreline was ravaged beyond expectation. Furthermore, a significant capacity of air, sea, and land transportation systems were disrupted, affecting people's movement and the business supply chain at all levels.

2.3 The 2013 Typhoon Haiyan

Striking the center of the Philippines in November of 2013, Super Typhoon Haiyan, locally named Yolanda, is the most recent and possibly most powerful storm in history. A category 5 storm, with a maximum sustained winds of nearly 200 mph right before it made landfall earned it the designation of a super typhoon. Although not the worst natural disaster in recent memory, but

more intense than Katrina's wind at its peak, Haiyan is responsible for over 5,000 death and 10,000 injuries, in addition to flattening a great number homes, churches, schools, hospitals and all kinds of other buildings. Many of the casualties were attributed to buildings being destroyed during the typhoon, which was also responsible for hundreds of thousands of people being displaced from their homes.

Other storms over past decades, although less intense, have brought similar destruction here in the United States and elsewhere in the world. However, there is agreement, generally, that the intensity of storms has been rising during the last few decades, and will continue to do so over the coming decades, with the likelihood of more damaging ones [2]. Weather-related events are only one type of extraordinary hazards that can disrupt our society, burden our economy, and cause significant personal and property damage. Geological disruptions bring similar risks of emotional, financial, and physical damage. The following section provides important facts on four recent, dangerous earthquakes.

3. Recent Devastating Seismic Activities

While the frequency of geological disruptions is less common than severe weather systems, unfortunately the resulting devastation of seismic activities can be the same, if not more. The last decade has had a number of such vivid examples of earthquakes.

3.1 The 2004 Indian Ocean Earthquake

A most notorious earthquake is one that occurred in December of 2004 in the Indian Ocean approximately 100 miles into the water off the west coast of Sumatra, Indonesia. Even at a magnitude of 9.1, because the Indian Ocean Earthquake was undersea, it obviously caused no damage to its watery surroundings. However, the earthquake suddenly magnified the height and speed of waves in the ocean resulting in tsunamis that overwhelmed communities along the coastal regions of the Indian Ocean, and was particularly devastating to Indonesia, Thailand, Sri Lanka, and India. Its human toll, more than a quarter of a million people dying, 125,000 injured, nearly 50,000 people missing, and close to two million people displaced, earned the Indian Ocean Earthquake and Tsunami its distinction as the deadliest natural disaster in recorded history.

3.2 The 2008 Sichuan Earthquake

The Sichuan Province, a mountainous region in Western China, is prone to earthquakes. In May of 2008, it faced yet another one of the most destructive earthquakes on record, an 8.0 magnitude. The Sichuan Earthquake left about 90,000 people dead, 18,000 missing, and nearly 400,000 injured. Neither the mud-brick houses nor the more modern reinforced concrete buildings in the impacted earthquake zone were able to withstand the effect of the shaking. As a result, millions of people were left without housing. In fact, this Sichuan earthquake is responsible for creating the highest number of homeless people in history due to a natural disaster. Notably, so many schools

collapsed causing a higher rate of children's deaths. Even though the Chinese government, because of the persistent threat of earthquakes in the region, had introduced more stringent construction code, subsequent reports have indicated such codes have not been enforced during the country's recent building boom [3].

3.3 The 2010 Haiti Earthquake

In January of 2010, a remarkably powerful earthquake hit Haiti. Although there have been conflicting reports on casualties, the Haiti Earthquake, a 7.0 magnitude and the strongest in 200 years, is likely to have killed nearly a quarter of million people and injured 300,000 more. An estimated 250,000 residences were also destroyed or damaged leaving millions of people homeless. Haiti shares the Caribbean Island of Hispaniola with the Dominican Republic where earthquakes are common [4]. Despite this, Haiti had no building codes, which explains the overwhelming infrastructure disruption it suffered as a result. Given the lack of construction standards and the number of affected buildings, the number of causalities could have been even larger. The fact that the overwhelming majority of dwellings in the country are low rise with light metal roofs was a positive factor in this. However, the use of heavy materials, such as concrete, to construct the walls without proper reinforcement contributed to the large number of destroyed buildings.

3.4 The 2011 Tōhoku Earthquake

A major earthquake hit Japan in March of 2011. The Tōhoku Earthquake, with a magnitude 9.0, was a record-setter for the country. Like the 2004 Indian Ocean earthquake, Tōhoku also occurred undersea about 43 miles east of the Oshika Peninsula of Tōhoku. There are more similarities between these two quakes: a powerful tsunami followed that claimed the lives of more than 16,000, most due to drowning, injured nearly 6,000 people, and left 3,000 more missing. Hundreds of thousands became homeless. The tsunami, which flooded an area of over 200 square miles, was accompanied by huge waves topping multi-story buildings. Further aggravating this, the tsunami caused failures at a local nuclear power plant causing a nuclear meltdown and the release of radioactive materials. It is well known that Japan is a seismically active region, and earthquakes are part of this country's history. The brutal force of the Tōhoku earthquake and its devastating character has been a surprise to scientists.

The ability to prepare for, respond to, and recover from environmental and natural disaster hardships requires that our physical infrastructure be designed in manners that allows it not only to withstand natural disruptions, but also in ways that enables it to adapt to changing conditions and ensure functional continuity at the individual and community levels. Interestingly, nature itself provides a model in resiliency, innovation, and progress reaching back billions of years and providing rich templates and examples for developing such sustainable human technologies. This process is referred to as Biomimicry or Bionics [5].

4. Imitating Nature

Human imitation of nature is not new, and could explain our status as a most resilient creature on this planet. In fact, biomimicry seems to be increasingly serving as a guiding principle for managing our natural resources, designing our machinery, and planning our built environment. Although we have not yet found a way to produce only clean energy, exploit all the sunlight that is emitted, or generate no waste, we are becoming less wasteful and more resilient in our everyday lives. In that regard, we remain novices compared to nature but, in particular, our buildings are becoming more responsive to disasters by employing design strategies that aim to invest minimal resources for maximum effect [6], thereby taking a page out of nature's book.

Take the human body as an illustrative point. Its skeletal system is composed of bones and joints. There are also ligaments, tendons, muscles and cartilage, which facilitate movement. From a structural viewpoint, the femur bone, longest and strongest among them all, is shaped like a hollow cylinder–an interesting one to consider. The femur design takes into consideration its role in supporting the upper body, with all its strain and heavy weight resulting from compression, bending, and torsion. The femur also endures equal strain from standing, walking, running, and jumping. It is specifically designed to provide maximum strength with minimum weight. The anatomy of the femur is based on multi-layered bone fibers that are aligned and crisscross each other to withstand the forces of the upper body. It is not hard to conclude that a parallel between the human skeleton and the structure of buildings can be drawn, particularly for construction in geologically active areas.

Shaking produced by earthquakes, volcanic eruptions, hurricanes, floods, and tsunamis create similar stresses on built structures as those endured by the human body as a result of its various movements. Unlike the human skeleton and its harmony with the needs of the body it supports, the overwhelming majority of existing built structures is inconsistent with Earth's dynamics and its flow of forces. For example, seismic waves depending on earthquake intensity, duration of shaking, distance from epicenter, and the geophysical characteristics of the impacted area routinely cause damage to buildings ranging from minor destructions to total collapse. Because of this, natural disasters often cause significant material and human loss.

5. The Femur as an Adaptation Model for Building Design and Construction

Recently, architects, civil engineers, and environmental engineers have been using the anatomy and mechanics of the human body as basis for designing and constructing buildings, often referred to as bio-structures, that yield improved ability to withstand and respond to natural and human-caused hazards [7]. Designing such structures involve mimicking biological forms and function to approximate their material strength, movement flexibility, and structural sustainability in order to produce architectural schemes and building solutions with similar properties. Figure 1 depicts analogies between the human skeleton and structural design.

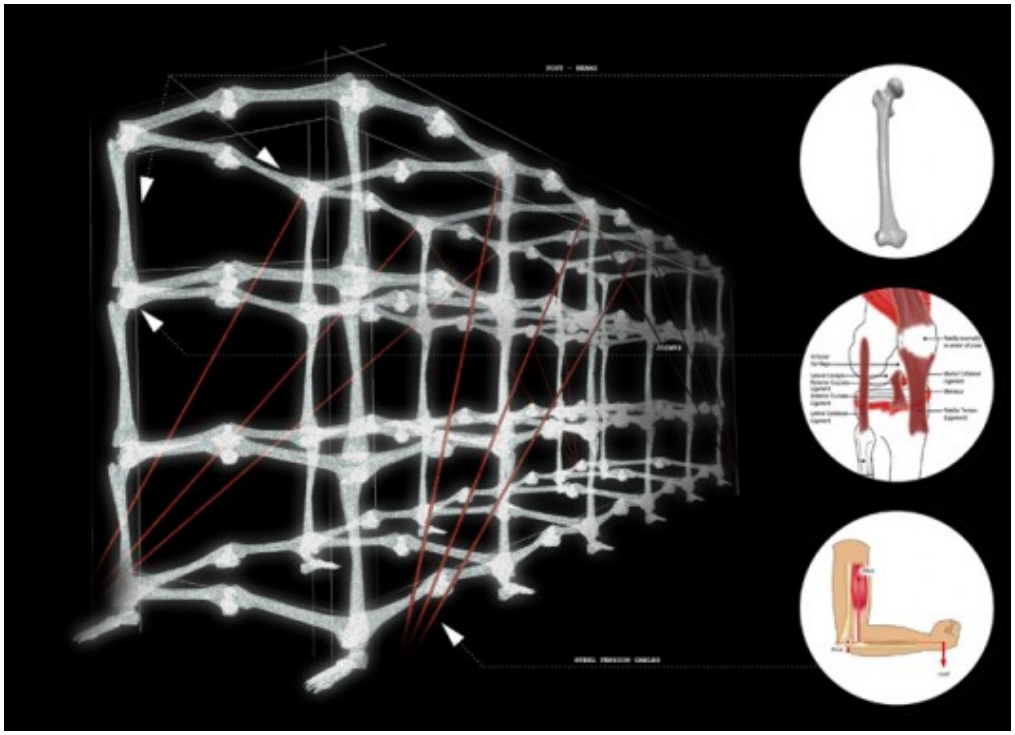

Figure 1: Analogies between the human skeleton and structural design

From E. Ramírez and W. Méndez. Low Consumption Architecture: Energy reduction models trough design. Fifth International Symposium on Energy, Puerto Rico Energy Center-Laccei, February 7-8, 2013, Puerto Rico and nextnature.net/2012/08/structuring-biomimicry-improving-buildings-resiliency-2/

The idea that the human femur can serve as a basis for building structures capable of sustaining load and stress in not new. Constructed in 1887, the Eiffel Tower was intentionally shaped like an upside-down human femur. Borrowing from the anatomy of the internal bone fibers within the femur, it was built with the least amount of iron for the most strength [8]. Figure 2 presents a drawing of the upper femur (upside down) and its lines of stress based on mathematical analysis placed side-by-side with a sectional drawing of the right half of the Eifel Tower.

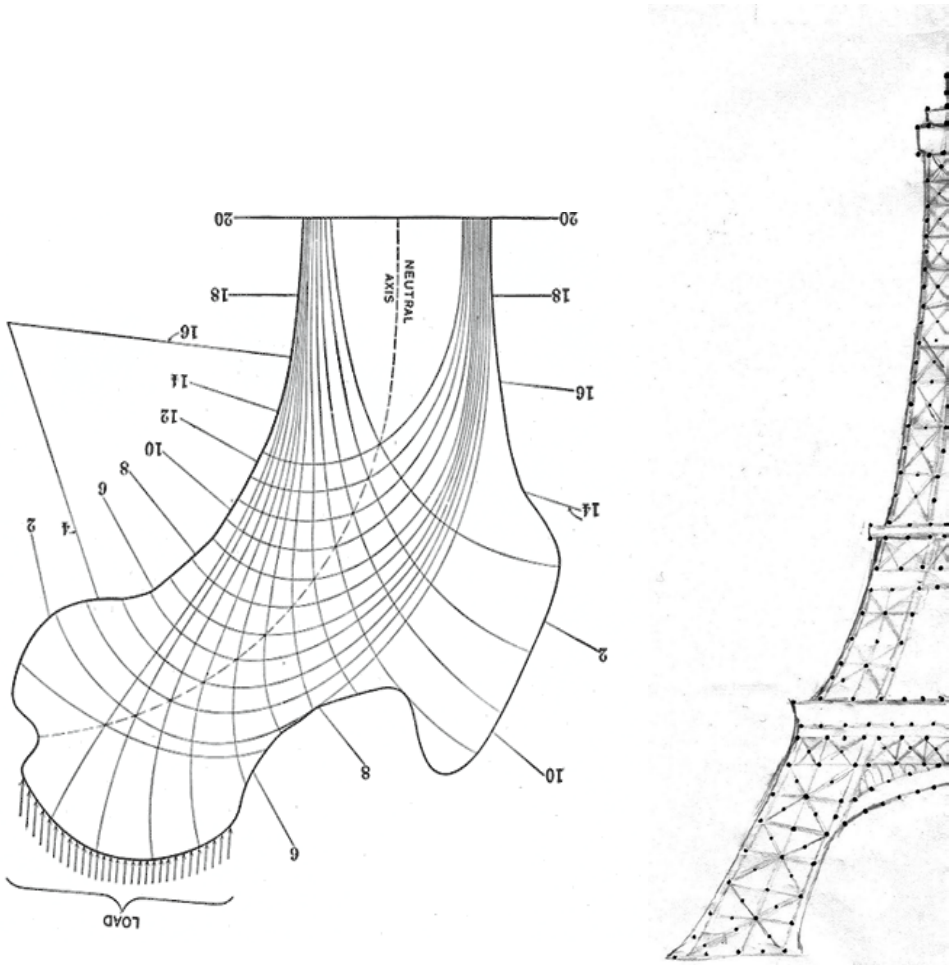

Figure 2: A side-by-side of the femur (upside-down) and the Eifel Tower

From: education.yahoo.com/reference/gray/subjects/subject/59 (femur) and richelafabianmorgan.com/2010/04/eiffel-tower-embroidery-pattern.html (Eifel Tower)

Like femurs, columns and beams can also be shaped as hollow cylinders and made to precisely fit specific load conditions with force applied where needed. This modification alone allows for roughly 30 percent reduction of concrete use [9]. Seismic intensity of building frames that use hollow-shaft columns and beams is similarly reduced as a result of mimicking the human skeleton in building structures. Less concrete means less weight and reduced building seismic vulnerability [7]. Figure 3 shows how the mapping of the femur structure results in sustainable building frames.

