



Post-Disaster Reconstruction Impact on City's Urban Development

Master Thesis

International Master of Science in Construction and Real Estate Management

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Conceptual Formulation



Impact of Post-Disaster Reconstruction on Urban Development

Master thesis proposal

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Joint Study Program of Metropolia UAS and HTW Berlin

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A handwritten signature in blue ink, appearing to read "Uwe Pollack", is written in a cursive style.

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Introduction

Cities during their lifecycle face different kinds of disasters that cause serious damages varies from the sensory visible damages -as seen in the destroyed buildings and infrastructure- and extend to all aspects; economic, environmental, social and humanitarian. These damages show the need for disaster management during the disaster and the need for reconstruction policies/plans for the post-disaster stage. Disaster management aims to mitigate the negative effects of the ongoing disaster while reconstruction process aims to initiate integrated sustainable urban planning that fulfil the future requirement, preserve the city's identity and maintain human sense of attachment to the place. This paper will focus on the reconstruction of the physical sensible parts of the destroyed cities ie; the reconstruction of buildings and infrastructure and study the impact of this process on the city's urban development.

Research Problem

This study addresses the problem of post-disaster reconstruction as a problem that cities suffer from it during their life cycle and discuss strategies which deal with this problem in the deferent stages of the problem, starting from the preparation of disaster management to the final reconstruction plans, taking in consideration the time frames, alternatives and options to implement the reconstruction programs.

Each city has its own characteristics and disasters negatively affect these characteristics, therefore there should be proper preparedness to avoid and mitigate these effects in addition to a well-planned strategy for the reconstruction that integrate all projects to form a sustainable urban plan preserve the city's identity and keep human history.

Post-conflict reconstruction requires contribution of many disaster relief agencies and financing institutions. The diversity of contributors, normally international contributors, in the reconstruction process shows the need for a coordination platform that organizes the activities to insure effective response and seamless reconstruction projects.

Research Questions

- How would newly generated reconstruction plans influence the urban development of a destroyed city?
- What are the disaster management? How it would mitigate the negative effects of the disaster?
- What are the reconstruction approaches? trends? And implementation models?
- Which reconstruction strategy is most suitable to be implemented in Yemen?

Method

This study starts with explaining the theoretical background of the topic by defining and discussing the two main aspects which are disaster management principle and the components of reconstruction process. Analytical study then undertaken for case-study cities in different regions in the world to evaluate the reconstruction strategies/plans and determine the strengths and weaknesses of each case study taking in consideration the influence of post-disaster international contributors.

The main objective of this analytical study is to extract/generate a reconstruction strategy that most fit the situation in Yemen -where a catastrophic war is still running-, the generated reconstruction strategy is proposed to benefit from the variety of reconstruction policies of the case-studies.

Expected Results

Disasters usually force the inhabitants to displace from their cities to temporary places and post-disaster reconstruction is necessity originated from the need of human to return to their home towns and settle in the place where they grow and used to live.

Therefore, reconstruction projects are expected to fulfil this urgent need by developing new urban plans that convert the negative side of the disaster to a chance to modernize the city, improve the sustainability, maintain the history and keep the sense of connection between the residents and their city.

Abstract

Cities face a very critical challenge that hits from time to time and affects many aspects of life; disaster is the challenge that many cities and human settlements suffer from, causing damages to physical structure of the city and consequently disturb the normal livelihood of the inhabitants and may cause losses in lives and injuries in addition to affecting many vital aspects that directly connect to human life and stability such as the economy, the social life, the environment, and the urban development.

The devastating impact of the disaster proves the need for measures and actions that should be applied before, during, and after the disaster to enable the cities and communities not just to recover to the normal before the event but also to improve and develop better and more resilient. These measures are what the study is going to discuss. Disaster management principles are the measure that mitigates the effects of the disaster, while the reconstruction is the measure that removes disaster's impact and the way for better recovery.

This paper study the impact of the reconstruction on urban development via four case studies; each case study presents one of the reconstruction approaches discussed in the literature review. The study concludes that post-disaster reconstruction has a positive impact on the urban development and offer an opportunity to achieve resilient cities/settlements.

Contents

Acknowledgment	II
Conceptual Formulation	III
Abstract	VI
Table of Figures	XI
List of Tabulations	XIII
1. Introduction	1
1.1 Problem Definition	1
1.2 Research Objectives/Structure	1
1.3 Project Boundaries	2
1.4 Research Method	2
1.5 Situation in Yemen	3
1.5.1 Natural Disaster Types, Impact, and Reaction	3
1.5.2 War Impact	4
1.5.3 Reconstruction Experiences	5
2. Disaster Management Principles	7
2.1 Definition of Disaster	7
2.2 Types of Disasters	8
2.3 Stages of Disaster Management	9
2.3.1 Prediction (Pre-Disaster)	10
2.3.2 Preparedness (Pre-Disaster).....	10
2.3.3 Mitigation (Pre-Disaster)	10
2.3.4 Immediate Response (During/ Post Disaster)	10
2.3.5 Recovery and Rehabilitation (Post-Disaster).....	11
2.3.6 Reconstruction (Post-Disaster).....	11
2.4 Disaster Impact	11
2.5 Hyogo Framework of Action (HFA):	13
Building the Resilience of Nations and Communities to Disasters	13
2.6 Sendai Framework for Disaster Risk Reduction 2015-2030	14

2.7	Disaster Management and Reconstruction Main Actors National Level.....	14
2.7.1	National Government.....	15
2.7.2	Community.....	15
2.7.3	Local Authorities	15
2.7.4	Private Sector	15
2.7.5	Non-Governmental Organizations (NGOs).....	16
2.8	International Contribution	16
2.8.1	International Organizations and Agencies (United Nations).....	17
2.8.2	International Finance Institutions (World Bank).....	18
2.8.3	External Governments (Government of Japan).....	20
3.	Reconstruction Policies.....	22
3.1	Reconstruction Approaches	22
3.1.1	Cash Approach - CA.....	22
3.1.2	Owner-Driven Reconstruction - ODR	23
3.1.3	Community-Driven Reconstruction - CDR.....	24
3.1.4	Agency-Driven Reconstruction In-Situ - ADRIS	25
3.1.5	Agency-Driven Reconstruction in Relocated Site - ADRRS.....	26
3.1.6	Comparison of Reconstruction Approaches	28
3.2	Post-Disaster Housing Approaches	29
3.2.1	Transitional and Temporary Housing	29
3.2.2	Repairing Damaged Housing.....	30
3.2.3	Building New Housing.....	30
3.2.4	Building Yard Approach	32
3.3	Reconstruction Implementation Models	33
3.3.1	Self-build Model	33
3.3.2	Community-Cooperative Model	34
3.3.3	Contractor Model	34
3.3.4	Compatibility of Reconstruction Approaches with the Implementation models	34
4.	Post-Disaster Urban Development.....	35

4.1	Urbanization of Rural Area	35
4.2	Build Back Better (BBB)	35
4.2.1	Build Back Stronger	36
4.2.2	Build Back Faster	36
4.2.3	Build Back more Inclusively	36
4.3	Resilient Development	36
4.4	Preserving Place’s Identity	37
4.4.1	Place Identity	37
4.4.2	Place Image	37
4.5	Reconstruction Trends	38
4.5.1	Restoration.....	39
4.5.2	Monumentalism.....	39
4.5.3	Memorialism.....	40
4.5.4	Neoliberalism	41
5.	Case Studies	43
5.1	Case Study 1: 2001 Gujarat - India (ODR)	44
5.1.1	Background.....	44
5.1.2	Emergency Response	45
5.1.3	Role of Different Stake Holders	45
5.1.4	Damages in Housing	46
5.1.5	International Contribution.....	47
5.1.6	Reconstruction Approach	48
5.1.7	Impact on Urban Development.....	48
5.2	Case Study 2: Banda Aceh – Indonesia (CDR)	50
5.2.1	Background.....	50
5.2.2	Emergency Response	51
5.2.3	Damages in Housing	52
5.2.4	Role of Different Stakeholders.....	52
5.2.5	International Contribution.....	53

5.2.6	Reconstruction Approach	54
5.2.7	Impact on Urban Development	55
5.2.8	Reconstruction Trends.....	56
5.3	Case Study 3: Beirut Central District 1995 - Lebanon (ADRS).....	57
5.3.1	Background:.....	57
5.3.2	Reconstruction Attempts.....	57
5.3.3	Post-War Reconstruction	58
5.3.4	Reconstruction of Beirut Central District (BCD).....	59
5.3.5	Role of Different Stakeholders.....	60
5.3.6	International Contribution.....	61
5.3.7	Reconstruction Approach	61
5.3.8	Impact on Urban Development	62
5.4	Case Study 4: Beichuan 2008-2011 - China (ADRRS).....	64
5.4.1	Background.....	64
5.4.2	Emergency Response	65
5.4.3	Damages in Housing	65
5.4.4	Roles of Different Stakeholders	65
5.4.5	Reconstruction Approach	66
5.4.6	International Contribution.....	67
5.4.7	Impact on Urban Development	68
5.5	Summery	69
6.	Conclusion and Recommendations.....	70
6.1	Conclusion	70
6.2	Recommendations.....	72
6.3	Recommendation for Reconstruction plan in Yemen	72
6.3.1	Organization and Legislation	72
6.3.2	Desired Reconstruction Approaches	73
	Declaration of Authorship.....	75
	References	76