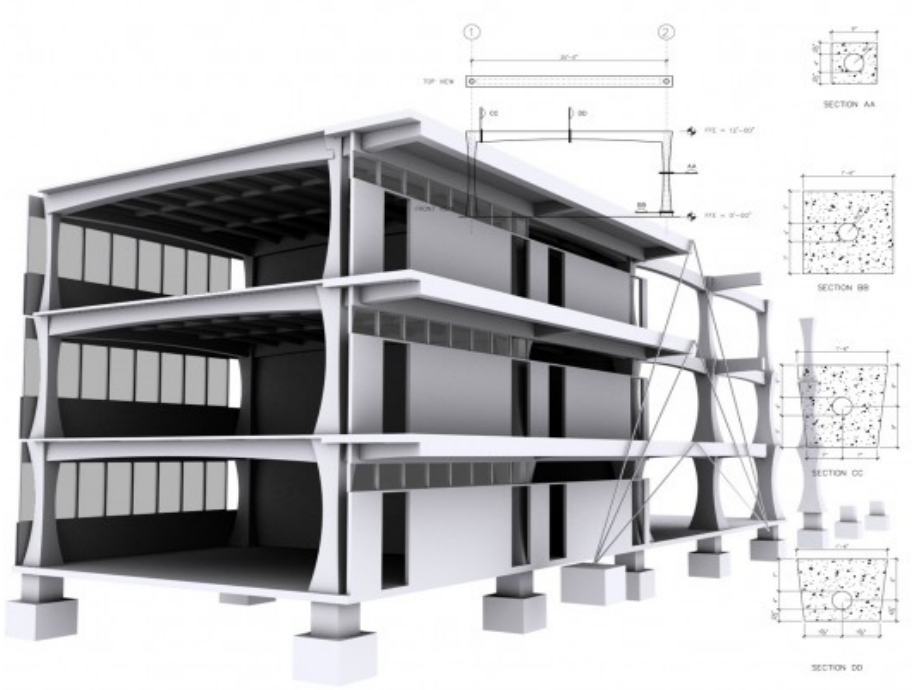

Figure 3: Mapping the Femur Structure into Building Construction

From: nextnature.net/2012/08/structuring-biomimicry-improving-buildings-resiliency-2/

Various concrete blends, masonry, and mortar have been used in construction for centuries, and the subsequent invention of reinforced concrete has made it the most commonly used building material. Blending steel and concrete allows for a higher force resistance giving it more strength in the face of vibrations caused by earthquakes, heavy wind, and other such forces. But even the most robust reinforced concrete suffers damage in the face of strong seismic waves, earthquakes, volcanoes, explosions, and even storms. This vulnerability can be partially mitigated by reducing the weight of necessary material without compromising the structural integrity of buildings, which will in turn increase adaptation to site geology and reduce human casualties [9].

6. Conclusion

Every year, natural disasters and extreme weather affect the lives of many people in various parts of the world. While the risks and dangers of these occurrences can be anticipated, it is impossible to fully confront all such threats. However, it is logical to explore ways to lessen the impact of natural disasters and extreme weather on the built structures so as to improve their resiliency.

The damage resulting from natural disasters clearly has environmental consequences, but it also has human, social, and economic ones. The human race has been working to better protect itself from foreseen calamities such as floods, droughts, and famine since its early existence. Our response has included a mix of developing tolerance for such conditions, migration to areas less prone to these challenges, and building better dwellings and infrastructures. Unforeseen devastations such as those caused by earthquakes and tsunamis are clearly much harder to defend

against. Over time, however, we have also learned that technology is a key component of our overall strategy for improving our resilience, robustness, and, consequently, the protection of human lives.

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Community spirit: Towards meaning and function for social and community resilience.

Paper ID: 440

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Abstract

This paper, representing a review of literature for a research project around community spirit, flood recovery and the capacity for building resilience through application of community spirit within a community development framework, provides an introduction to the nuances of meaning of community spirit as presented within literature pertaining to the flood recovery process. The term 'community spirit' is used in a wide variety of contexts, flood and other disasters included. The National Strategy for Disaster Resilience, the collaborative strategy for enhancing resilience as a disaster management strategy, in its introductory remarks identifies community spirit, which supports people in need, as something for which the Australian people are known and as an integral component of their ability to recover from disasters. The NSDR makes this claim without elucidation as to what community spirit means or any discussion about the way that community spirit functions in providing social support for people in crisis. Much of the contemporary research and writing around flood recovery and wider disaster management revolves around the concept of resilience and it is here that the concept of community spirit is largely situated. It is assumed that meaning one holds for the concept of community spirit may be correlated with the way in which one would expect community spirit to then function in the disaster management context and as such understanding meaning allows for clarity with regard to the role for community spirit in social resilience building. In this review of the academic literature the meaning of community spirit is explored with regard to the connection to community resilience, social capital and place attachment/displacement as well as psychosocial wellbeing. Given that flood and other disasters are inevitably part of the future for the global population, in depth examination of the meaning of community spirit as an integral component for resilience building and social support around disaster, is crucial. Only in discovering meaning or indeed, meanings, can we then guide the application of this resource for social and community resilience building.

Keywords: resilience; community resilience; social support; social resilience; displacement

1. Introduction

Contemporary disaster management in a neoliberal political environment and in an era of increasing risk, hinges upon the concept of resilience both of the built environment and also the social. Increasingly, individuals, communities and social groupings are being held accountable for their own disaster preparedness and recovery with the concept of shared responsibility a core concept in strategies for disaster management at the federal level. As a result, resources, tools and capacities that may enhance social and community resilience building are becoming more vital. Community spirit is widely recognized as linked to the flood recovery process and is hailed by governments as a key social support resource which strengthens and assists people in times of need and is also readily recognized as such by the communities themselves. Thus community spirit may be further recognized as a means to facilitating community resilience. However, conceptually community spirit appears to be a subjective term which is interpreted with a variety of meanings. This paper presents the different nuances of meaning presented within contemporary literature pertaining to the flood recovery context and with respect to community and social resilience. In discussing the various themes presented inclusive of as a factor for community resilience, as linked to sense of place, as a source of social capital and as linked to psychosocial wellbeing, this paper will consider the need for understanding meaning for community spirit to be considered a tangible and manageable resource for resilience building.

2. Resilience

Resilience conceptually, refers to the ability to withstand stressors or forces or return to a pre-stress condition (Prosser and Peters, 2010). With historical roots in the sciences, physics, chemistry and mathematics, the concept of resilience has been increasingly adopted by the health and social sciences as a means of explaining the capacity of people to cope with stressors that impact wellbeing (Prosser and Peters, 2010). Furthermore, a sociological perspective locates community resilience as the ability of a community to withstand both stressors and change and to bounce back to a functioning state (Prosser and Peters, 2010, Price-Robertson and Knight, 2012). Increasingly over the last decade community resilience has become conceptually important to policy makers, practitioners and academics in many disciplines (Price-Robertson and Knight, 2012). For Australia, the outcome of the increased emphasis on resilience and in particular, community resilience, has led to the implementation of the National Strategy for Disaster Resilience (NSDR). This collaborative strategy is aimed at identifying and informing the different stakeholders in the emergency management arena of their roles in the achievement of community resilience (Commonwealth of Australia, 2011). This adoption of a resilience based approach to contemporary disaster and emergency management recognises the shared responsibility of many players in disaster preparedness that enhance community resilience, this concept being the core focus of the strategy (Commonwealth of Australia, 2011). The position of government is well stated in the NSDR as one of shared responsibility and as enhanced by the inevitable community spirit that is inherent to Australians.

> "Australians are also renowned for their resilience to hardship, including the ability to innovate and adapt, a strong community spirit that supports those in need and the self-reliance to withstand and recover from disasters."(Commonwealth of Australia, 2011, pg IV).

Here we see the beginnings of expectation from government that community spirit may have a role in community resilience to disaster but without any elucidation as to what community spirit means or how it may function.

In considering if there is indeed a role in community resilience building for the concept of community spirit as manageable resource for building community resilience to disaster in a manner that is more than merely expecting such spirit to exist, occur and enhance recovery, we must have some agreement as to what community spirit means. Only with clarity in meaning or meanings can there be any attempt to foster the context that would promote community spirit which in turn promotes social and community resilience. In researching meaning of community spirit it becomes readily obvious that meaning differs and that there are differences in meaning that may indeed drive the way in which community spirit may function for resilience building. Embedded in research around resilience, particularly disaster focused community resilience, are a variety of nuances of meaning for community spirit which are noted as significant in a number of ways.

- As a source of community resilience
- Linked to sense of place and place attachment
- As social capital
- As contributory to psychosocial health and wellbeing

2.1 Source for community resilience

Skerratt and Steiner (2013) state that a community resilience model functions at an optimal level in communities where there is active participation in the processes aimed at building capacity to cope with stressors and change and that such communities are effectively are empowered by this engaged participation. They note that their research participants hold the view that there is a high level of community spirit during moments of crisis, formed through the shared anxiety of these moments of crisis by the gathering together of the people within the community and leading to engaged participation from which community resilience is instigated. Here we can see community spirit having a sense of meaning relating to sharing, connectedness through gathering as well as through engagement. Smith et al. (2011) consider the fact that during their study of farming households in New Zealand post flood, it was noted that the network of helping relationships formed during the flood, reignited the community spirit leading to more significant and long term communal relationships that effectively increase community resilience. Meaning of community spirit here revolves around this sense of communality and relationships or connections between people. Similarly, Armour (2010) states that it is the interconnectedness of a community that helps to create resilience for that community during a disaster, linking this interconnectedness to community spirit that may further be conceptualised as neighbouring.

George (2013) in an ethnographic account of her own flood experience in Brisbane, Australia, notes that community resilience, in line with federal expectations of shared responsibility, is fostered by working toward building a sense of community through the invocation of community spirit which is seen as having meaning here around volunteerism, helping and altruism. Further, Tobin (1999) states that community resilience is built when internal conflicts within the community are decreased due to the increased community spirit that arises in a crisis situation as the members concentrate their energy on the recovery task at hand in a collaborative fashion. Thus community spirit is viewed in the context of this research, analysing sustainability and resilience in hazard mitigation in Florida, USA, as a short term phenomena that relates to the sharing of social values and organisational consensus within a transient and "synthetic" (Tobin, 1999) community, that being the post disaster community. Again meaning is found in the themes of collaboration, sharing and consensus.

Pupavac (2012) in an article considering disaster management at the global level and the change in attitude towards community governance in accordance with changing views of the nature of disasters and associated responsibility, states that it is this rise in community resilience as a model for disaster management that has led to an increased reporting of community spirit. Pupavac (2012) believes that this increased reporting of community spirit associated with disasters is a response to the globally encroaching attitude that communal values and participatory social responses are the means to coping with future disasters. In an article from the period that preceded resilience models of disaster management, Cronan (1998) states that whilst a disaster in the short term, can dismantle community bonds, the emerging community spirit as evidenced by people, including strangers, helping each other, can help to reconstruct these broken bonds. Here we see meaning around helping and with a more positive role for disaster management as well an introduction to community resilience prior to its adoption as national strategy.

Stevenson et al. (2012) studies individual and community resilience following cyclone Larry in Queensand, Australia, and found that community spirit was one of the most significant means for help in the immediate post cyclone period. This study also found that at the mesosytem (family, friends and neighbours), community spirit as defined also as sense of community provided resilience through connectedness which allowed for the people around to provide help. Interestingly, this help was noted as being both from strangers as well as people that have prior connection. Here community spirit appears to mean helping, connectedness and cohesion. In each of these studies, community spirit, whilst having different nuances of meaning, is deemed as being a source of social and community resilience. Madsen and O'Mullan (2013) in work around social memory and community narratives and the way they contribute to social resilience following a disaster, consider the way in which community spirit is represented in local narratives. These authors state that the community narratives based on shared values which incorporate historical aspects of pioneer resilience such as hard work, self sufficiency and community spirit through volunteerism, add to the post disaster resilience. These values, including community spirit, are viewed as "the very fibre that forms the community" (Madsen and O'Mullan, 2013). We can see here clear meaning of community spirit as volunteerism as well as links to the sense of place of the members of the community.

2.3 Sense of place/attachment

Pooley et al. (2010) concludes, from a study with bushfire communities regarding building of resilience for future bushfire disasters, that the competence of the community and the attachment it has to place is a factor which can be fostered to enhance community resilience. This attachment or sense of place, which is contributory to community resilience is noted as being the same as community spirit by the residents that participated in this study (Pooley et al., 2010). Contrastingly, Manock (2012) states that it is community spirit that fosters a sense of place and attachment to same which leads to the need for community resilience as people are reluctant to leave communities which are located in even high risk areas. Here we may see a cyclical relationship between community spirit and resilience. These two studies offer sense of place as meaning for community spirit but offer no substantive discussion around meaning. The most significant research, around resilience to disaster that notes community spirit as important in fostering sense of place and thereby promoting community resilience is the work of Boon (2014) and the collaborative efforts of Boon et al. (2012). These academic works discuss research focusing on disaster resilience in both a flood impacted town and in disaster affected communities in multiple settings across Australia. Boon (2014) discusses community spirit as noted by flood impacted residents as the most helpful factor during a flood and goes on to discuss community spirit in terms of connected, neighbouring communities who chose to stay in situ post disaster for the benefits that this community afforded them by way of coping with adversity as well as lifestyle. In the collaborative research from Boon et al. (2012) which notes community spirit as a sense of community and having a place within your community, nuances of meaning around community spirit such as solidarity, cohesion, helping, altruism, selflessness and social connectedness are also noted. Community spirit features quite significantly in this piece of research but no real discussion occurs that makes objective definition regarding meanings of community spirit nor the specific way it has been conceptualised by the researchers for the purpose of the study. Meaning in this study appears to be drawn from the noted responses of participants, and seems at times to have been constructed from the researcher conceptualisation of community spirit and applied to responses given.

2.4 Social capital

Smith et al. (2011) state, in connection to their research around community resilience and flooding in New Zealand, that social capital is seen as the key in the shift of disaster management to a community resilience and sustainability model rather than the recovery and response model which preceded it. Hawkins and Maurer (2009) conceptualise, albeit simplistically, social capital as resources that are formed as a result of social networks and social support systems amongst family, friends or community. In considering the role of social capital in the governance relationship for building community capacity in low socioeconomic communities of the United States/Mexican border, Wilson and Guajardo (2000) definitively link community spirit with social capital. They make this link by stating that a community produced

mural which was designed to increase social capital, now stands as a symbol of the emergent community spirit. Smith et al. (2011) found with their research that community spirit was reignited by networks of helpers who came together as a result of the floods indicating meaning for community spirit around connectedness, helping, neighbourliness, camaraderie and the enhancement of communal relationships. We can see here links between community resilience, social capital and community spirit. Smith and Boruff (2011) discuss their conclusion that social capital is linked to the building of resilience in the following way, that social, human and political capitals are possessed within the community but they also link the community to the wider political sphere. Further they comment that in their research findings, that community spirit is enhanced by social connectivity and social bonds strengthened by opportunities to connect with each other. This demonstrates meaning for community spirit around connection and connectedness. Stevenson et al. (2012) further complements this idea in the presentation of key findings from a study around community resilience to cyclones, that state that exosystems or those connections to multiple communities and the wider societal structures lead to enhanced social capital which contributes to community resilience. In this study we can then see connection between these findings around social capital and the social networks that enhance resilience which are viewed as fostered by community spirit and cohesion within the community. Meaning around community spirit here can then be seen as including nuances such as connectedness, cohesion and the helping relationship that Stevenson et al. (2012) earlier link with community spirit. Allen (2013), studying resilience as a component of disaster management, links social capital with volunteerism. This volunteerism is further seen to be constructive in building community resilience and the spirit of resilience that this author deems is an inherent aspect of the Australian people. In writing about community based disaster preparedness, Walia (2008) includes comment on community spirit as social capital which is crucial as a strength for community resilience in a disaster scenario. We can see here links from this author, between social capital and community spirit and the broader disaster management context as well as a succinct meaning from this author of community spirit as social capital.

2.5 Psychosocial health and wellbeing

Contextually, community spirit is also, within the broader flood recovery context, located within research which documents the impact of floods and disasters on psychosocial health and wellbeing. A number of authors note the connection between community spirit and psychosocial health and wellbeing and whilst one could argue that psychosocial wellbeing at an individual level certainly leads to wellbeing at a community level and thus is intimately tied to social health and community resilience, the examples of research do not specifically approach the concept of community resilience. Carroll et al. (2009) discuss their qualitative study around the social and health impacts of severe flooding and their subsequent findings that included the correlation between flooding and psychological health issues, notably Post Traumatic Stress Disorder (PTSD), anxiety and depressive illnesses. Carroll et al. (2009) state that numerous participants from their study, including those flooded and workers from support agencies, note community spirit and bonding as part of the rebuilding process leading to recovery. Community spirit in this context appears to hold meaning around the friendships, connectivity and bonds

which are seen to have been strengthened by the sharing of a traumatic experience. This sense of spirit and bonding may be further linked to rectification of psychosocial ill health caused by broken place attachments and alienation from community as well as the assault on identity instigated by the flood, although they do note that in as much as some relationships having been strengthened by the community spirit following the flood there were also a number of broken relationships that followed. In research around the same flood event Convery and Bailey (2008) again study the health and social impacts of this flood on the community of Carlisle in the United Kingdom. They discuss physical ill health and similar psychological issues and also note the sense of place that is lost during a flood event and the psychological distress that may eventuate. Research participants from this study note a renewal of community spirit with neighbours helping each other but as well note a loss of community spirit as evidenced by thefts and a subsequent loss of trust within the community. Here we can see meaning for community spirit around neighbouring or connection between people and place either as a positive outcome from disaster or as a negative outcome which is constituted by a lack of spirit.

Ceobanu and Grozavu (2009), again researching the psychosocial impacts of flooding in Romania, report in their findings that a lack of community spirit leads to decreased social health and increased impact on psychological health. They link building community spirit with flood preparedness. The meaning for community spirit here is derived from researcher opinion which was based on participants noting the lack of assistance that people within the community offered each other. Ceobanu and Grozavu (2009) further state that management for future disaster should involve the building of community spirit as connection to each other and solidarity and as a sense of and means to community self reliance. Similarly, Shepherd and Williams (2014) note that community spirit was reported by their research participants as being a resource that was readily available, non physical resource for response to disaster and on which was considered as evidence of shared local values. This research was aimed at identifying the role of locality and community in reducing suffering from disaster and looked at the small local community, as embedded within the wider community as a source of reliable, disaster related resources.

Writing by Ladrido-Ignacio and Perlas (1995) and Vasterling (2008) allow for interesting comparison between developed nation disasters and those occurring in the developing world. Both articles note that participation of victims in the recovery stage is crucial to psychosocial wellbeing as well as being linked with a sense of purpose, re-emerging hope and community spirit. Both articles note the acts of community collectivism that contribute to community spirit, however Ladrido-Ignacio and Perlas (1995) note more so the intervention by formal disaster management personnel. This may be a result of the historical context, top down focussed policies rather than resilience based. This author also notes that community spirit is only useful where there is an end to the disaster not as much for developing countries where deficiencies in infrastructure and lack of emergency funding may impede the recovery process by significant amounts of time. Meaning is perhaps tied to collectivism but differs between developed nations and those still developing.

We can see from these sources, clear links between psychosocial wellbeing and community resilience and the role of community spirit with meaning around connection between people and the capacity for collective activity at the community level.

3. Community spirit as a disadvantage

In a study by Box et al. (2013) the arguments against community spirit as a resource for social and community resilience building are introduced. In their findings around resilience building for future flood events during dry times, they note the response of one participant that by the one year anniversary of the Brisbane flood of 2011, who stated that learning from this event was limited mainly to reflections on community spirit rather than any in depth analysis of means by which community resilience could be enhanced for future disaster events. Here we see the meaning of community spirit in a less than positive, as an indicator of a lack of serious response to flood risk by any level of government and as a transient flood response rather than contributor to longer term community resilience. Fairbrother et al. (2013) present research around preparedness for bushfire as a natural disaster, contextually located in rural Victoria, Australia. Specifically, they discuss the role and importance of community in disaster preparedness. This study again precedes the NSDR but it relates to preparedness for the bushfire events that stimulated the policy response which resulted in the adoption of the NSDR. However, it does note the overwhelming emphasis on the widely contested concept of community adopted by the majority of stakeholders in the disaster management process. The core participants of this study were members of what is known as a community fireguard, which are essentially community based, bushfire preparedness and resilience promotion groups as organised by the Country Fire Authority. Whilst the researchers note that policy makers use rhetoric to promote self reliance in the promotion of community based groups, participants themselves note the importance of community spirit as a feeling of connectedness which they deem as fostered by such collective, community based activity. This meaning of community spirit comes from the disaster victims themselves, framed around their experience of community organisation for disaster preparedness. They discuss connectivity through meeting and sharing or the responsibility of goals for preparedness of those people who are geographically close by and note this sense of connectedness as the primary positive outcome of the groupwork program. In this way, the meaning of community spirit is seen as having significance in the sense of connectedness that is not only an outcome of groupwork strategies for disaster preparedness but also for building the resilience of the community, although they do not apply the term resilience but rather community building. Fairbrother et al. (2013) note the limitations to this fostering and expression of community spirit and include discussion around the issues of geographical boundaries. Some participants noted that they felt their neighbours were too far away to connect with or that there was greater need to look after those closer in a geographical sense. In this way we can see that community spirit may well have some meaning that fosters a sense of exclusion and also further alludes to the subjectivity of the concept of community spirit in that some participants find positive meaning where others find negativity.

Interestingly, Forrest and Kearns (2001), in an article that considers the decrease in social cohesion as linked with increasing individualism, changes in social identity as a result in

changes to the concept of neighbourhood and a decrease in or lack of social capital, community spirit is viewed as an elusive and romanticised concept. They state that in low socioeconomic areas, the notion of a cohesive community with high community spirit is an unrealistic and romanticised idea. They further state that community spirit is rated much higher in wealthy and mature neighbourhoods and is interpreted by these authors as the capacity to act collectively when required. Although the meaning is similar to that of other authors, that being around connectedness and collectivism, the broader meaning of community spirit here may not be as positive as it is from other authors who deem it as a disaster management asset. For social resilience there are inevitable issues highlighted here for the potential for community spirit to be beneficial to different social groups where perhaps more vulnerable people from lower socioeconomic groups, people with disabilities, the aged and single parent families are less likely to benefit.

There may well be questions around what the meaning of community spirit is and if it is a beneficial resource for social and community resilience building in the disaster context when one broadens the view of the literature. Offe (2012) in his discussion about the benefits of the concept of the common good, asks if there is credibility in governance that attempts to shirk responsibility or perhaps shift the onus of responsibility to the people with the invoking of rhetorical concepts of which he gives examples as including civic self help and community spirit. There also appears to be questions as to whether the invocation of concepts by governance, that are already deemed positive by many within the community, may be seen as part of the ideology of neoliberalism which would have individualistic self reliance and lessened state financial responsibility as a core focus.

The meaning one holds for the concept of community spirit may be correlated with the way in which one would expect community spirit to then function in the disaster management context. If we view meaning as being connected to helping, volunteerism, neighbouring we would then look for ways in which the enhancement of community spirit can foster increases in activity in these areas to enhance community resilience or conversely, how increases in these activities and connections can build community spirit. Similarly, if meaning for community spirit is seen to be tied to sense of place, the feeling of connection to a location, one can work towards building community spirit through interventions that foster and celebrate this sense of connection. Much of the academic literature appears to view the meaning of community spirit as having a positive correlation with the flood recovery process and as being an almost tangible, albeit subjectively interpreted, resource. There would seem to be much in the way of justification in this point alone for the in depth examination of the meaning of community spirit given that flood and other disasters are inevitably part of the future for the global population. In discovering meaning or indeed, meanings, we can then guide the application of what appears to be a resource. In concluding, perhaps there will need to be some appreciation that meanings of community spirit will appear to be different when viewed from a different perspective from that of academia and as such, the communities and people themselves. However, it is in the discussion of these nuances of meaning that we can begin to drive the resource of community spirit so that it indeed becomes as asset of the people to allow them to participate in their own social and community resilience building in the face of inevitable, forthcoming disaster. If we can understand what

community spirit means and the correlation it has with social and community resilience then truly collaborative partnerships with government can be facilitated. Understanding meaning allows for the funneling of increasingly scare funding towards government programs and initiatives that will definitively enhance social and community resilience in the disaster management context.

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Coping With Disasters: The Potentiality of Indigenous Knowledge and Community Based Responses to Climate Change Adaptation

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Abstract

Climate change is a rapidly emerging concern throughout the world, particularly in vulnerable developing countries dependent on natural resources. The changing climate is apparent through increased numbers of extreme weather events, natural hazards and environmental degradation. 'Bangladesh' is projected as one of the world's most climate-affected countries in the world. Climate change is exacerbating socio-economic challenges because climate vulnerability is also associated with poverty and a lack of institutional capacity to adapt. However, evidence also demonstrates that indigenous knowledge and community-based initiatives offer significant prospects to adapt to climate change. Community initiatives reinforce the strengthening of social capital and arranging of alternative livelihoods, food security, water management and disaster-preparedness, which are all significant for coping during adverse situations. This paper presents participatory approaches, which build resilience of affected communities in Bangladesh. Hence, the initiatives by the communities should be considered as an important tool for climate change adaptation and disaster risk reduction at the national level for policy formulation.

Keywords: Climate Change, Indigenous knowledge, Community, Participation, Adaptation.

1. Background

As a global reality, climate change has manifested itself through a range of weather events and climatic hazards. Climate change is also considered as a developmental issue for its potential impacts on socio-economic sectors. In terms of vulnerability, the impact

of climate change is not evenly distributed. Many countries are more vulnerable because of the differences in resources and capacities. As a result, the impacts and effects of climate change are multi-dimensional, and they vary according to diverse socio-economic and political factors among continents, regions and countries. Eventually, the poorer developing countries become more vulnerable than the richer developed countries due to their economic dependency on natural resources, fragile economies and political structures. Thus, Asia is considered the most climate-vulnerable region because of its agriculture-based economy, the majority of the population depends on natural resources, and moreover its lack of capacity to take adaptive measures.