Table of Figures

Figure 1: Summary of experience of Dhamar reconstruction.....	5
Figure 2: Housing units after Dhamar earthquake 1982 - Source: Sultan Barakat	6
Figure 3: Summar of experience of Aldhafeer village reconstruction.....	6
Figure 4: Areal image of the newly reconstructed village of the Addhafeer - Source Google maps.	6
Figure 5: Schematic disaster management	7
Figure 6: Disaster management cycle	9
Figure 7: Disaster impact by nation's level of income	12
Figure 8: Numbers of disasters per type (1997-2017)	12
Figure 9: Disaster financing by sector 1991-2010	16
Figure 10: Financing for DRR from development banks.....	18
Figure 11: Contribution of top funders of GFDRR 2006-2010 (\$ million)	19
Figure 12: Direct financing for DRR from donors, 1991 - 2010, (\$ millions)	20
Figure 13: Top recipient countries of DRR funding during 1990-2010, (\$ millions)...	21
Figure 14: Drivers to Recovery (Alkazei & Matsubara, 2018).....	38
Figure 15: Warsaw's marketplace in 1945 (left) and now (right) © Public Domain (left) Dennis Jarvis (right).....	39
Figure 16: Berlin Wall Memorial.....	40
Figure 17: Hiroshima prefectural industrial promotion hall before attack (right) and after the attack (left).....	40
Figure 18: Dresden city center in 1945 (left) and in 2015 (right) Source: ADN (l.) Jens Meyer (R.)/AP	41
Figure 19: Case study main axes	43
Figure 20: Structure of the case study	43
Figure 21: Earthquake-affected districts in Gujarat State - Source: UNDP.....	44
Figure 22: Number of fatalities due to Sumatra tsunami 2004- Source od image to right corner: BBC	50
Figure 23: Number of Damaged Houses in Aceh Province	52
Figure 24: Donation as per February 2008 to ERTR program via UNDP	54
Figure 25: Number of rebuilt houses and public facilities	55
Figure 26: Monument of a boat thrown by tsunami – Source: Christopher Zinn.....	56
Figure 27: Volume of demolition in BCD as of 1998: all demolished except in black	59

Figure 28: Newly developed master plan pf BCD	60
Figure 29: Distribution of contracts over infrastructure sectors. Source: CDR report 2017	61
Figure 30: Floor space per category in the master plan	62
Figure 31: Wenchuan earthquake as of 14.05.2008 - Source: ReliefWeb.....	64
Figure 32: Location of the Old Beichuan and the New Beichuan (Yunchang)	67

List of Tabulations

Table 1: Distribution of answers' of research questions on the chapters	2
Table 2: Examples of reconstruction experiences in Yemen	5
Table 3: SWOT analysis - CA.....	23
Table 4: SWOT analysis - ODR.....	24
Table 5: SWOT analysis - CDR	25
Table 6: Advantages and disadvantages of ADRIS.....	26
Table 7: SWOT analysis - ADRRS	27
Table 8: Comparison of reconstruction approaches	28
Table 9: SWOT analysis - temporary and transitional solutions	29
Table 10: SWOT analysis - Housing repair.....	30
Table 11: SWOT analysis - building new housing	32
Table 12: SWOT Analysis - Building yard approach.....	32
Table 13: Compatibility of reconstruction approach with implementation models.....	34
Table 14: Losses Resulting from the Gujarat Earthquake, 2001	45
Table 15: Classification of house damages. Source GSDMA progress report Sep. 2003	46
Table 16: Partners contribution in UNDP programs.....	47
Table 17: Some benefits of reconstruction	49
Table 18: Summary table of damages and losses (\$ million)	51
Table 19: Reconstruction Approach Selection.....	73

List of Abbreviations

ADRS	Agency-Driven Reconstruction In-Situ
ADRRS	Agency-Driven Reconstruction in Relocate Site
BAPEL	Authority for the Rehabilitation and Reconstruction of Aceh and Nias - Indonesia
BAPPENAS	National Development Planning Agency - Indonesia
BCD	Beirut Central District
BNBP	National Board for Disaster Management - Indonesia
CA	Cash Approach
CDR	Community-Driven Reconstruction
CDR-L	Council for Development and Reconstruction - Lebanon
DRR	Disaster Risk Reduction
ETRT	Emergency Response and Transitional Recovery - Indonesia
EU	European Union
GFDRR	Global Facility for Disaster Reduction and Recovery
GSDMA	Gujarat State Disaster Management Authority
HFA	Hyogo Framework of Action
IBRD	International Bank for Reconstruction and Development
JICA	Japan International Cooperation Agency
KfW	The German Development Bank
MDF	Multi-Donor Fund
ODR	Owner-Driven Reconstruction
PPP	Public-Private Partnership
UNDRR	UN Office for Disaster Risk Reduction
UN-HABITAT	United Nations Human Settlements Programme
UNISDR	United Nations International Strategy for Disaster Risk Reduction
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
UPLINK	Urban Poor Linkage Indonesia
WHO	World Health Organization

1. Introduction

Disasters have a noticeable impact on human life in many aspects; it affects the humanitarian, social, economic, political, health, and urban environment. This impact is strong, negative, and destructive. The negative effects on the urban environment consequently affect the urban development; therefore the post-disaster reconstruction should delete/clear this negative effect and turn it to a chance/opportunity that not only recover or restore to the normal before the event but to improve the living conditions and develop new sustainable urban development via 'improving construction and design standards, renew infrastructure, create new land-use arrangements' (Johnson & Olshansky, 2016).

1.1 Problem Definition

This study aims to address the impact of reconstruction on the urban development after the negative effects due to disasters, which can be obtained by achieving two main goals: proper disaster control and successful reconstruction implementation and then discuss the impact which is the results of reconstruction on the urban development.

To study the first goal, this paper will explain the disaster management principles which should be applied beforehand, during, and after the occurrence of the disaster to avoid or at least mitigate its negative impacts.

A detailed description of the reconstruction strategies and implementation methods would lead to explain the second goal.

1.2 Research Objectives/Structure

The objective of this research is to answer the research questions; to achieve this objective, this paper includes six chapters: chapter 1 for the introduction, chapter 2 answers question 2, chapter 3 answers question 3, chapter 4 answers questions 1 and 3, chapter 5 (the case studies) answers 1st question, and chapter 6 to answer the fourth question.

Q1. <i>How would newly generated reconstruction plans influence the urban development of a destroyed city?</i>	Chapter 4 and Chapter 5
Q2. <i>What is disaster management? How would it mitigate the negative effects of the disaster?</i>	Chapter 2
Q3. <i>What are the reconstruction approaches? Trends? And implementation models?</i>	Chapter 3 and Chapter 4
Q4. <i>Which reconstruction strategy is most suitable to be implemented in Yemen?</i>	Chapter 6

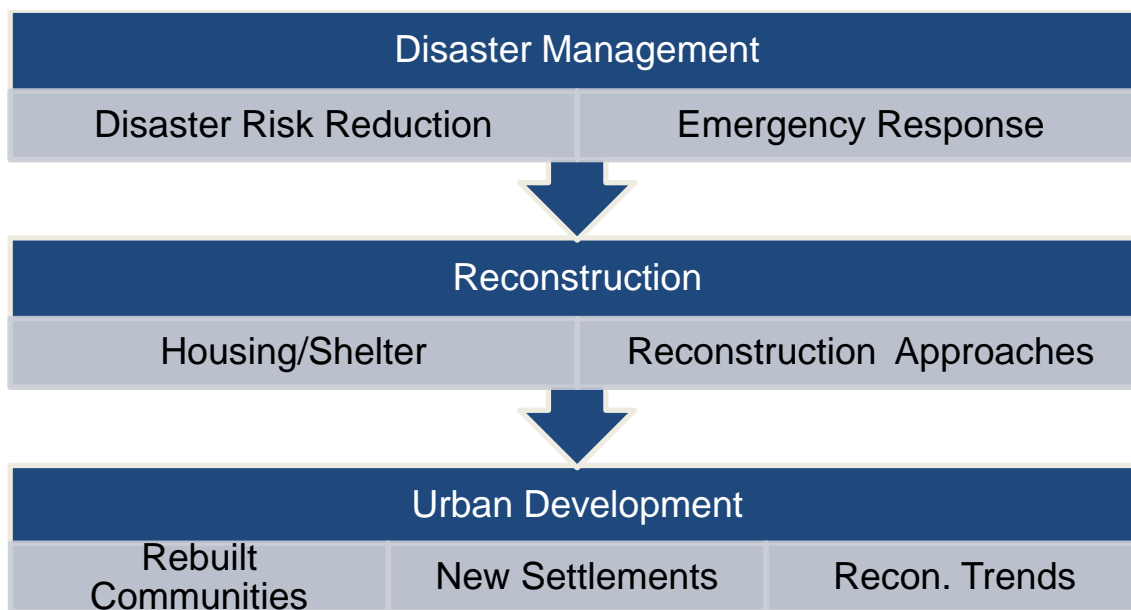
Table 1: Distribution of answers' of research questions on the chapters

1.3 Project Boundaries

Reconstruction is a broad term that covers many aspects such as economic, social, institutional, urban, and many other aspects. This research will be limited to the urban side of the reconstruction process, with a focus on the housing matters before, during, and after the event. Indeed, as the disaster has a great impact and apparent effects on the social, economic, humanitarian, and political aspects, the reconstruction process is profoundly affected by the political situation, the social and cultural nature of the society, and economic stability.