Bangladesh is one of the most climate-affected countries in South Asia. German Climate Research Institute [14] indicates that Bangladesh is the fourth most vulnerable country in the world to extreme events resulting from climate change. The Country faces climatic hazards such as sea level rises, salt-water intrusion in arable lands and increased natural disasters like storms, cyclones, floods, flash floods and droughts [16]. Consequently, the potential of increased poverty and reduced economic growth due to climate change impacts the overall development of the country [13]. Climate change in Bangladesh interconnects with many other socio-cultural and economic factors. Evidence from the global perspective has revealed that natural resources-based and agricultural-dependent populations are the primary victims of climate change. More than one third of the Bangladesh's population lives in rural areas and they are the prime stakeholders of the rural economy, which is mostly agriculture-based. Climatic events directly and indirectly endanger people's livelihoods in multi-faceted ways [4]. Affected populations are increasingly vulnerable to poverty, food insecurity, water crisis, loss of traditional livelihoods and lack of social wellbeing.

Though the institutional initiatives began over a few decades ago, the country has a long history of dealing with and adjusting to climate-related natural disasters. According to the Bangladesh Climate Change Strategy Action Plan, the people of Bangladesh have adapted over generations to the risks of floods, droughts and cyclones through locally innovative practices: changing crop systems and diversified agricultural productions. Bangladesh needs to continually confront a series of natural disasters with limited resources and move forward to develop a comprehensive system in order to handle these threats and to minimize the impacts on vulnerable population groups, and, overall on the country's economy.

The purpose of this paper is to explore how community-based initiatives and locally-generated coping strategies can play a distinct role in the adaptation process. In particular, the paper seeks to reveal how indigenous practices contribute significantly to community based adaptation strategies especially in rural Bangladesh. In doing so, it focuses on three core questions: How does indigenous knowledge influence to adopt

alternative arrangements to cope? How do community initiatives strengthen natural and social capital to adapt to adverse situations? Can community-based initiatives offer significant effort to the climate response? These considerations are critically important in addressing overall climate change adaptation issues in Bangladesh.

1.1 Conceptual framework

Adaptation is a dynamic social process. [26] describe the human dimensions of adaptation as some processes and actions to deal better with or adjust to changing situations and to cope with the hazards and risks. Human society itself has built-in resilience power, so autonomous adaptation is a long-standing practice initiated by individual or community in response to climate related events. According to [3] community based adaptation addresses the vulnerability of local people and it considers the adaptation strategies generated through participatory processes by local people. Evidence shows that it is easy for a community to predict and project the climate variability and their knowledge can help them adapt to the changing climate. [6] argues that adaptation is a process of response to help improving community prospects and that can only be achieved through learning-by-doing. Therefore, CBA develops based on the community skills, experiences, local knowledge and networks to undertake locally appropriate activities that increase resiliency and reduce vulnerability to climate change. This type of adaptation process is generated from the vulnerability of a community, where adaptive capacity is directly associated with capabilities and opportunities. According to [8] "Vulnerability and exposure are dynamic, varying across temporal and spatial scales, and depend on economic, social, geographic, demographic, cultural, institutional, governance, and environmental factors. Individuals and communities are affected differently due to factors such as wealth, education, race/ethnicity/religion, gender, age, class/caste, disability, and health status."Although vulnerability is context specific, it is also a multidimensional phenomenon and impossible to determine by a single measure. The vulnerability to a changing climate is determined by its manifestations, physical setting, and the ability and opportunity to adapt to change [2]; [7]; [27]. The level of vulnerability depends on resiliency and the adaptive capabilities of individuals, communities or society as a whole. [5] argued that well-being and poverty are related to people's livelihood choices and strategies and the capacities that they possess add to their quality of life and enhance their capabilities to confront adverse social conditions. Based on the related concepts of vulnerability and adaptive capacity, the following framework was developed to analyze the selected case studies and to understand how the CBA works to reduce vulnerabilities and improve ability to cope.

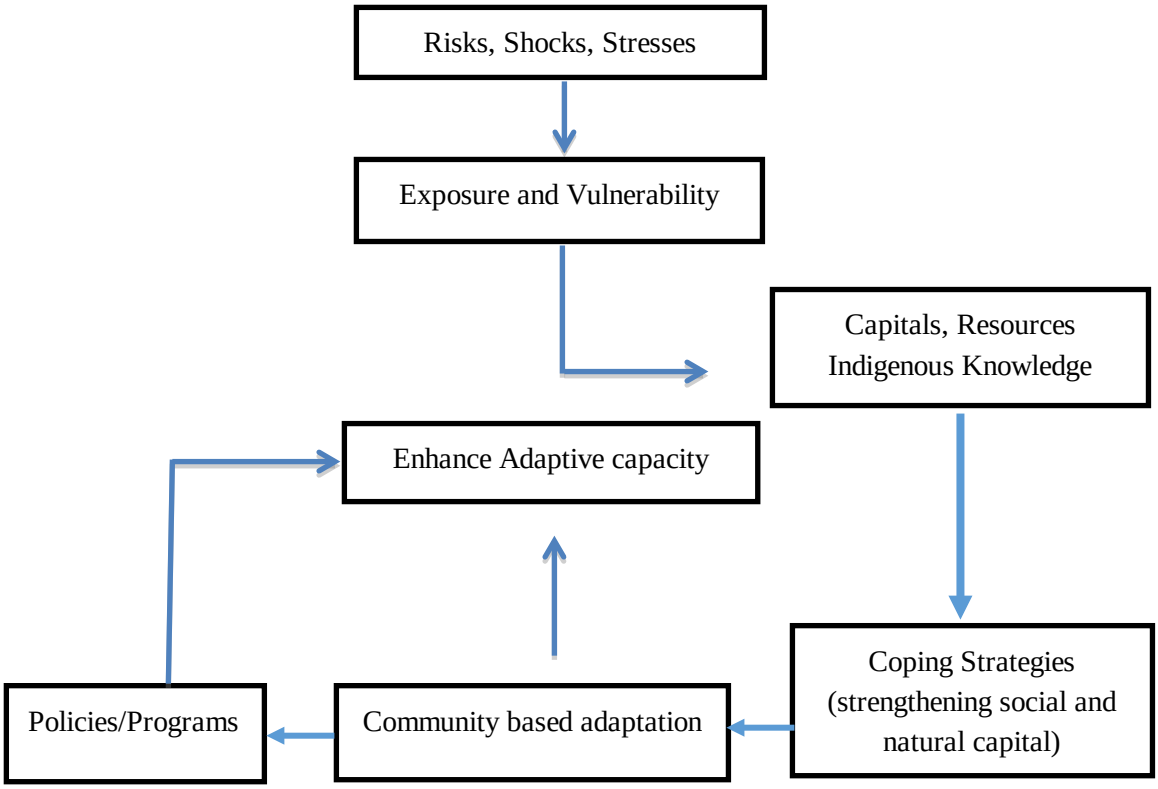


Figure1: Conceptual framework

1.2 Methodology

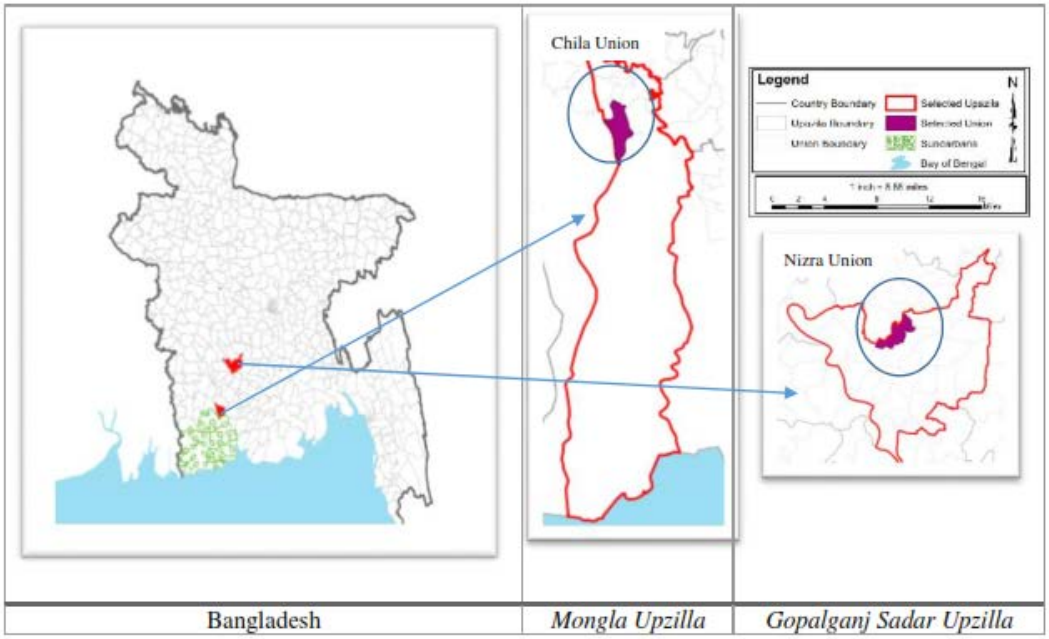
This paper is based on the findings of the author's PhD research where a case study approach was adopted. Bangladesh has many different examples of community-based adaptation which utilize indigenous knowledge to strengthen community resilience to flood, cyclone, landslide and salinity intuition. Among these, two cases are chosen for this particular paper to address the questions posed in this paper. Table 1 presents observation and interviews with local people and focus group discussions (FGDs) that were conducted for information collection. Representatives from the local government, program stakeholders and program beneficiaries were considered as local level interviewees. Relevant research and study reports were considered as secondary data sources.

Method	*Participants*	*Number*
Primary data collection		
Focus group discussion (FGD)	Community members (a group of 10–12 people) in 3 Unions	2 mixed groups and a total of 24 persons (10 females and 14 males) (women group henceforth stated as WG and mixed group as MG)
Open ended questionnaire interview	Program stakeholders, representatives from local government, development partners	10(5 males, 5 females)
Observation		2 Unions of the two Sub-districts
Secondary data collection		
Study reports, government documents and program documents		

Table 1: Methods of Data and Information Collection

Study Area

The study was carried out in two communities ("Unions" the lowest tier of the administrative body) respectively from the district of Bagerhat and Gopalgonj in the Southern Bangladesh. These communities are 'Nizra' under sadar upzilla of Gopalganj District and 'Chila' under Mongla upzilla of Bagerhat district. The study areas were selected based on the geographic locations, impacts of climate change and variations in coping strategies.



Map: Location of the Study Area

Chula union under the 'Mongla' Upazila, is one of the south most coastal sub-districts under the Bagerhat district with a population of 137,947 out of which 54.73% male and 45.27% female (BBS 2011). This is on the river Pashur and the Sundarbans (the largest mangrove of the world) is on the south. It is important to note that it is one of the most disaster prone areas in Bangladesh and, unsurprisingly, one of the most affected areas during three recent cyclones: SIDR (2007), AILA (2009) and MOHASEN (2013). Salinity contamination and sea level rise are the prominent hazards of the area like all other Unions (7) of the Upazila. A number of climate change adaptation programs have been initiated by the government and NGOs to cope with cyclone and salinity contamination for the communities in this Upazila.

Nizra union is under the Sadar Upzilla of Gopalgonj District. Total population of the upazila is 344008, of which 172991 are males and 171017 are females. This area is situated in a flat topography and one of the flood prone areas of Bangladesh. The selected area (Nizra Union) is flooded every year and located on flood plain.

2. Key Findings

Bangladesh is one of the most flood-prone countries in the world [11]. Due to the location at the confluence of the Ganges, Brahmaputra and Meghna (GBM) rivers basin, an average annual flood inundates 20.5% of the areas of the country whereas during an extreme flood event it reaches out to about 70%; this occurred in 1998 [20]; [11]. 3.03 million ha of the country (about 20.5%) is flooded annually due to flood [20]; [9]. Floods in Bangladesh are classified into four categories based on their origin such as, river floods, rainwater floods, coastal floods and flash floods. [21] argues that global warming is likely to have a significant effect on the hydrology and water resources of the GBM basins and might ultimately lead to more serious floods in the country. According to [11], 17 districts in Bangladesh have a history of 10-20 years return period of annual floods and more areas are likely to be exposed for higher inundation in the changing climate. The district Gopalgonj is one of the most exposed districts in the country.

People who are living with climate change impacts have alternative knowledge about climate variability because of their locally developed knowledge and practices of the resources they use [19]. 'Floating gardens' are a unique indigenous practice in communities living with floods. Both men and women play vital roles and give their best efforts to continuing the practice. When cultivation options are scarcer during a flood, the floating garden practices become an alternative way to grow vegetables to meet household needs and also to earn money by selling the vegetables to the neighbours or at the market.

Union Nizra is located in the flood plain and middle of marshy land with scattered settlements located on raised land to avoid from seasonal flooding. Almost half of the year the union remains under water as the large flood plain continues to be the basin of the upzilla. About 90% of the union is not usable for normal vegetation except deepwater rice which can grow as fast as 25 cm (9.8 in) a day to reach a length of up to 7 m (23 ft) and survive in water as deep as 4 m (13 ft).

As Nizra remains under water for an extended period of the year, it is difficult to grow any fruits or vegetables except on the limited raised homesteads. The limited space for cultivation of daily essentials makes adverse situation for the villagers especially during the rainy season. To cope with the situation, by tradition the villagers built an artificial cultivatable space popularly known as floating garden (locally known as "Gaito"). The floating garden is erected using the long paddy plants with deep-water rice and water hyacinth. The Preparation of the bed of the garden starts after harvesting. The Size of the garden ranges from 200 sft to 800 sft depending upon the individual's requirement. Once the monsoon starts and water increases, the garden starts to float and can be transported from one place to another place. During this time different types of vegetables like pumpkin, eggplant and beans are grown on the float garden. The garden becomes the grazing land for ducks and chicken as they have limited space for moving around. Women from the respective households takes care of the gardening to meet household demand.