1.4 Research Method

This research has three fundamental concepts: disaster management, post-disaster reconstruction and urban development, the primary concern of this research is to determine the impact of the second aspect (reconstruction) on the third aspect (urban development).



To reach this goal, each element is discussed in a separate chapter, and then case studies were taken to examine the practice of these concepts in places that already suffer from catastrophic disasters.

1.5 Situation in Yemen

Yemen is suffering from a devastating war that has stalled the development and affected various aspects of people's livelihood. The population of Yemen is 30.5 million (UNOCHA, 2018), one-third of them living in urban areas while the rest distributed in a large number of small remote rural clusters.

The largest city is Sana'a – the capital city- which hosts 1.8 million, while the following big cities host a maximum population of 500.000, such as Taiz, Aden, and Hudaydah. All of these cities suffered from the war and still a battlefield till writing this paper.

1.5.1 Natural Disaster Types, Impact, and Reaction

Yemen is prone to natural disasters due to its geographical location and nature of its terrain, which combines high mountains, flat plains, and deserts. Floods resulting from heavy rains are the most frequent and destructive, followed by landslides, rock slides, and earthquakes.

Climate changes in recent years contributed to the recurrence of the phenomenon of droughts, which causes scarcity of underground water and increases the desertification phenomenon, which constitutes a threat to the sustainability of the agricultural sector and thus food security. During the past three decades (1980-2010), Yemen has experienced more than 32 natural disasters, causing casualties and economic losses of more than \$ 6 billion (Alshaibani, 2013).

The situation gets worse, and the negative impacts aggravated due to running war. Long duration of the war – started on 2014 and continuing till writing this paper- and its widespread on urban and rural areas cause damages in the architecture and infrastructure vary from direct destruction due to military operations and indirect effects due to the lack of recovery operation, and stoppage of maintenance works for the infrastructure.

Yemeni government has laid some legislative and institutional foundations -in the late 1990s- for disaster risk management, reflecting its commitment to achieving the Millennium Goals in field of disaster risk reduction in accordance to Hyogo Framework for Action 2005-2015, but what has been achieved remains modest compared to what is required, as it lacks sustainability and the perceived impact on reality (Alshaibani, 2013).

1.5.2 War Impact

The war in Yemen started in 2014 and continues to its fifth year cause the worst humanitarian crises in the world, with 9,864 killed and 60,211 injured in addition to 4.1 million displaced (UNOCHA, 2018). The war caused a massive effect on the economy with a high inflation rate, an acute decrease in the purchasing power, and a severe shortage in the basic essential material and fuel.

The physical infrastructure, including the housing sector, also suffers from the devastation due to the military operations and due to the stoppage of routine maintenance. No accurate estimation for the losses, but the World Bank estimated the cost of reconstruction of the physical infrastructure only by \$40 billion (Lynch & Yahya, 2018).

1.5.3 Reconstruction Experiences

After each disaster, the Yemeni government forms special committee/fund/program to manage and drive the response and the reconstruction such as:

Project/Fund	Year	Type of Disaster
Taiz Flood Disaster Prevention and Municipal Development Project	1999	Natural - Floods
Hadramout and Al-Mahra Reconstruction Fund	2008	Natural - Floods
Saadah Reconstruction Fund	2008	Vandalism
Abyan Reconstruction Fund	2012	Vandalism

Table 2: Examples of reconstruction experiences in Yemen¹

On 2003 the Government of Yemen (GOY) initiates the Disaster Management Unit in cooperation with UNDP(United Nations Development Programme), but this unit stopped its work in 2010 due to financial difficulties (MOAI, 2013), part of this unit mission is to coordinate the efforts of Different focal points in disaster prevention and emergency response. Following, a summary of two reconstruction projects.

1.5.3.1 Dhamar 1982

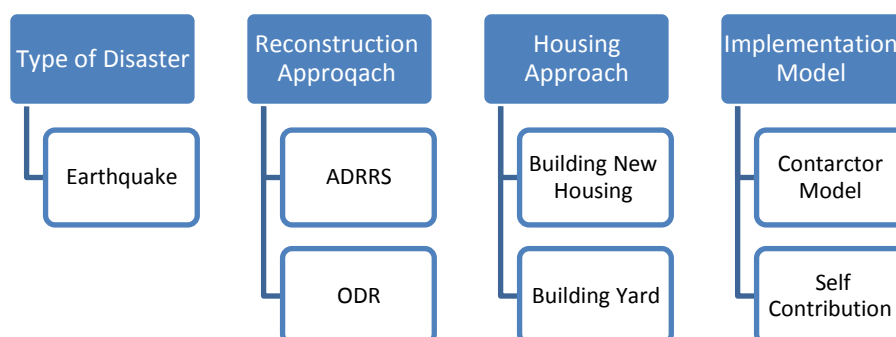


Figure 1: Summary of experience of Dhamar reconstruction²

This experience is a bad example of post-disaster emergency response and reconstruction because of the long period of procurements and bidding process, the long-time of reconstruction, the poor infrastructure, and the worst is that housing units did not meet local community's requirements (Barakat, 2003).

¹ Own work

² Own work



Figure 2: Housing units after Dhamar earthquake 1982 - Source: Sultan Barakat

1.5.3.2 Aldhafeer Village 2005

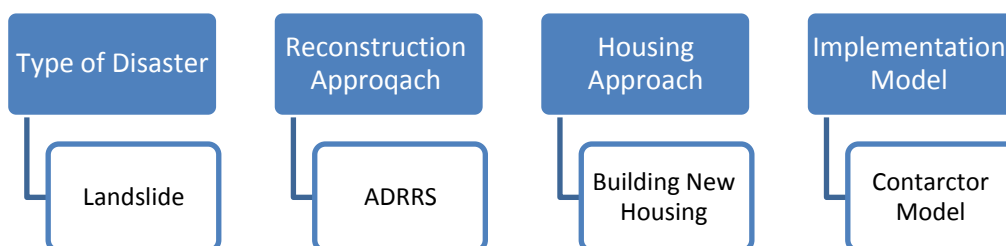


Figure 3: Summary of experience of Aldhafeer village reconstruction³

A successful project in terms of time, quality of construction, and satisfaction of residents.



Figure 4: Aerial image of the newly reconstructed village of the Addhafeer - Source Google maps.

³ Own work

2. Disaster Management Principles

Disasters have danger, and negative impact on different aspects in terms of loss of life, displacement of people, destruction of properties/buildings, destruction of infrastructure and damage to the environment, in addition to the social, economic, psychological and health problems, these problems require proper interaction during the different stages in order to mitigate their negative effects and minimize the consequences of the disaster on people, infrastructure and environment.

Disaster management is the set of measures aiming to assess the losses, address and mitigate their effects in all aspects via plans and reactions before, during and after event hits. UNSIDR (2017) gives the following definition: ‘The organization, planning and application of measures preparing for, responding to and recovering from disasters.

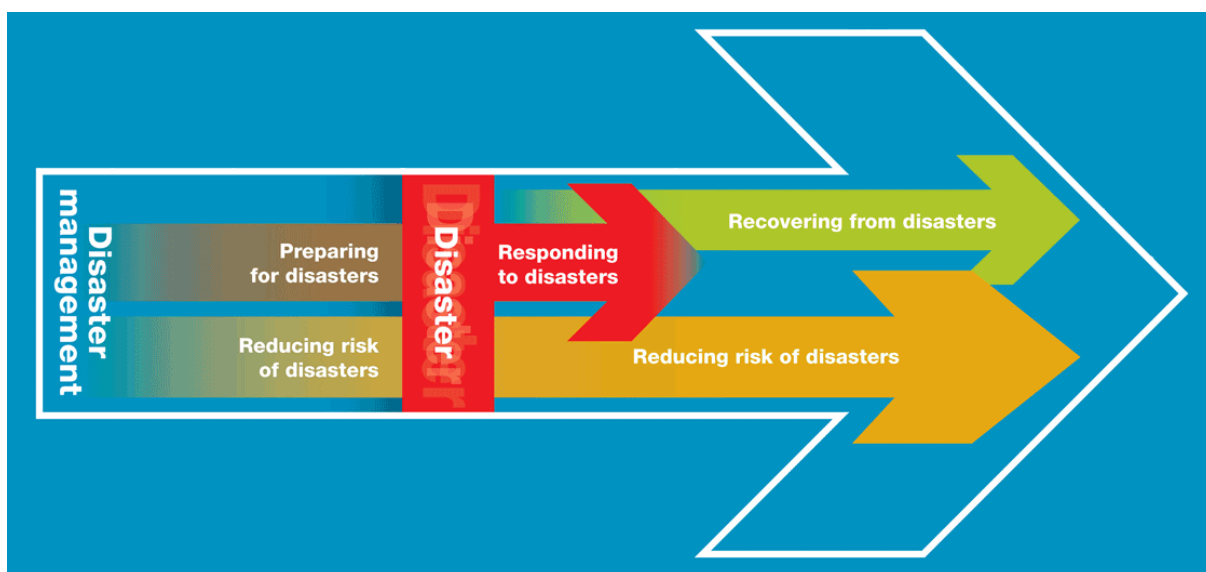


Figure 5: Schematic disaster management⁴

2.1 Definition of Disaster

Many institutions give their own definition of “disaster” based on their specialty, concern, and area of interest, the following are some of these definitions:

- ‘An event that results in great harm, damage, death, or serious difficulty’ (Cambridge Dictionary, 2019).