According to the villager Mr. Abdul Wahab Mina (75) the use of the floating garden in the village dates back at least hundred years as he also learnt from his grandfather about the traditional practice to adapt the rainy season's scarcity of vegetables. This has been a traditional practice over the generations among the villagers who mainly depend on agriculture and limited fresh water fish. The above traditional practice of native Floating Gardens are gradually changing. Over the years, villagers gradually use more and more hybrid rice because the yield is higher. More paddy field is used for hybrid rice cultivation resulting in native rice variety cultivation almost disappearing. Moreover, the new road network in the village has connected the villagers to market places during the rainy season which has reduced dependency on floating garden than past.

[11] states that saline water intrusion was a highly seasonal phenomenon earlier in Bangladesh but recently some coastal districts have become permanently inundated with high-level salinity and new areas are likely to be affected by higher salinity. [11] also claimed that saline water intrusion is likely to occur during the dry season with an increased sea level rise of 50cm by the year 2050 with increasing scarcity of freshwater for agriculture and domestic use. A study by WARPO [28] has conducted a detailed assessment of impacts of sea level rise on inundation, drainage congestion, and salinity intrusion in the coastal zones of Bangladesh. Both the studies anticipated the severe

consequences that a significant number of coastal polders will be facing acute drainage congestion due to sea level rises. Salinity in the Khulna (including Bagerhat, Satkhira) region will increase by 0.5 to 2 ppt for the 32 cm and 88 cm sea level rise. It is observed by the local inhabitants are suffering from lack of potable water as the salinity level has increased significantly since the early 1990s. Local people are observing changes to their local environment as a consequence of specific natural events and changing weather pattern over the decades. A local resident of Chila Union observed:

> *The water level of the local river 'Poshur' has increased significantly and water has become salty. This salty water has contaminated the surface and ground water of the locality. Even in the dry season we feel salt in the breeze. The traditional crop system has been changed and scarcity of drinkable water in the locality been prominent.*

Salinity intrusion, especially contamination of drinking water sources in coastal belts, appears to be the most important vulnerability concern for the locality especially for women [11]. According [23] water management has become a more complicated issue for the southern part of Bangladesh, as saline water has inundated the surface as well as the groundwater systems. The local inhabitants strongly feel the changes to their biophysical environment that they are personally experiencing. During group discussion, women of the locality expressed –

> *We have been suffering from lack of safe drinking water for many years. We need to walk more than two or three kilometres to collect drinking water since there is no source of sweet water in our area and deep tube-wells do not work here. Sometimes those have a large family need to walk two or three times in a day.*

The villagers often share the community wells that require to walk about 400 m for several times a day. Deep tube-wells in a central location can be a good solution to reduce workload of women. However, it was not possible due to reduced ground water level and saline contamination. Under these circumstances, rainwater harvesting in rural communities and individual households can play an important role for providing safe drinking water.

In Chila Union a local NGO ' Rupantor' initiated a project for rainwater harvesting for their beneficiaries. Emphasis was given on a community-based approach, to ensure local participation and utilization of knowledge. Community members were involved in selecting the place to build water tanks. Community involvement process includes multiple village meetings at different stages of the project to raise awareness, disseminate

information, and most importantly involve villagers. At the meetings, water preservation, monitoring and maintenance processes were discussed and the continued use of safe water use in the community was promoted. The rainwater harvesting system uses a tin rooftop or sometimes a sheet of plastic, to collect rainwater and store it in large cement tanks. First few minutes shower is to clean roofs and gutters without collecting the water. Once the tank is full, the rainwater can be safely stored for months without being contaminated by bacteria. They also use water-purifying tablets as requires. With a large tank, a family can store enough water for drinking and cooking during the dry season. It has been observed that this water is used for both cooking and drinking purpose, which helped to ensure safe drinking water and also reduced women's workload significantly.

3. Discussion

Although indigenous knowledge is an under-appreciated and under-represented element of adaptation discourse, the acceptability of adaptation responses can be more effective if they can be linked to the formal climate change adaptation process [1]; [22]. It is evident that people living with vulnerability can show extreme tenacity in taking a long view and struggling to maintain the basis of their livelihood. The floating garden is a good example and it proves how people can make themselves resilient in an adverse situation. On the other hand, community mobilization and community participation are essential for any type of sustainable adaptation and mitigation process. People are willing to become part of such problem solving activities for their own interests and needs. Thus, community based initiatives can offer priority setting, awareness building, and cost sharing within the community. In the context of climate change, the importance of CBA is the way it frames risks and vulnerabilities and understanding the dynamism of community processes, which is important for a successful adaptation practice. The impacts of climate change are translated into the specific vulnerabilities that are strongly dependent on local circumstances, which means that the measures to build resilience must also be context specific [6]. In both cases, it is revealed that, the successful usage of natural and social capital is helping the rural communities to manage their vulnerabilities in the unfavourable environmental conditions. As [18] argues, that social capital not only strengthens ties within similar social groups but also strengthens ties between diverse social groups and enhances access to internal and external resources. The case studies demonstrate that proper use of indigenous knowledge, natural capital and social capital in enhancing collective capacity can successfully manage a variety of environmental problems. Similarly, [17] found a high level of social capital played a crucial role in forming community-based eco-tourism in Gambia. Another strength of community-based adaptation is that it can utilize the diverse options of social and human capital of the whole community such as the elderly, women or adolescent groups. For example, the success of cyclone warning dissemination by women volunteers in rural coastal areas in

Bangladesh, women forming self-help savings-groups for family welfare or initiating small business to overcome shocks and stress, and awareness raising on disaster by adolescent groups. All these community-based activities have positive outcome for community resiliency in diverse ways. It is also evident that the life-based experiences and knowledge of the elderly section of the community help to take preparedness measures. Many rural communities in Bangladesh still depend on elderly people's knowledge to receive the notice about upcoming hazards like floods or cyclones in advance through some particular natural signs. This is a major potential aspect of rural livelihoods to cope with and to manage disaster impacts. A community may have differences based on class, ethnicity, gender, and religion but they also exhibit relationships of cooperation and reciprocity when needed. The social relationship reinforces them to take collective actions for their benefit or to solve environmental problems. Furthermore, by generating appropriate norms and rules, social capital can improve the resource users' ability to sustainably manage their resources [17]; [24], which the rainwater harvesting community group in Chila proves. Therefore, a community can build their adaptive capacity and develop a local level institutional framework for climate change adaptation by working collectively and fostering co-operation to benefit from common resources.

4. Conclusion

The relationship between indigenous practices and community-based adaption is mutually converged. It is evident that many community based adaptation programs have been initiated based on locally generated best practice. According to a study by CARE Bangladesh [29], in many parts of Bangladesh indigenous knowledge has been used as an effective tool and local people have developed their own capacity to mitigate risks and vulnerabilities posed by disasters and nature. Therefore, the dissemination and utilization of indigenous knowledge through community practices can be an effective tool in DRR and CCA. In addition, if the inclusion of indigenous-knowledge base in the local and national level program and policies can be assured, the country can move forward to a more sustainable climate change adaptation pathway. It is important for a sustainable adaptation strategy to incorporate local knowledge, indigenous coping practices and promote meaningful participation from community-members [12]. Since community based adaptation strategies are generated and carried out through participatory processes involving local people preferring existing norms, values and traditions, which lead to a practice with more sustainability. Either climate change adaptation or disaster risk reduction in a rural life-based developing country like Bangladesh needs be developed by utilizing traditional indigenous knowledge and should be community- centric. The success of any policy or program to reduce climate vulnerability depends on incorporating indigenous practices and knowledge systems effectively and be

implemented through a collaborative and participatory approach with the community. This can be supportive for enhancing their adaptive capacity and resiliency. Thus, the combination of local knowledge with a sustainable adaptation model can help to shape an effective climate change adaptation policy process and accelerate the goal of sustainable development

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A Hybrid Governance Framework for Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) in Australia

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Abstract

The growing contribution of climate change to disasters is recognized worldwide. The integration of climate change adaptation (CCA) in disaster risk reduction (DRR) is crucial to ensure benefits for societies and the environment. This paper considers Hybrid Governance (HG) as a valuable framework towards the CCA&DRR integration efforts. HG is a set of subjects, goals and mechanisms constituting hybrid practices, which crosses state-market-community triad and is directed by the involved actors. The paper proposes HG as a main framework for exploring CCA&DRR integration in Australia, a climate and climate change prone country, with insights from the Local Government Areas (LGAs) located in the Hunter Valley region, New South Wales (NSW). The paper calls for further research efforts which account the variety of actors to explore relational mechanisms and actions in HG of CCA&DRR integration in the Hunter valley and worldwide. The paper will provide an initial, but robust background for framing the multi-actors characteristics of CCA&DRR integration and for driving scholars and policy-makers towards a better understanding of governance in CCA&DRR integration at multiple scales and levels.

Keywords: Climate Change Adaptation, Disaster Risk Reduction, Integration, Hybrid Governance, Australia

1. Introduction

The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) recognizes climate change as one of the main drivers of disaster risk (1). In 2013, most of global disasters' damages derived from climate change-related hazards. 51% of victims derived from storms, 33% from floods and 8% from droughts; floods in South-East Germany represented the most costly climate

change-related disaster with estimated damages of US$ 12.9 billion; cyclones, tornadoes and hurricanes in Philippines, China, USA and Mexico, plus floods in Canada and China caused more than US$ 30 billion damages (2).

Considering these large human and economic costs, Climate Change Adaptation (CCA) is crucial for Disaster Risk Reduction (DRR). However, the work in isolation and separation by scientists' and practitioners' communities of CCA and DRR has represented worldwide a major challenge for integration. These communities have followed different timelines and claimed differences in terms of decision-making arenas, actors, audiences, and goals, developing a 'silo' mentality (3, 4) which did not help a joint and shared action facing climate change-related risks.

Within the international agenda, initial steps towards CCA&DRR integration emerged in the past decade. The World Conference on Disaster Reduction (WCDR) in 2005 recognized the concerns of climate change within DRR as part of the Hyogo Framework for Action (HFA) 2005-2015 (7). The UNFCCC's Bali Plan of Action in 2007 and Conference of Parties in 2009 opened to the incorporation of CCA in DRR (5, 6). The Cancun Adaptation Framework by UNFCCC in 2010 and the Doha Climate Change Conference in 2012 have represented significant institutional appointments urging for CCA&DRR integration (5). Several countries have adopted CCA&DRR plans and programs, such as the National Adaptation Programs of Action (NAPAs) and specific DRR programmes (20, 40). Least Developed Countries (LDCs) use NAPAs to assess climate-sensitive sectors and to prioritize adaptation in vulnerable regions/communities on a sectorial basis (3, 41, 42, 43). Some countries have also approved Strategic National Action Plans (SNAP) under recommendations by the HFA, while other countries still lack concrete suggestions (40).

Currently, IPCC (3) has provided milestone guidelines, while the new SFDRR (1), combined with the new international agreements targeting GHG emissions and Sustainable Development Goals, have set the 2015-onward agenda for CCA&DRR integration (8). However, one of the main gaps of SFDRR (1) is that it did not suggest effective mechanisms to operationalise its intentions of CCA&DRR integration, so its implementation is still challenging. Some of the main barriers of this integration are the lacks of political will/support, of funding, of relevant information and expertise, as well as the limited budget flexibility (3). Additionally, the existence of parallel national agencies for CCA and DRR generates conflicts in terms of coordination, attribution of responsibilities and resource allocation (19).

According to Jörn Birkmann and colleagues (20, 40), this isolation led to numerous challenges that can be categorized as spatial, temporal and functional scales, and mismatches based on the legislative, cultural and behavioural norms and knowledge (Table 1).

Table 1: Major challenges for CCA&DRR integration. Source: Adapted from (20, 40).

Spatial Scale	• Mismatch on the combination of global and local scale • Lack of local, down-scaled data of climate change effects • Lack of the forecasts about the localisation of potential extreme events' impacts • Lack of attribution of responsibility for trans-boundaries climate change effects • Lack of attribution of responsibility for secondary effects deriving from the implementation of CCA measures • No links between local and national CCA and DRR measures
Temporal Scale	• Mismatch on the combination of long-term perspective with electoral mandates • Mismatch between short-term strategies coping with the immediate impacts of climate-related events, and long-term adaptation goals
Functional Scale	• No clear responsibilities of CCA and DRR to different institutions • Fixed funding schemes
Norms	• Different legislative, cultural and behavioural perspectives by human societies about climate change across time • No clear frames and accordance about scopes and forms of CCA
Knowledge	• Weak links between CCA and DRR communities of scientists and practitioners • Lack of common terms and definitions • Limited availability of socio-economic data supportive of CCA and DRR • Gaps between scientific and local/traditional knowledge

Table 1 raises significant points to be discussed. For example, when the funding schemes are not leveraged towards the reduction of vulnerability, the potential functional benefits of CCA&DRR integration are not realised. Similarly, the short-term temporal scale of electoral mandates is often inconsistent with the longer-term scale of CCA&DRR action (20). Therefore, clear and collaborative roles should be established and adopted to define how actors work together to achieve their goals (5).

Currently, reducing vulnerability (9, 10), strengthening resilience (7, 11), and investigating their long-term root causes (8) are some of the main actions for CCA&DRR integration. This integration has also been linked to local development (12, 13), urban planning (6, 14, 15) and rural growth (16). Community-Based Initiatives (CBIs) (17), participatory approaches (18) and the use of local knowledge by Indigenous people (13) and practitioners (19) represent crucial additional drivers. It has also been claimed that CCA&DRR integration requires the changing of institutional structures, the strengthening of collaborative, integrated and multi-community dialogue, and the learning process among scientific communities (9, 10, 12).

Based on these statements, this paper states that governance represents one of the major frameworks of how to integrate CCA&DRR (7, 13). Governance can be defined as a set of subjects, motivations, goals and techniques constituting hybrid practices directed by the involved actors. Governance allows exploring a more effective use of institutions, accounting for the interdisciplinary characteristics of policies, and promoting partnerships and collaboration within and across sectors and actors (4).

More theoretical and empirical research is required in the governance of CCA&DRR integration (i) to explore which are the groups of actors to be involved, (ii) to detect their relational mechanisms, and (iii) to investigate the actions to be undertaken. This paper is an initial proposal to investigate in depth this topic. It develops a conceptual framework of Hybrid Governance (HG) for CCA&DRR integration and proposed some initial insights for its application in Australia. Starting from initial insights by Lemos & Agrawal (21), this paper considers governance as a hybrid form resulting from the actions of different groups of actors from the state, the market and the "civil society". These actors related to each other through a set of relational mechanisms which allow taking decision and actions for CCA&DRR integration. This paper will address the relevance of HG framework for the investigation of CCA&DRR integration, and will set the research agenda for scholars, policy-makers and practitioners at multiple scales and levels.

2. From government to the hybridization of governance

The shift from *government* to *governance* reflects larger-scale social and political changes in governing places and resources, including the rise of practices such as contracting and outsourcing, the emergence of new collaborative forms, and the replacement of hierarchical bureaucratic systems of control with more decentralized network forms of organization (45). The concept of governance arises from the recognition that functions previously carried out by public entities are now frequently dispersed among different sets of actors other-than-governmental institutions, such as private-sector and civil society entities. In governance systems, no single authority can command compliance among all participating actors; conversely, such systems rely on the development and diffusion of various types of norms, on both state regulation and self-regulation, on market mechanisms, and other processes which facilitate collective decision making and action, such as negotiation, participation, and engagement. Through networks of collaborating and diverse entities, governance provides addressing complex problems because networks are flexible, adaptable, and capable of mobilizing diverse resources (21, 45).

Therefore, the rise of governance indicates the transformation from top-down regimes of governing to networked, cross-sectorial, shared and cooperative modes, in which public, private and social actors use mixed and soft policy instruments. Government does not exist at the global scale, so transnational governance processes and institutions constitute major coordinating mechanisms within societies (21, 45). In this way, governance is a set of structural arrangements and processes through which coordinated decision-making processes and actions take place. The redefinition of governing regimes leads to a coevolution *with* and *within* dynamic systems, that governance simplifies, systematises and structures through a set of self-organizing and coordinated networks, ideally autonomous and with no hierarchies or boundaries (21, 22, 45).

Hybrid forms of Governance (HG) respond to the dynamic characteristics of these systems (21, 23). Decision-making authorities and activities are dispersed among and across multiple jurisdictional, administrative and organisational scales, levels, policies and sectors. HG renegotiates the boundaries among actors (24), so "non-traditional" actors (7) within the broad spectrum of market and society, are considered as capable of self-organization. Actors have new roles and responsibilities; intergovernmental organizations are more autonomous, while

nongovernmental organizations are generally more involved. Market and social actors employ, contest and shape arrangements by the state into a mix of voluntary, collaborative and rule-based measures. Market actors fill the gap of the inefficiencies by state, e.g. putting competitive pressures in the provision of services, simultaneously seeking to safeguard their profitability goals. Social actors supply individual and community skills, as well as site-based and place-specific knowledge and resources to state actions (21, 24).

Globalization and decentralization influence HG and cause neoliberal governments to be particularly inclined to HG (21, 23, 24). Globalization integrates knowledge, provides for redundancy and flexibility, addresses multi-scale relationships and cooperation, and enacts communication channels and use of technology. It also increases the transformative role of social movements, the legitimacy and accountability of non-state actors and their access to knowledge and technology. Decentralization produces greater competition among actors, promotes participation and accountability, provides inputs for place-specific knowledge about targets and outcomes, disperses the political influence and creates more space for action and learning than monocentric governance (21). Within HG, three mechanisms allow state, market and social actors to operate and relate to each other:

- *public-private partnerships* between state and market actors;
- *private-social partnerships* between market and social actors;
- *co-management* between state and social actors.

These mechanisms incorporate joint action across at least two of the actors' groups and mobilize human incentives through market exchanges, solidarity relationships and knowledge of local communities (21, 23, 24). *Public-private partnerships* meet the compromise between public and private interests, strengthening public goals by harnessing private efficiency and resources. *Private-social partnerships* emphasize the role of individual incentives acting initially as market-oriented. Within *co-management* mechanisms, social actors regulate issues in direct and confrontational ways with state actors, legitimating social initiatives in public actions. These mechanisms tend to share and reach common goals, accounting for strengths and weaknesses of each actor (21).

3. A Hybrid Governance Framework for CCA&DRR Integration

Governance is a common framework for exploring CCA (e.g., 26) and DRR (e.g., 25), and it has been recently used also in responding to how to integrate CCA and DRR (3, 4, 7, 13). A good governance of CCA&DRR integration requires engagement and coordination among actors (3, 7), and is necessary when struggles exist for rights and access to resources, services and infrastructure, as in Tanzania (13). Governmental systems are often inadequately designed for CCA&DRR integration, as well as different foci of CCA&DRR national systems worldwide, and the diversity of perceptions about institutional roles and goals by practitioners and policy-makers, lead to limited arrangements which hinder cooperation, as in Nicaragua (6), Pacific Islands (27), Southern Africa (28) or Indonesia (29). A multi-sectorial and multi-actor approach is necessary

to reorient institutional structures, supporting local governments, recognizing the active role of NGOs and communities, and doing efforts to avoid fragmentary policies (e.g., 7).

Among the others, Jörn Birkmann and colleagues (20) provide general recommendations for CCA&DRR integration, such as the adoption of cross-sectorial and multi-scale approaches; the development of standardised methods and quality criteria; the coordination of actors; the shift from short-term perspectives to long-term strategies; the improvement of social learning and memory; the use of local data; and the development of an international comprehensive framework (20). IPCC (6) suggests actions for international and national agencies when relate to non-state actors, while Djalante (7) calls for the support to local stakeholders, the link with established networks and the engagement of actors.

However, there is still little evidence for weighing these actions within the relational mechanisms of a governance regime. For providing initial insights filling this gap, this paper proposes a HG framework (Figure 2) which considers a triad of actors which intervene in CCA&DRR integration through the aforementioned relational mechanisms. These actors use differential but complementary strategies of governance for CCA&DRR integration, for enacting key reforms according to own skills, knowledge and capacities. Such actors are the national and sub-national governments (*state actors*), the private and economic sector (*market actors*), and civil society including Community-Based Initiatives (CBI) and NGOs (*social actors*) (Fig. 1) (21). *Public-private partnerships*, *private-social partnerships* and *co-management* mechanisms bridge each actor to the others and hybridize decision-making and actions through processes of negotiation and share (21).

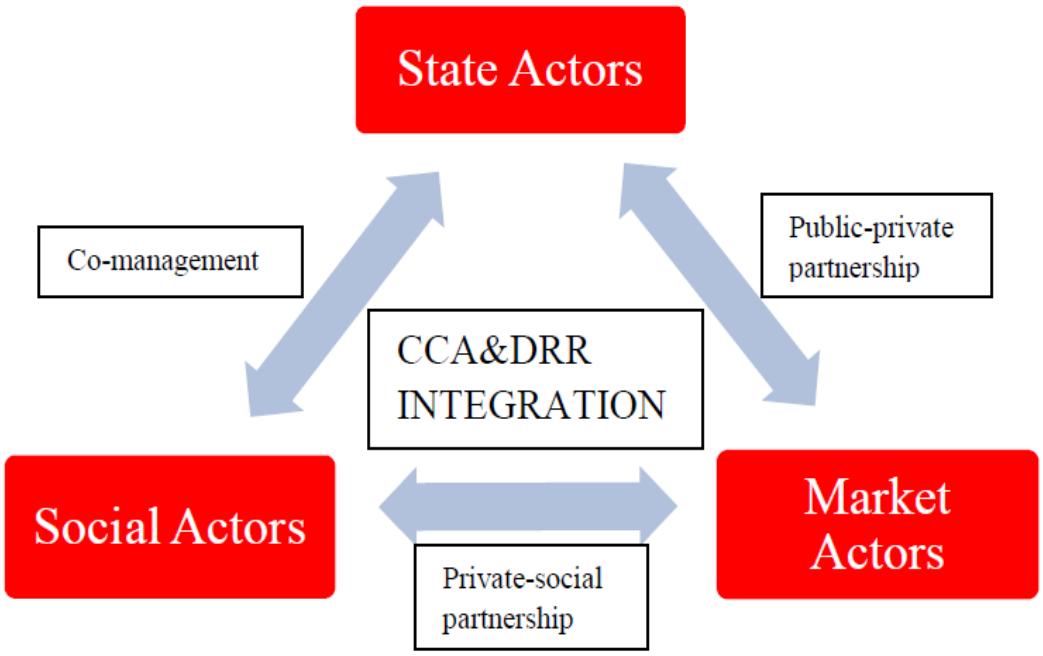

Figure 1: HG framework for CCA&DRR integration.

According to this framework, there is scope for an initial proposal to be developed for Australia, a climate and climate change prone country, with an in detail analysis of the Hunter Valley region, NSW.

4. Governance of CCA&DRR integration in Australia

4.1 The Australian political system: pitfalls about adaptation issues

Australia is a country prone to climate change and has been subject to a number of climate related disasters during the past decades, such as: tropical cyclones Tracy (1974), Larry (2006) and Yasi (2011); the Sydney Hail Storm (1999) and the Pasha Bulker Storm (2007); the Nyngan (1990), Charleville (2008) and Queensland (2010–2011) floods; the Ash Wednesday (1983) and Black Sunday (2009); and recurrent and prolonged droughts since 1990s (30). The Australian climatic diversity ranges from tropical monsoonal to arid, temperate and alpine conditions, with regional differences in relation to CC impacts (31, 33). Most of the major population centres are located on coastal areas, which are likely to face higher risks of floods and coastal erosion, while the likelihood of frequent heatwaves will increase the rate of mortality the vulnerable particularly for the elder and very young (31, 32, 33).

Integrated institutional strategies are required to cope to these challenges. However, the Australian political system, based on a vertical power structure of three governmental levels (federal, State and local), discourages collaboration and is not designed to provide an integrated response across governmental levels to complex policy/planning issue (4, 11, 15). Rather, it encourages duplication and jurisdictional disputes, and a lack of trust between and within the different levels of government (4). Short political timeframes and cycles do not coincide with planning time frames, and consequently elected officials are reluctant to make long-term decisions, perceived as difficult and unpopular in the short term (34).

Even though multi-level attempts (from national to local) to build a national capacity of adaptation exist in Australia (4), the national federal system has posed limited attention to adaptation issues (11). For example, the governance structure and leadership in addressing CCA issues is widely inconsistent both at national and state level. In many cases, roles and responsibilities are ultimately not yet defined. At the local level, although local councils are generally responsible for implementing state policies/strategies, there is limited statutory protection of local government activities/initiatives results within the context of CCA (e.g. the absence of consistent sea level rise policies at the state level which local government could adopt to support their adaptation planning decisions) (34, 44). Serious issues have been outlined in the governance of the CCA process in Australia, primary due to a lack of coordination across governmental levels. At the local level, although local councils are generally responsible for implementing state policies/strategies, there is limited statutory protection of local government activities/initiatives results within the context of CCA (e.g. the absence of consistent sea level rise policies at the state level which local government could adopt to support their adaptation planning decisions). (34).

4.2 The potentialities of HG framework for CCA&DRR integration in Australia

In terms of policies, both the NAS (2007) and the National Strategy for Disaster Resilience (NSDR) (35) consider climate change as a principal factor of risk. The Council of Australian Governments partially attempted to address the structural difficulties of CCA&DRR integration assisting the different government levels in improving their communication and collaboration, e.g. through the guidelines established into the National Climate Change Adaptation Framework in 2007, the National Partnership Agreement on National Disaster Resilience in 2009, the National Emergency Risk Assessment Guidelines in 2010 and the National Strategy for Disaster Resilience in 2011 (4). In terms of actions, Howes et al. (4) have found that to overcome the structural impediments of government hierarchy and to enact a more effective and efficient governance of this integration, five main joined-up and networked approaches are required: (1) the development of a shared policy vision; (2) the adoption of multi-level planning; (3) the integration of legislation; (4) the building of a culture of collaboration through network organisations; and, the establishment of cooperative funding. Heazle et al. (11) propose an incrementalist approach to managing climate-related uncertainties and building resilience not just through the reduction of hazard exposure, but also through the reduction of community vulnerability, the consideration of normative priorities, and a community engagement in climate-related risk debates. Finally, Serrao-Neumann et al. [15] consider spatial planning, cross-sectoral planning, social/community planning and strategic/long term planning as main enablers of CCA&DRR integration.

Against this background, this paper aims to add a perspective of governance centred on potential/actual actors and their relational mechanisms in CCA&DRR integration. In this way, HG may represent a useful framework for overstepping the structural barriers of vertical governmental hierarchies and the “silo mentality” across jurisdictional levels, and provide an effective and efficient response toward CCA and DRR integration. Governance can be successfully explored using case-study based approaches, towards the identification of system dynamics and efforts to handle the complexity of outcomes and effects (37).