⁴ (IFRC, 2019b)

- 'An occurrence disrupting the normal conditions of existence and causing a level of suffering that exceeds the capacity of adjustment of the affected community' (WHO/EHA, 2002).
- 'An event, either natural or man-made, which has the ability to destroy life, natural landscape and man-made infrastructure' (McDonald, 2003).

According to Goyet, et al., (2006) United Nations International Strategy for Disaster Reduction (UNISDR) and the World Health Organization (WHO) has defined three disaster-related terminologies as follow:

- '**Hazards** are potentially damaging physical events, which may cause loss of life, injury, or property damage. Each hazard is characterized by its location, intensity, frequency, and probability.' (Goyet, et al., 2006)
- '**Vulnerability** is a set of conditions resulting from physical, social, economic, and environmental factors that increase the susceptibility of a community to the effects of hazards. A strong coping capacity - that is, the combination of all the strengths and resources available within a community- will reduce its vulnerability.' (Goyet, et al., 2006)
- '**Risk**: is the probability of harmful consequences (health burden) or economic losses resulting from the interactions between natural or human-induced hazards and vulnerable or capable conditions. In a simplified manner, risk is expressed by the following function:

$$\text{Risk} = f (\text{Hazards} * \text{Vulnerability})' \text{ (Goyet, et al., 2006)}$$

2.2 Types of Disasters

Disasters can be classified based on their source to two main types: natural disasters and human-made disasters. Natural disasters include all natural phenomena caused by slow or rapid onset events (IFRC, 2019) such as earthquakes, volcanos, tsunamis, floods, drought, and epidemics, while human-made disasters include wars, famines, transport accidents, pollution, and industrial accidents.

Regardless of the type of disaster, most of them are characterized by common features, including the speed, sequence of sudden, surprising events, high number of

causalities, damages in properties, lack and conflict of information/data, and disorder in public services system.

Volume and extent of disaster impact depend 'on the following characteristics (McDonald, 2003):

- **Magnitude:** event destructiveness measured on an approved scale.
- **Frequency:** repetition of the event based on previous records or/and the possibility to predict.
- **Duration:** the period of time for which the disaster lasts; it varies from seconds in case of earthquakes to years in case of drought.
- **Area Covered:** it might be limited to a domestic level or it may expand to reach regional or global levels.
- **Speed of onset:** time from the start until the peak

2.3 Stages of Disaster Management

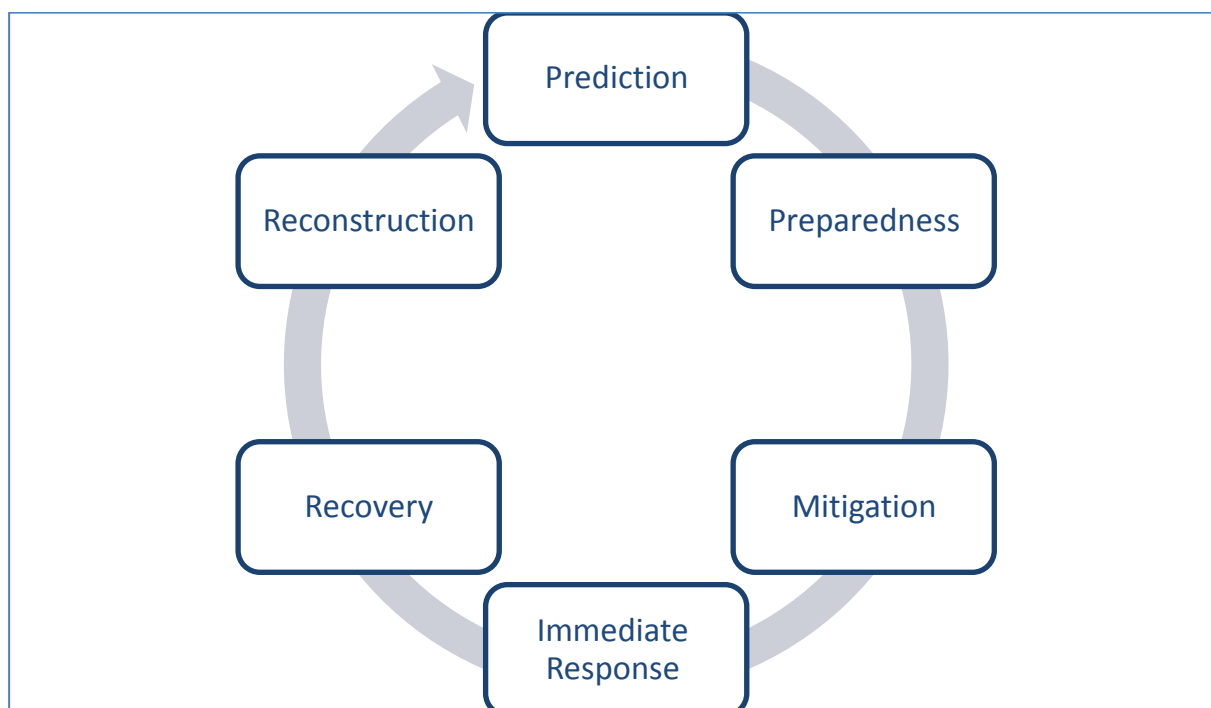


Figure 6: Disaster management cycle⁵

⁵ Own Work

Since disasters have the above-mentioned characteristics, they need special procedures and plans to confront and manage. These procedures should be implemented during the various stages of disaster's lifetime. The main stages are defined based on the chronological sequence starting from the prediction to the reconstruction.

2.3.1 Prediction (Pre-Disaster)

In this stage, responsible authorities install the technical tools and utilize all the available technologies such as weather forecasting, seismic monitoring, and remote sensing to predict the occurrence of natural hazards.

2.3.2 Preparedness (Pre-Disaster)

When a particular hazard is predicted, a comprehensive study should be generated for the potential impacts of this hazard and develop an integrated plan/strategy for the possible reactions/measures that would save lives and protect properties. The developed strategy may include evacuation plans.

2.3.3 Mitigation (Pre-Disaster)

The range of actions undertaken by all focal points on all levels to avoid or at least lessen the expected adverse effects of the hazard. This stage may include legislative aspects such as updating the building codes and/or impose the seismic structural requirement in specific types of building depending on the level of vulnerability.

2.3.4 Immediate Response (During/ Post Disaster)

The period immediately following a disaster, where attention is given to assessing and providing basic needs to the victims, rescue and tracing operations, and where information is collected to estimate losses and damages.

This stage includes providing shelters to displaced people, which is usually be the housing in tents, plastic sheeting, or fabric sheeting, in addition to the opening of access roads to facilitate relief operations.

2.3.5 Recovery and Rehabilitation (Post-Disaster)

This stage starts after the completion of the emergency response, aiming to resume the normal life condition prior to the disaster and rehabilitate the affected housing and infrastructure. During this stage displaced people should be moved to temporary housing instead of the emergency ones. Temporary housing composed of prefabricated units or simple brick houses gathered in camps, and have the necessary basic services such as water supply and sanitary facilities.

2.3.6 Reconstruction (Post-Disaster)

A comprehensive operation aims to delete all the negative impacts of the disaster and sustainably develop the whole affected area to fulfill the requirements of the local community and lead to betterment in living conditions. By the end of this stage, displaced people should move to permanent housing –rebuilt or newly built-.

2.4 Disaster Impact

Disasters have a growing impact on human life due to the increase in the number of disasters and their frequency of occurrence. According to Southgate, et al., (2013):

- The increase in disaster frequency is due to climate change
- Human is more exposed to hazards due to:
 - Growing populations
 - Aging of populations
 - Unplanned settlements
 - Increasing assets.
- More than half of the people affected by natural disasters are living in fragile and conflict-affected countries which prove the relation between fragility/ conflict and the increase in natural disaster's impact.