In this way, the HG framework can be applied in three LGAs (Local Government Areas) of New South Wales (NSW), specifically Upper Hunter, Singleton and Muswellbrook. The three LGas have been selected as case study for CCA&DRR integration for three main reasons. First, they represent a complex environment. They are traditionally rural areas which are now experiencing an in depth transformation of their socio-economic structures also due to a change in their productive characteristics. In these areas, mines are close to agricultural land and rural communities which survive thanks to wine, thoroughbreds and tourism. So, towns, coal mines, vineyards, horse breeding farms, and dairy farms all co-exist within a few kilometres, and some farms and some whole villages have been swallowed by mining operations (36). Second, they are climate and climate change prone areas, in which several climate-related impacts are occurring, as the recent recurrent storms, bushfires and droughts, and others are expected in the near future (46). Third, these LGAs represent the heartland of coal mining in the Hunter Valley region, which

is one of the most productive areas of the world for the coal extraction, and one of the largest single sources of thermal coal exported from Australia (47).

In the selected LGAs, CCA&DRR integration seems to be characterized by a complex nexus of potential conflicting actors which have diverging interest in terms of goals and expected outcomes, as well as different perspectives of climate change and its related risks. Both LGAs and citizens show in some cases relevant concerns about the increasing development of the extractive sector. For example, the Position Statement Coal and Coal Seam Gas Activities by the Upper Hunter Shire Council (48), states that "open-cut mining and a viable international scale thoroughbred breeding enterprise are incompatible land-uses" (Part A.4). In the same way, the thoroughbred sector (49) is concerned about the increasing encroachment of coal and coal seam gas mining and the cumulative impact these industries will have on water quality, land management, air quality and the human and animal health. The sector asks to governments and industry a sense of responsibility to provide a sustainable future for the region, also finding a sustainable balance between the increasing demands of land by the extractive sectors and the necessities of other economic sectors and local communities. Furthermore, since the past decade groups of environmental and residents action have proliferated in HV, such as the Hunter Environment Lobby, the Hunter Valley Protection Alliance, Mine Watch, and the Lock the Gate Alliance, among the others. These groups are community-based and grassroots organisations, often with overlapping memberships, which apply pressure on mining companies to deal with their negative cumulative impacts. They have claimed that the positive economic impacts of coal mining, while well recognised, have not been experienced evenly across the region, and have not been adequate to balance the negative impacts. Some of the groups would like to stop coal mining in the area altogether, but most appear to be willing to co-exist with limited coal mining (50).

This research will collect, interpret and analyse qualitative data from these LGAs to provide relevant evidences about governance of CCA&DRR integration, exploring the potential and actual actors involved, the relational mechanisms among actors, and the potential/actual actions to be undertaken.

5. Next steps

The identification of appropriate frameworks for contextualizing DRR governance in the context of climate change is necessary for reaching practical goals, particularly for vulnerable areas and groups. Based on the HG framework proposed in this paper and on the gaps identified, much further investigation is required. Who are the actors most capable of governing DRR in a context facing climate change, which mechanisms are created when actors relate to each other, and what are the potential actions to be undertaken to realise CCA&DRR integration, are future questions to be answered analysing the case studies. The findings will be helpful in depicting the challenges for mainstreaming CCA into DRR, shedding light on the multiple meanings of governance in Australia.

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Significance of community participation in success of post natural disaster reconstruction project – evidence from developing country

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Abstract

Disasters associated with natural hazards are striking today's world more frequently than ever before and, as a result, number of post disaster recovery and reconstruction projects has increased substantially. Community participation in post natural disaster reconstruction projects is the most important factor for its success and sustainability. Contemporary research has emphasized on involving community in each and every phase of Post Disaster Reconstruction (PDR) project, however, such practices are not being implemented in developing countries; thus, PDR projects in developing countries are facing massive failure. In this paper, review of literature and case study methods have been used to reveal the significance of community participation and current practices being adopted for implementation of PDR projects in developing countries. Study of a PDR project named 'New Balakot City Development Project' initiated in the earthquake struck area of Pakistan, evidenced that community participation is the most significant factor for success of PDR projects. The study has provided applied evidence that disengagement of community could lead PDR projects to failure. Some recommendations for the practitioners to enhance chances of success of a PDR project have also been outlined in this study.

Keywords: Natural disasters, disaster management, post natural disaster reconstruction, stakeholder, community participation

1.0 Introduction

The world has been facing natural hazards caused disasters for centuries and there is very little chance to escape, or even alleviate such disasters [1]. The devastating consequences of natural disasters require huge resources, inputs and efforts for restoration of the natural and built environment [2]. The sustainable reconstruction of built environment is drawing more attention of researchers and it is revealed that community participation and engagement is an essential part of post natural disaster reconstruction activities [3]. According to the Asian Disaster Reduction Centre report 2004, the frequency of natural hazards caused disasters including earthquakes, floods, mudslides, hurricanes and tsunamis is increasing with passing time. The statistics reflects that the major victim of most of the natural disasters that have occurred during last decade are from developing countries [4]. Examples are, the August 2002 drought of China, the Indian Ocean tsunami of December 2004, the earthquakes of October 2005 in Kashmir & Pakistan, of

May 2008 in China, of January 2010 in Haiti, and the floods of July 2010 in Pakistan and these were all major disasters during past decade devastated the developing nations [5]. It is also a fact that the developing countries have very limited capacity to combat the natural disasters and due to social, economic, political and cultural factors, poor communities of developing countries are living in natural disaster prone areas [6].

Researchers have highlighted the importance of community participation in the Post Disaster Reconstruction (PDR) projects and have recommended different approaches for this purpose; however, these approaches still have not been practiced in the developing countries [7]. This is a major factor causing failure to the PDR projects in the developing countries. Study of a post natural disaster reconstruction project being implemented in a developing country has revealed that community participation practices have not been implemented, thus, project faced massive failure. Although contemporary research have highlighted the significance of community participation in PDR activities and also have pointed out that in developing countries community participation practices have not been implemented on ground; however, evidence based studies to identify the reasons of failure of PDR projects in developing countries are missing. In this research, authors have validated the argument that developing countries are not implementing community participation practices in PDR projects which is the main reason of failure of these projects. Several issues hindering the participation of community in PDR projects have also been revealed and recommendations have been outlined to resolve these issues.

2.0 Research Background

Disaster is a term used to describe situation of distress, whether individual or communal [8]. These situations include earthquake, tornado, starvation, drowning, vermin and insect infestations, epidemics, extremes of heat and cold [9]. The United Nations Office for Disasters Risk Reduction has categorized disasters into two main types, Natural Disasters and Technological Disasters [10]. These natural disasters group is further divided into three sub-groups i.e. Hydro-Meteorological Disasters (floods, droughts, storms, and wave surges), Geophysical Disasters (earthquake, volcanic eruptions and tsunamis) and Biological Disasters (epidemics and insect infestations). It is a commonly understood that there is no way to avoid natural disasters and their negative impact upon humans, however, efforts could be made to reduce disaster impacts [8].

These natural disasters directly affect the human lives by destroying not only their natural habitat but also the built environment [11] and losses due to disasters are sometimes gigantic and irreversible. The United Nations Office for Disaster Risk Reduction (UNISDR) has reported that during the year 2000 to 2012, about 2.9 billion people have been directly affected by natural disasters. These natural disasters have also caused death to about 1.2 million peoples during this period. Loss to the economy of the world during 2000 to 2012 was about US$1.7 Trillion, which is greater than ever before [4]. Some of the factors which contributed towards increased loss of life in the disasters are rapid urbanization, environmental degradation, unplanned growth and social marginalization [12]. Charlotte Benson (2001) have pointed out that in the developing countries, poor communities are forced to live in the areas particularly prone to natural disasters due to reasons such as economic, social, cultural, and political, thus they often suffer more damages [13]. It is also a challenge that the developing countries are lacking in effective disaster management expertise and skills and these badly need to be developed to help these countries should disaster strike.

2.1 Disaster management

Disaster management is the process of avoiding or minimizing the impact of disaster [14]. It is obvious that the natural disasters are unavoidable phenomenon, however to minimize and recoup impact or damage, there needs to be a more systematic approach of disaster management applied [1]. The UNISDR has divided disaster management into following phases.

1. Prediction
2. Warning
3. Emergency relief
4. Rehabilitation
5. Reconstruction

The prediction phase is the preparatory phase consists upon the activities to limit the effect or damage of the disaster. It also predicts the occurrence of disaster based upon previously available data. The warning phase refers to provision of information to the individual or to the mass through identified institutions about the disaster. This phase also tend to minimize the destruction and ensure the taking of effective actions. Emergency relief is the phase wherein the affected populations are provided with the assistance. It is an immediate and short term activity that starts immediately after the disaster and ends within short span of time after the disaster. The rehabilitation phase is initiated to restore the living conditions close to what existed of prior to a disaster. Communities stricken with a disaster are provided with the necessary assistance for restoration of their livelihood. Reconstruction is the phase that emphasises on restoring the built environment and includes rebuilding of the infrastructure, systems and services for present and future needs.

The reconstruction phase not only involves the reconstruction of the destroyed infrastructure and services but also initiates new projects of sustainable development [15]. Better preparedness, more resilient and sustainable development and improvement in warning and prediction systems should also be carried out in this phase. This is the long-term phase and involves interests of all stakeholder groups. Le Masurier, Rotimi and Wilkinson (2006) revealed that post disaster reconstruction is different from more routine construction due to some additional and interrelated challenges. Effective coordination among stakeholders, scarcity of resources and implementation of routine constructions rules and regulations are the major challenges faced during PDR [16]. Emergency managers are now moving beyond the short-term recovery and emergency responses [17]. They are focusing their efforts more on the survivability of communities. Similarly, environmental professionals are also placing their emphasis on the environmental quality and its sustainability [18].

According to Agyekum et. al. (2012), the idea of sustainability is relatively recent [19]. The exponential growth of populations and their ever increasing requirements are directly affecting the sustainability of natural systems and the environment. The planning and implementation of the PDR should equally consider the social, economic and environmental aspects and many researchers have identified these factors as three main pillars of sustainability [20]. In PDR, generally sustainability is a very crucial factor to be considered. The disaster management plan should be sustainable and to achieve sustainability, it is necessary to develop ownership amongst the local community towards the PDR plan and its outcomes. To avoid repeated investments in the same cause and effect, projects should be sustainable and resilient to the natural disasters [21].

2.2 Stakeholders

Stakeholders are usually defined as any identifiable group which can affect the objectives of the organizations or who can be affected by the achievement of the objectives of the organization [22]. In PDR there could be several stakeholders, however, the Participatory Planning Guide for Planning Disaster Reconstruction [23] has grouped stakeholders as shown in Figure 1:

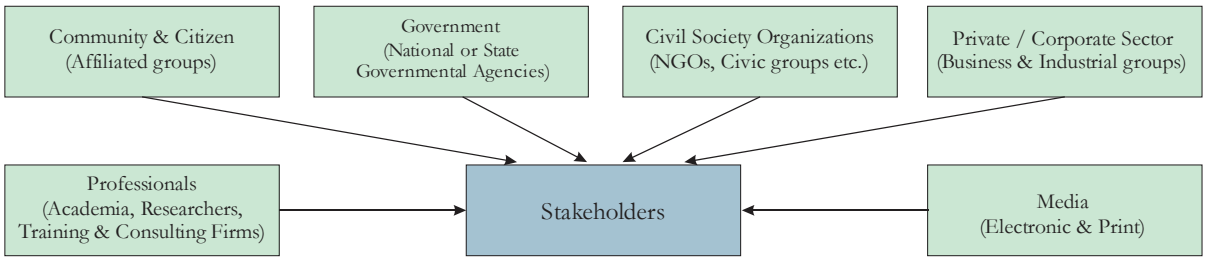

Fig 1: Stakeholders in PDR

Kate Davis [17] has further classified in stake holders into the following groups:

Senior management — Board, directors, portfolio director, executive management, investors, executives, project executives, senior management, programme director, owner

Project core team — Project leader, manager, personnel, project team and its leader, other organizational involvements

Project recipients — Consumers, customers, clients, end users, users

The researchers [24] identified typical stakeholder groups as individuals, families and households, traditional groups, community based groups, local traditional authorities, political authorities, non-governmental bodies, local governance structures, agencies with legal jurisdiction, local government services, national organizations, cultural and voluntary organizations, business and commercial enterprises, educational, financial, government, foreign aid agencies and international government bodies. Rotimi (2006) have classified stakeholders into several groups based upon their interests and their objectives [25]. However, from the perspective of post natural disaster reconstruction projects, the following could be defined as the major groups; i) government; ii) NGOs; iii) community and; iv) professionals. The government group includes international collaborative governments, country, state and local governments and its agencies, and NGOs includes international, national, local NGOs and volunteer groups and associations, civic societies, clans and religious organizations / bodies. The community consists of the people residing, belonging, or affiliated with the area stricken by the natural disasters, while professionals could comprised on business and industrial groups, academics, researchers, professionals, media, training and consulting organizations etc.

2.3 Community participation in PDR projects

New century is more stakeholder focused [17] and stakeholder, especially affected community participation in PDR projects is the most important element for its success [3, 26]. The word community has various meanings, but in context of disaster management, community mean local people who are self-organized and voluntary [27] and have common attributes, such as living in

same environment, facing similar risks of disasters or have been affected by a disaster [28]. Affected community should be encouraged to participate in the reconstruction phase in different ways [29] including planning and designing phase [30-32] to its implementation and completion phase [33, 34]. Disaster preparedness and management activities could not achieve its objective without involvement of the affected community [35] and in recent years community participation has been considered as an essential part of reconstruction phase [3]. Reconstruction activities involves huge economic resources [15] thus attracts interest of a large number of stakeholders [15, 36]. Involvement of a large number of stakeholders can lead to clash of their interests. Researcher have also emphasised on resolving of issues and clashes which may arise during the PDR projects among its stakeholders, for better results [36, 37].

Researchers have categorized five levels of community participation, i.e. i) manipulation, ii) information, iii) consultation, iv) collaboration, and v) empowerment [28]. The last level of community participation is empowerment which establishes full control of community over the project. (ibid, 2013). In PDR projects, community participation must be ensured [32] because it is the community that knows what is needed and what is best suited for them [28]. The researchers are determined that community participation practices should be implemented in its true letter and spirit to achieve the objectives of a PDR project as well as to ensure its sustainability.

3.0 Methodology & theoretical framework

The objective of this research is to substantiate the significance of community participation in PDR projects and to find out the reasons of failure of PDR projects in developing countries. To achieve this objective, literature review has been conducted to get an overview of the relevant research areas and special attention was given to community participation in success of post natural disaster reconstruction projects. Subsequently, case study method is used to reveal on ground practices adopted by developing countries for implementation of PDR projects. The case study research method is considered as a suitable research method for social science research. Case study is selected from a developing country, as majority of natural disaster victims during past decades are from developing countries and a large number of post natural disaster reconstruction projects are at various stages of implementation in these countries. Published research data, periodical and published reports and personal observations were used to analyse the case study.

Contemporary research highly recommends that local community should be encouraged to participate in post disaster reconstruction projects [15, 19, 26, 38-40]. However, research conducted by Dalay and Brassard (2011) have revealed that community participation practices have not been adopted in the developing countries yet [7]. Contrary to the developed countries, PDR projects in the developing countries are facing massive failure due to disengagement of community. This scenario needed to be validated through empirical evidence, thus, following case study have been chosen to be analysed in this research.

4.0 Case study: New Balakot City Development Project

The earthquake occurred on October 8, 2005 was arguably one of the most devastating natural disaster in the history of Islamic Republic of Pakistan [41]. The magnitude of earthquake on the Richter scale was 7.6, and it struck not only the Himalayan region of Pakistan and Kashmir but also other parts of South Asia. It affected about 30,000 km^2 area, and resulted 86,000 deaths, 80,000 severely injuries and about 3.5 million people were left homeless [41, 42]. Balakot city is located in the Khyber Pukhtunkhwa province of Pakistan having a population of 80,000 people. The epicentre of 2005 earthquake was located at 34.493°N, 73.629°W, on the western end of

Himalayan Arc [42] and was about 30 km in the northwest of Balakot city. The city was one of the worst affected cities and was about 95% destroyed [43].

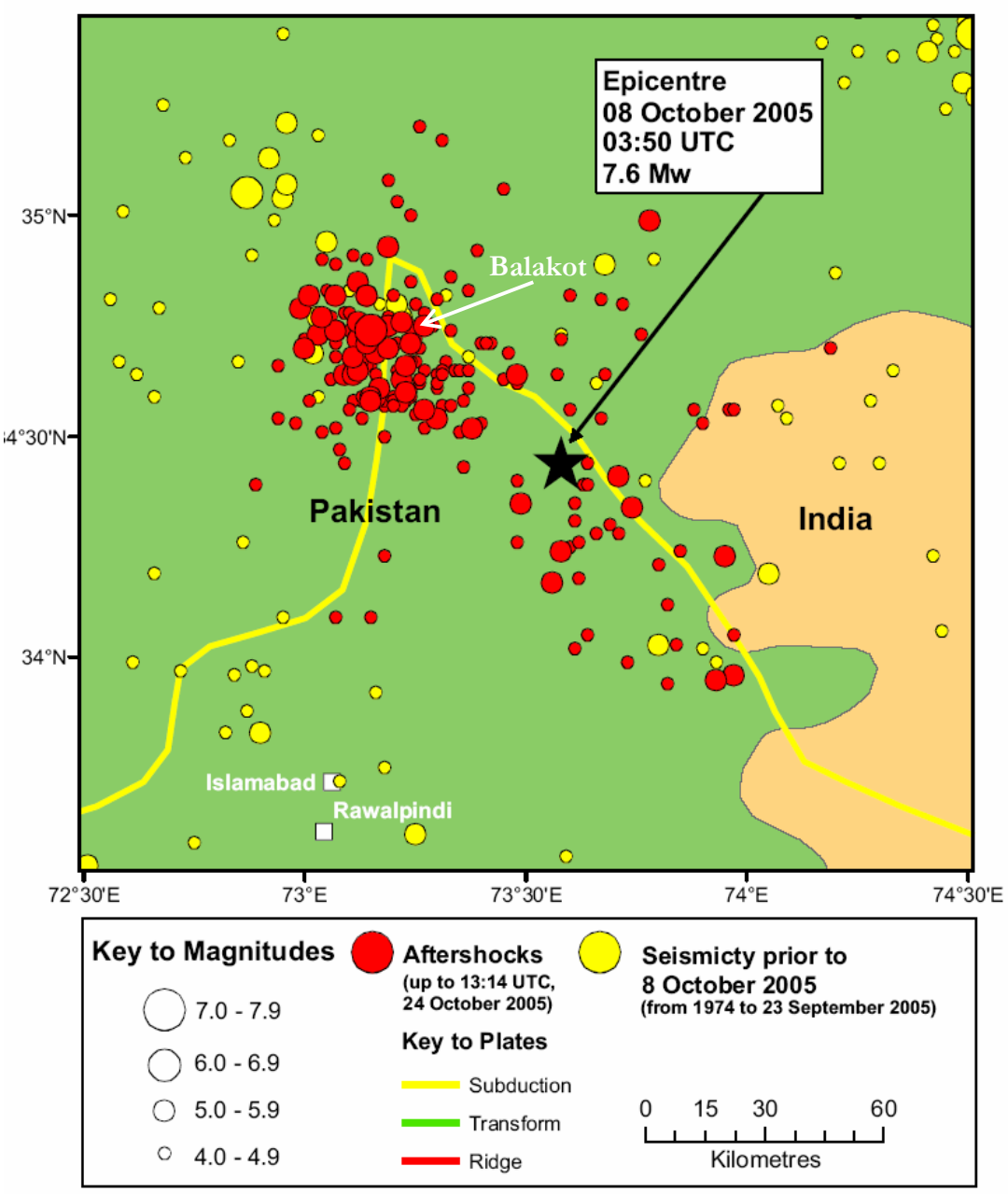

Fig 2: Map showing the location of Balakot, epicentre and aftershocks of the earthquake occurred on October 8, 2005. Source : [44]

Immediate after this massive disaster, government of Pakistan initiated relief and rescue efforts. These efforts were mainly organized by the Pakistani military and assisted by foreign and local governments, international and local NGOs, civil society and volunteers [42]. After completion of emergency relief and rescue phase, Government of Pakistan established Earthquake Rehabilitation and Reconstruction Authority (ERRA) in 2005 [45] for post disaster reconstruction, in the earthquake affected areas [46]. At the outset, ERRA in collaboration with The World Bank prepared social impact assessment report and mentioned that Balakot is the most affected city and 95 percent houses and infrastructure are effected by the earthquake [47]. After a detailed survey of the earthquake affected areas, ERRA determined that Balakot city is

situated on conjunction of three major fault lines. Thus, it was declared as a "red zone" and unfit for future reconstruction [48].

Considering this fact, government of Pakistan planned to build a new city for the affected people of Balakot. ERRA was assigned to initiate a new reconstruction project named "New Balakot City Development Project" to provide the safe heaven to disaster struck people. The new project was planned to build on most modern lines at another site called 'Bakrial'. This site is about 20 Km away from the existing Balakot city. Primarily, the relocation of old Balakot town to new site 'Bakrial' was decided in consultation with provincial government. This typical post natural disaster reconstruction project was started in 2007 at an estimated cost of Rs. 12.00 billion (equivalent to US $200 Million) at an area spread over 11,463 kanals of land [49]. This project was supposed to build new houses for about 5000 families. This project was initiated with the support of international donors including Gadaffi Foundation of Libya and government of Kingdom of Saudi Arabia and government of Kuwait [50]. As per plan, the project was initiated in 2007 [49] and the completion date was July 17, 2010 [50].

5.0 Analysis and Discussion

A recent report discussed in the meeting of Senate Standing Committee on Cabinet Secretariat of government of Pakistan states that ERRA – the government agency who is responsible for the New Balakot City Development (NBCD) Project – has the control of only 14 percent of project land [51]. The official spokesperson of the ERRA apprised to the committee that ERRA has not been given the authority to work on complete site of NBCD project, as yet. Furthermore, the construction cost of the project has also been escalated to Rs. 14.2 billion; that is an increase of more than 18 percent [52]. Moreover, work on project remained suspended for more than a year time due to severe clashes between landowners and government agencies. The project completion dates were revised twice from 2010 to 2012 and then 2013, however still the completion of the project is far dream, as it has achieved only 14% of its targets. Being a post natural disaster reconstruction project the NBCD project has significant importance for its stakeholders, especially for the local community i.e. earthquake affected people of Balakot, however, substantial delays, snail pace progress, increase in cost, absence of commitment and lack of interest of its stakeholders including affected community, management team, local and national government and other stakeholders lead this project to a colossal failure.

The studies conducted by Sophia Akbar [45] and Usman Quzai [48] have highlighted a few issues related to resettlement of population to a new place, however, NBCD project faced several interrelated issues which could easily be resolved through community involvement. Before the earthquake, the inhabitants of the Balakot city earn their livings mostly from tourism. Balakot is one of the most scenic and beautiful city of Pakistan and also serves as transit point for the people visiting to the picturesque valleys situated upstream of the town. During the summer season, thousands of local and foreign tourists visits Balakot city, which boosts the economic activities in the area and also provides the opportunity to the local population to earn their livings. Hotel, transport and cottage industry of the area were making good money from these tourists and were also contributing towards development of the city. However the new site selected for the relocation of the local population is off the route of tourists [48]. Shifting to the new site means loss of earning to the local population, thus, despite of vulnerability to the future disasters, local population refused to relocate.

This economic issue could easily be catered through involvement of local community in decision making. The decision makers should have considered these economic issues before initiation of the project through involving local community in decision making process. The old Balakot city could be developed into an amusement park or a daytime time city with light steel infrastructure

only for shops and recreational activities. Similarly, these economic issues must have been taken into consideration in the selection of new site for the project. A site close to the main road of upstream valleys could be a better option for continuation of the tourism related economic activities of local population.

Another issue faced by the project is cultural and social; as residents of 'Bakrial' – the site selected for project – refused to vacate their land. Dispute arose over the demand of payment to landowners of the new site, who had earlier pledged the land free of cost. This dispute caused law and order problem and one person was murdered during a severe clash among local community and project team [53]. Subsequently, government offered plots in new city and monetary compensation to local landowners, however, despite this lucrative offer, landowners of 'Bakrial' refused to hand over their land to ERRA due to their social and cultural norms and values. After several long negotiations rounds among landowners, ERRA and provincial government, and paying monetary compensation, ERRA managed to get hold of only 14 percent of the project land [50]. This issue not only hindered the progress of the project but also resulted in division of community into several groups. ERRA requested provincial and district government to help them out, however, dispute remains unresolved and ERRA has expressed inability to complete the project (ibid, 2012).

This is purely a cultural and social issue, which could also be resolved through involvement of local community. The government, at its own, decided to relocate earthquake affected people of old Balakot city to the new site at 'Bakrial' without due consultation with local population. Just a few of local landowners must have expressed their consent for provision of land, free of cost, on humanitarian grounds, however, majority of landowners are not ready to handover their land which they inherited by their forefathers. The government tried to enforce its decision through law enforcing agencies, which resulted in severe clashes and death of a local community member; however, situation remained unchanged. This issue must have been resolved by involvement of community at the time of decision making or by engaging them in result oriented negotiations.

Political scenario of the Kyber Pakhtunkhwa (KP) province of Pakistan has also been changed and according to Khalid Mustafa [50] after initiation of 'Hazara Province Movement' the provincial government does not seems interesting in resolving the NBCD project issues. According to the statement of former Chairman ERRA, published in the leading newspapers of the country, it was the responsibility of provincial government of KP to acquire the land for NBCD project. However, due to lack of interest and despite receiving huge payments for land acquisition KP government has failed to take possession of land. Furthermore, political instability of the country also resulted in diversion of project funds towards Swat IDPs (Internally Displaced Persons) and flood victims and caused unnecessary delays. Lack of interests of provincial government due to differences with national government and 'Hazara Province Movement' is purely a political issue and could be resolved through dialogue.

6.0 Conclusion & Recommendation

Thorough review of contemporary research has highlighted the significance of community participation in success of PDR projects. It is also revealed through literature review that developing countries are not adopting the most recommended community participation practices while implementing PDR projects. Furthermore, detailed analysis of 'New Balakot City Development (NBCD) Project' has revealed that the project is a massive failure; and even after lapse of more than double of its stipulated time it has achieved only 14% of its targets. It is also noted that project implementers did not consulted community at any stage of the project. Extrication of community resulted in confronting situation which raised several allied issues during course of the project. Non-cooperative rather opposing behaviour of the community

caused unnecessary delays, law and order situation and unforeseen financial burden on the project, which directly contributed towards failure of the project. Major community issues were economic, social, cultural and political, which could easily by resolve through involving of community in the project. Therefore, it is quite evident that the major reason of failure of project is extrication of community.

It is substantiated that community participation is quite significant for success of PDR projects; and community participation practices should be implemented in true letter in spirit, in developing countries, as well. It is recommended that developing countries must also implement the community involvement practices; in its true letter in spirit, at each and every phase of post natural disaster reconstruction projects to ensure its success and sustainability. It is also recommended that confrontation with the community should be avoided and issues should be resolved through dialogue and with mutual understanding. Interests of the community should be given prime importance while planning any PDR projects. Economic, social, cultural and political issues of the community and of the region must also be given due consideration while planning and implementing the PDR projects.

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