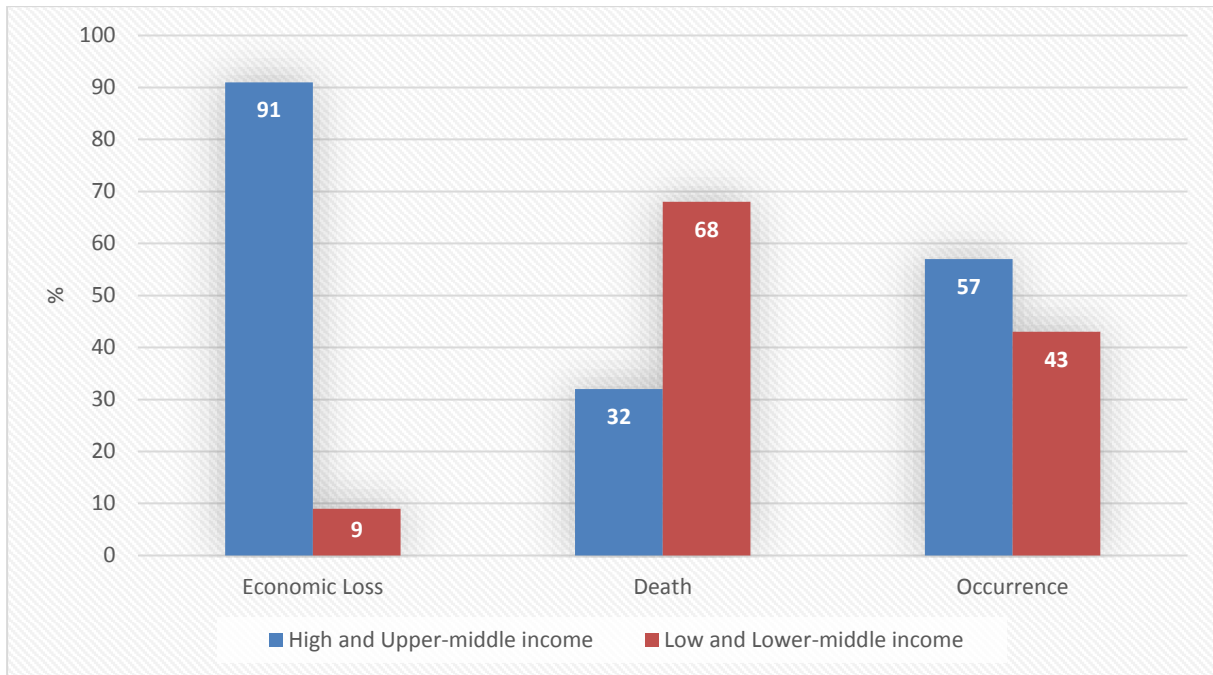


Figure 7: Disaster impact by nation's level of income⁶

McDonald (2003) provided additional reasons for the increasingly negative effects of disasters on the urban environment:

- The frequency of natural disasters increment resulted from:
 - Changes in the natural environment
 - Global warming
 - Destruction of ecological balance

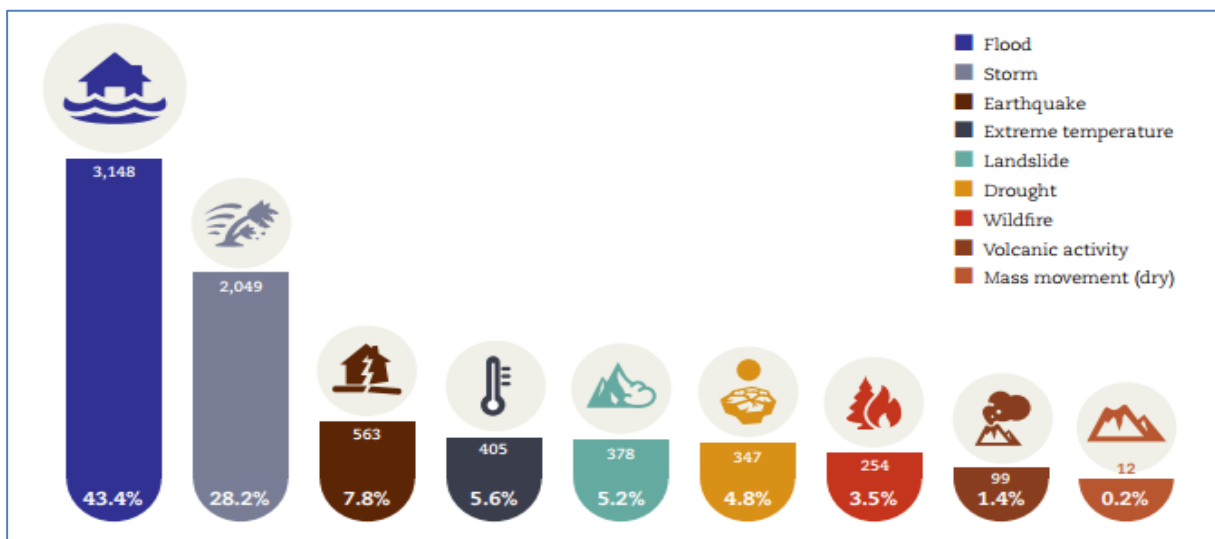


Figure 8: Numbers of disasters per type (1997-2017)⁷

⁶ In conformity with (Wallemacq & House, 2018)

⁷ (Wallemacq & House, 2018)

- People settle in an unsafe and vulnerable area due to the rise in world's population
- Poverty and social-economic crises in the developing country, where people have to find access to the labor market in large cities, but due to the lack of proper housing, they live in risky-vulnerable locations.

2.5 Hyogo Framework of Action (HFA):

Building the Resilience of Nations and Communities to Disasters

Hyogo framework of action originated by the United Nations in 2005 and endorsed by 168 countries. It is a 10-year plan/strategy seeks to make the world safer from disasters by 2015 (UNISDR, 2007). This framework aims to reduce disaster's losses in humans, the environment, and economy, especially in poor countries and regions where the risks of disasters are primarily concentrated as the population density is high.

Disaster risk is not only linked to vulnerability but is also the result of a range of other drivers related to the level of economic and social development. Hence, the program emphasizes the importance of being more aware of early warning systems and better preparedness and disaster response systems and emphasizes that governments should be more open and supportive of disaster risk reduction policies (UNISDR, 2007).

This framework adopted five priorities for action based on a careful review of past successes and failures in disaster reduction, HFA also developed reconstruction management strategies to ensure that this is done in the best and most efficient manner. The five priorities are (UNISDR, 2007):

1. Ensure that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation.
2. Identify, assess and monitor disaster risks and enhance early warning.
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
4. Reduce the underlying risk factors.
5. Strengthen disaster preparedness for effective response at all levels.

The framework specified several key activities under each priority to ensure the best practice of disaster risk reduction.

2.6 Sendai Framework for Disaster Risk Reduction 2015-2030

This framework is the successor agreed framework to the HFA for the period 2015-2030; it focuses on enhancing the resilience of the affected country and reducing the disaster impact. The framework specified the following four priorities:

- Priority 1: Understanding disaster risk
- Priority 2: Strengthening disaster risk governance to manage disaster risk
- Priority 3: Investing in disaster risk reduction for resilience
- Priority 4:
 - a. Enhancing disaster preparedness for effective response, and
 - b. to «Build Back Better» in recovery, rehabilitation, and reconstruction.

The framework includes guiding principles that emphasize on the integrity between national governments, local authorities, private sector, and local society (UNISDR, n.d.) to ensure well preparedness and active emergency response.

2.7 Disaster Management and Reconstruction Main Actors

National Level

The bodies that have the responsibility to carry out the workload of preparedness plans to face disasters and mitigate their impact, planning and developing strategies for reconstruction, and then implementation of reconstruction programs. Each party has its specific role; hence coordination and integration between these bodies are one of the most important reasons for successful reconstruction operation as the role of these bodies is complementary rather than individual. The key actors in reconstruction at the national level are:

2.7.1 National Government

National governments play the key role in the preparation of the strategies of disaster management and reconstruction plans; they take out the responsibility to assure adequate tools and legislations that:

- support the implementation of these strategies and
- facilitate the participation of various stakeholders to enable them to perform their contribution in the various stages of the process.

2.7.2 Community

The role of the community is vital and essential in all the stages of the process, starting from the preparation for disaster and continuing during the emergency response and lasting until the end of the reconstruction stages. If the community is not prepared to face the disaster at the required level, recovery and reconstruction cost more and become more complicated.

2.7.3 Local Authorities

These authorities which are represented by municipalities or village councils take out the responsibilities at the local level for implementing the national strategy during the various stages starting from preparedness, during disaster response and aftermath stage with complete guidance from the national government, coordination and cooperation with all focal actors.

2.7.4 Private Sector

The private sector plays a significant role, especially in reconstruction programs after disaster or war, as this sector has many strengths such as skills, abilities, workforce, and resources (Barakat, 2003) in addition to the motivation to participate in the reconstruction, which is the profit. It also has a great feature which is the flexibility and adaptability to the various circumstances.

2.7.5 Non-Governmental Organizations (NGOs)

NGOs have an important role to play in the emergency response stage and subsequent reconstruction. They help and support official institutions, especially in humanitarian issues, emergency relief, loss assessment, and field surveys. These organizations fill the gap that can arise, especially when the role of government is weak. Many civil society organizations conduct loss assessments to provide comprehensive economic and financial studies to donors to help securing the necessary funding for reconstruction projects.

2.8 International Contribution

International community finance and give aid in many forms and for many purposes, but the finance for the disasters during the period 1991-2001 was \$106.7 billion out of \$3,03 trillion, which is less than 4%. (Kellett & Caravani, 2013)

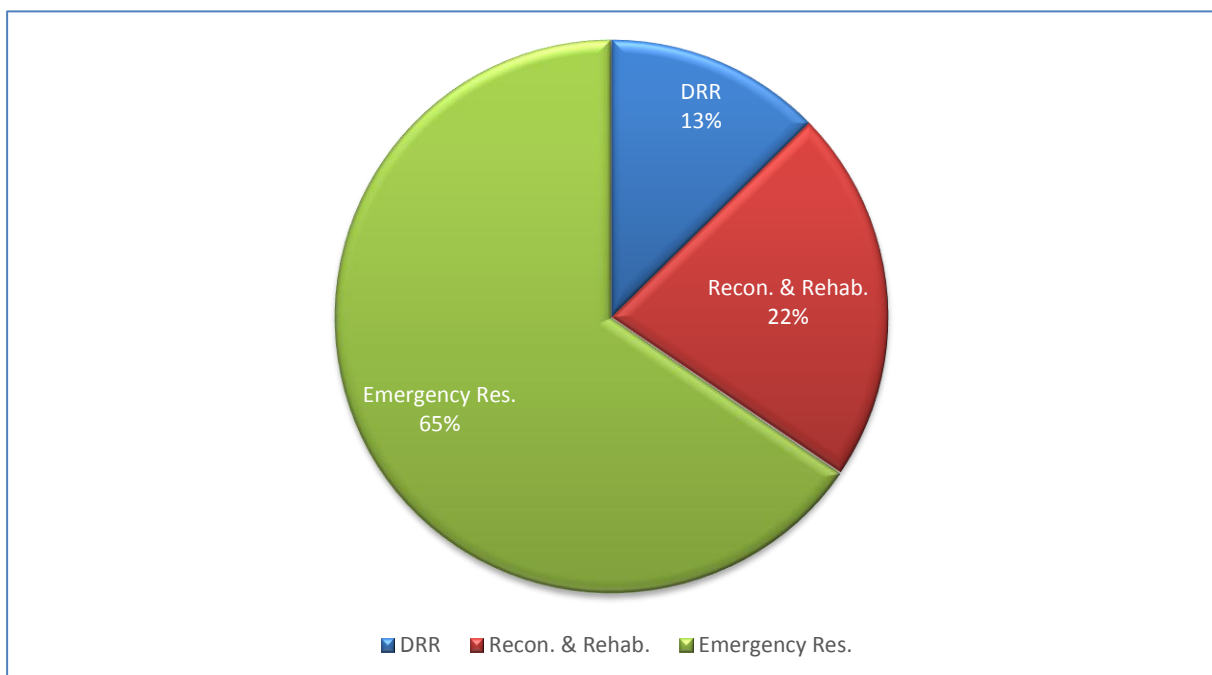


Figure 9: Disaster financing by sector 1991-2010⁸

Disaster financing goes through three paths; each path covers one of the disaster management main stages, the first path is disaster risk reduction (pre-disaster stage), the second path is the emergency response, and the third path is

⁸ In conformity of (Kellett & Caravani, 2013)

reconstruction and rehabilitation (post-disaster stage). The figure above illustrates the distribution of finance on the different paths.

Many institutions and governments initiate to support and give a hand to the affected country, especially during the emergency response. The main supports take two forms: financial and technical (Barakat, 2003), and the support during the reconstruction phase usually comes in the form of investment.

The main categories of active international contributors are international organizations, international financial funds/institutions, and external governments. One example of each category will be discussed in the following.

2.8.1 International Organizations and Agencies (United Nations)

Different organizations are participating in the disaster emergency response and reconstruction funding and operations. The field of work of these organizations cover a wide range of assistance and help to the affected community/country such as health, humanitarian issues, rapid relief, emergency response, and reconstruction operations; this chapter will discuss the last two fields.

United Nations plays an active role in the field of the disaster risk reduction by helping nations and communities to reduce the negative impact of disaster through implementing Hyogo Framework for Action 2005-2015 (OCHA, UNDP, UNISDR, n.d.) and Sendai Framework for Disaster Risk Reduction 2015-2030 in cooperation with the designated agencies and programs.

The UN addressed that DRR is a priority for all its organizations to ensure and guarantee high-quality assistance for disaster-vulnerable countries, and to ensure that resilience is achieved by implementing Sendai Framework for DRR 2015-2030 (UNDRR, 2019).

UN representing agencies and programs work with national governments, Non-Governmental Organizations - NGOs, and the private sector to minimize the impact of the disaster and accelerate the recovery (UN, 2019). The main active UN programs/agencies in the field of disaster risk reduction are:

- Office of the Coordination of Humanitarian Affairs (OCHA)

- UN Office for Disaster Risk Reduction UNDRR (formerly known as UN International Strategy for Disaster Reduction UNISDR)
- UN Development Program (UNDP)

In addition to many other agencies, organizations, and programs such as the World Health Organization (WHO), Food and Agriculture Organization (FAO), and The United Nations Human Settlements Programme (UN-HABITAT).

2.8.2 International Finance Institutions (World Bank)

The world bank is one of the UN's organizations, but because of his significant and crucial contribution, it normally considered as a separate outstanding organization. The bank played a very important role in post-world-war-II reconstruction via the International Bank for Reconstruction and Development (IBRD), from that early beginnings the bank expanded his activities to cover a wide range of services via five affiliate institutions form the World Bank Group (GFDRR, 2019) in addition to many other programs and projects.

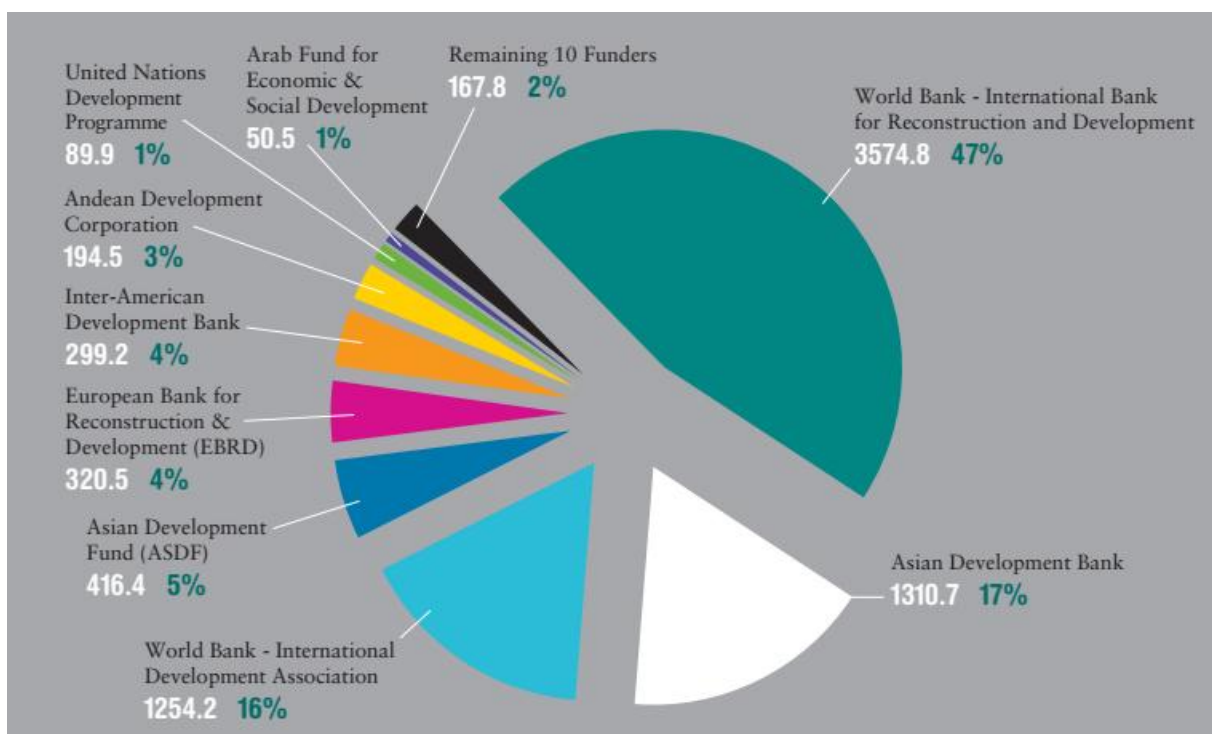


Figure 10: Financing for DRR from development banks⁹

⁹ (Kellett & Caravani, 2013)

World Bank Group financing institutions -IBRD and International Development Association IDA- have the highest contribution in donations for Disaster Risk Reduction (DRR) among all development banks, financing mechanisms, and Implementation agencies (Kellett & Caravani, 2013) (see the figure above).

In 2006 the world bank with other donors established the Global Facility for Disaster Reduction and Recovery (GFDRR), which serves as the focal point of the bank in disaster reduction and management. GFDRR has many goals to reach and achieve, including the support for implementing HFA 2005-20105, advance disaster risk reduction, and accelerating the post-disaster recovery (GFDRR, 2019). GFDRR funded by the World Bank and by some governments, top government funders of GFDRR during the period 2006-2010 are EU institutions, Sweden, Australia, the UK, and Japan.

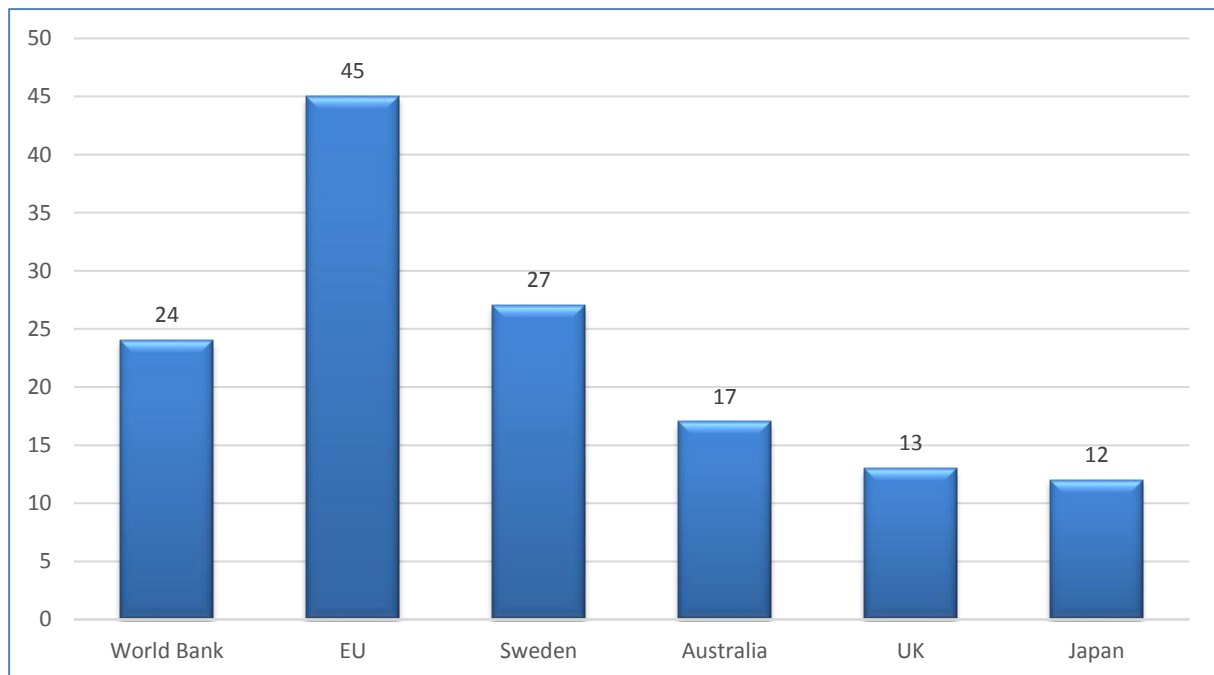


Figure 11: Contribution of top funders of GFDRR 2006-2010 (\$ million)¹⁰

The focus on disaster risk reduction is essential on donor's policies for humanitarian funding; participant on the third UNISDR's Global Platform for DRR suggested to allocate 10% of humanitarian aid plus 10% of post-disaster reconstruction funding for DRR work (Sparks, 2010)

¹⁰ Inconfermity of (Sparks, 2010)

2.8.3 External Governments (Government of Japan)

Countries with expertise in disaster management participate in disaster management and emergency response operations via specific institutions depending on the type of assistance. This participation takes two forms: technical support or/and financial support. Nevertheless, in both cases, the assistance is usually implemented by certain governmental agencies for international cooperation. The contribution takes two paths; direct bilateral cooperation to the affected country or via donating to international agencies (Kellett & Caravani, 2013).

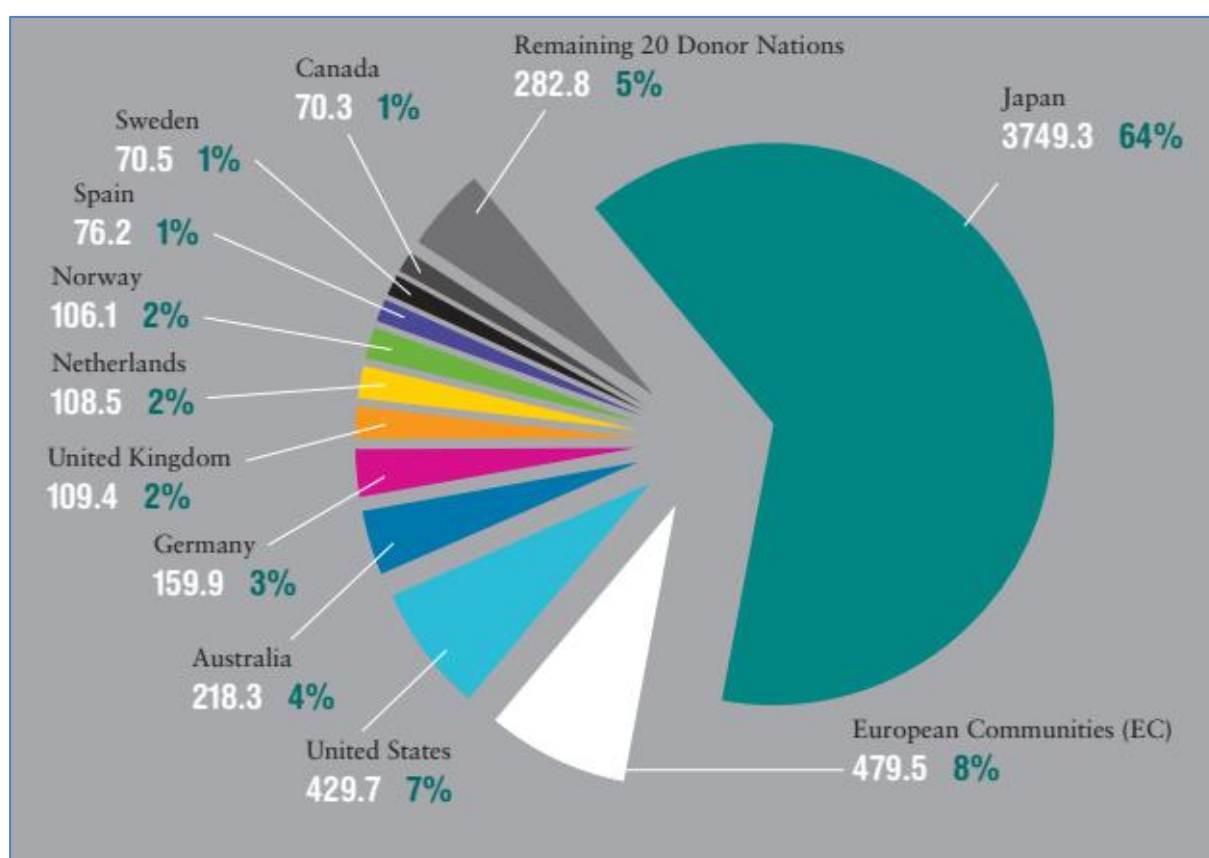


Figure 12: Direct financing for DRR from donors, 1991 - 2010, (\$ millions)¹¹

The figure above shows the volume of contribution for the DRR by country in the period 1991-2010, which shows that Japan is the largest direct donor even more than the World Bank, the next figure shows the top recipient countries of DRR during the same period.

¹¹ (Kellett & Caravani, 2013)

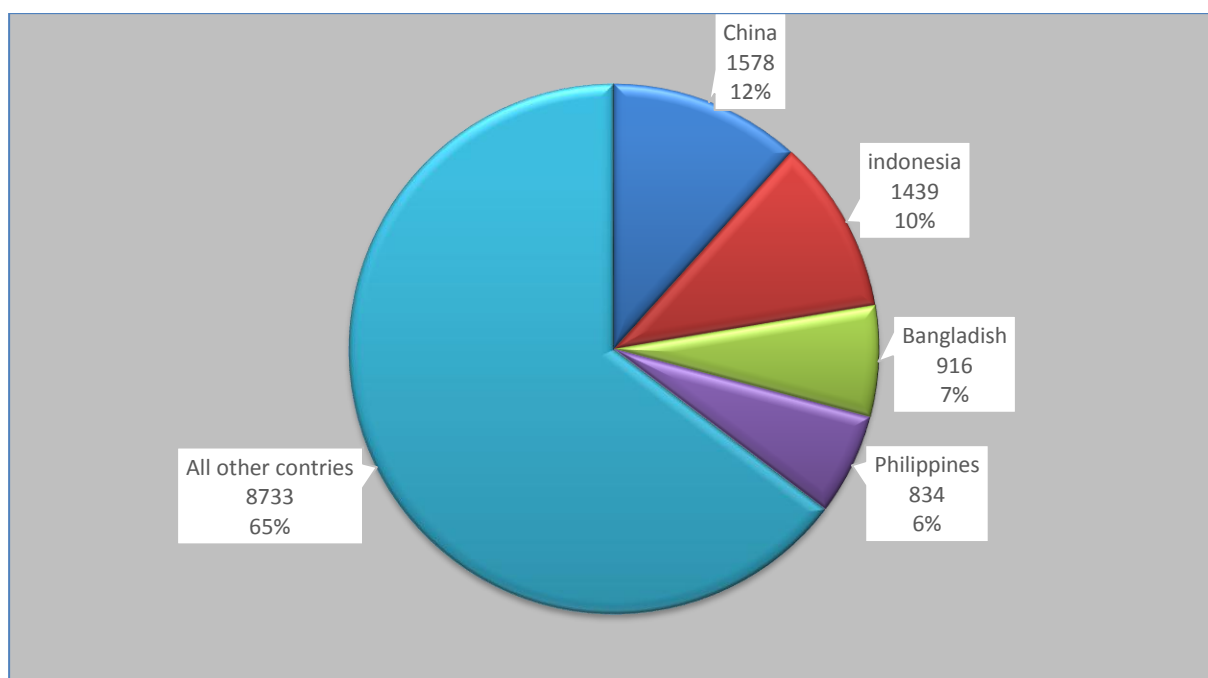


Figure 13: Top recipient countries of DRR funding during 1990-2010, (\$ millions)¹²

Japan has a unique and distinguished experience in disaster management since it faces a high number of catastrophic disasters such as the Kobe earthquake 1995, floods of 2000, and the compound disaster in 2011 (earthquake, tsunami, and nuclear disaster). This might explain the reason for which the government spent up to 5% of its annual budget on DRR (Sparks, 2010).

Japan utilized its accumulative experience in the field of DRR to play a leading role in the global efforts in this field, and it supports the DRR all over the world by its generous funding and finance which exceeds the contribution of the World Bank and form two-third of the combined contribution of all countries (Kellett & Caravani, 2013).

JICA (Japan International Cooperation Agency) is the primary channel for the Government of Japan to participate in international cooperation, including the financing of the DRR efforts. JICA controls the three schemes of Japan's Official Development Assistance (ODA): loans, grants, and technical cooperation (OECD, 2010).

¹² In conformity with (Kellett & Caravani, 2013)

3. Reconstruction Policies

Reconstruction is an operation aims mainly to rebuild the physically-damaged structure to enable the restoration of the livelihood of the affected people (Jha, et al., 2010). This operation offers an opportunity to improve the living condition, reduce disaster risk, avoid the vulnerability of the location, minimize the impact of the same hazard (UNSIDR, 2017) by applying the principle of “Build Back Better.”

3.1 Reconstruction Approaches

Reconstruction approaches are the available options that main reconstruction actors have to choose, adapt, or combine to form the appropriate and most applicable approach to implement reconstruction project. Each of these approaches has pros and cons depending on the practical situation applied. Choose of the suitable approach is controlled by various factors that may influence the decision such as the availability of international assistance, community awareness to disaster response and private sector involvement in the reconstruction process. The key factors in choosing the approach are: 'reconstruction costs; improvement in housing and community safety; restoration of livelihoods; political milieu; cultural context; and people’s own goals for well-being' (Jha, et al., 2010).

3.1.1 Cash Approach - CA

This approach is the simplest and most cost-effective where the assistance is limited to financial support given to the residents of the affected buildings, which means that they can use the cash freely upon their priorities even if they prefer to migrate from disaster zone rather than repairing their houses. This approach is appropriate when the damages are limited, and the community has certain building capacity i.e. enough experience in construction and availability of construction materials or the ability to utilizing the salvage of the damaged houses. This approach does not guarantee the quality of repair and reconstruction work. Furthermore, it may not repair the damaged houses at all if the beneficiaries decided to use the cash for other purposes (Jha, et al., 2010).

SWOT Analysis - CA

Strength	Weaknesses	Opportunities	Threats
Cost effective	Beneficiaries lack the technical assistance	Reuse of salvage of damaged houses	Risk of pre-disaster vulnerability
Households get the aid faster	No capacity building for the local communities	Adjustment of the assistance as per the household conditions	Not to use the cash in house repair
Flexibility of utilization of cash as per families' priorities	No improvement in building technology		Beneficiaries fail to complete the rebuild
Simplicity of delivery mechanism	Quality of the work not guaranteed		

Table 3: SWOT analysis - CA¹³

3.1.2 Owner-Driven Reconstruction - ODR

In this model, owners take the responsibility to repairing their buildings themselves returning them to normal, assistance in this approach takes many forms like financial assistance, technical assistance, and supplement of building material and building tools. ODR does not necessarily mean the owner does reconstruction work by himself, but the owner has the option to do the work himself or with the assistance of family members, hire a local contractor or to combine all these together based on his preference and ability. (Jha, et al., 2010).

Technical assistance aims to ensure the quality of the performed works via engineered construction manuals and standards, and approved mechanism for payments based on progress in work, training to build the capacity of owners and laborers, in addition to construction supervision from the government/local authorities or technical institution. (Jha, et al., 2010).

¹³ In conformity of (Jha, et al., 2010)

SWOT Analysis - ODR

Strength	Weaknesses	Opportunities	Threats
Households involvement in the reconstruction	Difficult to apply in urban areas due to lack of building experience	Reuse of salvage of damaged houses	Risk of pre-disaster vulnerability unless good standard oversight
Consistency with normal housing construction practices	Quality of the work not guaranteed unless active supervision	Adjustment of the assistance as per the household conditions	Beneficiaries fail to complete the rebuild due to rigid building code
Effective in case of remote settlement	Difficult to apply when relocated settlement	Speed recovery from the psychological trauma	Households of elderly face difficulties managing reconstruction alone
Less influenced by the political situation		Preserve the place identity	
Speed the recovery of local economy and livelihood		Beneficiaries can top up the assistance by adding their own budget	

Table 4: SWOT analysis - ODR¹⁴

3.1.3 Community-Driven Reconstruction - CDR

In this approach, the community involved in the reconstruction process via the community reconstruction committee, this committee represents the owners of the affected houses and manage the reconstruction operation directly or via a particular agency.

The agency or the committee- separately or together- take the responsibility of all technical and engineering tasks, including the design/redesign of houses, infrastructure, and urban plans, training of local labors, material supply, and implementing the reconstruction operations. This approach may improve the abilities of the local community in terms of building construction skills as it gives the owners control over the reconstruction process (Jha, et al., 2010).

¹⁴ In conformity with (Jha, et al., 2010)

SWOT Analysis – CDR

Strength	Weaknesses	Opportunities	Threats
Owner control over reconstruction	Overheads due to agency involvement	Foster the social cohesion	Local contractors may capture the construction committee
Assured access to building materials	Community participation perceived as time-consuming	Speed the recovery of the local economy	Risk of limiting the consultation to community leaders
Adopting new building technologies		Community development due to linkage to housing reconstruction	

Table 5: SWOT analysis - CDR¹⁵

3.1.4 Agency-Driven Reconstruction In-Situ - ADRIS

In this approach, an agency -initiated by the government or in some cases NGO- takes the responsibility to hire contractor/s for designing and building the new houses. The local community may have some effect on quality control as the project in their land, but if contractors utilize resources from outside the local community (Jha, et al., 2010); this may limit the intervention/influence of the local community in the reconstruction process.

This approach is not recommended when local community has the capacities to participate in reconstruction activities, and in case this approaches is considered; it is possible that the agency hire house-owners to perform some construction tasks and/or involve them in design, site planning, and materials selection (Jha, et al., 2010).

¹⁵ In conformity with (Jha, et al., 2010)

SWOT Analysis - ADRIS

Strength	Weaknesses	Opportunities	Threats
Community not displaced	The contractor plays the major role in design and construction over the local community	Community can monitor the construction	Negative environmental and social potentials due to demolition
No land acquisition is required	Ruins consider as an obstacle and lead to huge demolitions	Introducing of new building technologies	Negative impact on place identity due to exogenous building technologies
			Corruption and exploitation by contractors

Table 6: Advantages and disadvantages of ADRIS¹⁶

3.1.5 Agency-Driven Reconstruction in Relocated Site - ADRRS

In this approach, contractors -hired by governmental or non-governmental agency- undertake construction duties in a new location. The main reason behind relocating is to avoid the vulnerability of the previous location and to mitigate the risk of disaster reoccurrence. This approach is preferred by the agency who drive the reconstruction because of the benefits of starting the work in a plain land rather than working in devastated location, and to avoid the complications of ownership and tenancy issues (Jha, et al., 2010).

Applying this approach is argumentative and raises the debate: relocate or not to relocate; therefore it should not be applied unless there is a strong reason as mentioned above. In case of choosing this approach, it is recommended to involve communities in the Different stages of reconstruction. (Jha, et al., 2010).

¹⁶ In conformity with (Jha, et al., 2010)

SWOT Analysis – ADRRS

Strength	Weaknesses	Opportunities	Threats
Best option for hazardous site	Loss of place image	Heritage conservation by moving from sensitive sites	Delay due to site selection
Fast	Lack of community contribution	Betterment of living condition	Elite capture and unequal of houses distribution
Cost effective	Disruption of livelihood	Enhance the infrastructure and urban planning	Risk of alien architecture
Avoid pre-disaster housing problems			

Table 7: SWOT analysis - ADRRS¹⁷

¹⁷ In conformity with (Jha, et al., 2010)

3.1.6 Comparison of Reconstruction Approaches

A comparison can summarize the approaches mentioned above and distinguish the main features and characteristics of each.

Reconstruction approach	Degree of household control	Form of assistance		Role of actors			Location	
		Financial	Technical	Community	Agency	Contractor	In-Situ	New site
CA	Very high	Cash only	None	None	None	Household may hire	Yes	No
ODR	High	Conditional cash transfer to household	TA ¹⁸ /Training of household	None	Project oversight and training	Household may hire	Yes	NO
CDR	Medium to high	Transfer to household or community	TA/Training of community and household	Project organization and oversight	Project oversight and training	Community may hire	Yes	NO
ADRS	Low to medium	Funds handled by agency	Limited or none	Limited	Management of project	Agency hires	Yes	NO
ADRRS	Low	Funds handled by agency	Limited or none	Limited	Management of project	Agency hires	NO	Yes

Table 8: Comparison of reconstruction approaches¹⁹

¹⁸ TA: technical Assistance

¹⁹ (Jha, et al., 2010)

3.2 Post-Disaster Housing Approaches

During the emergency response and at the reconstruction stage there is a need for housing to accommodate people who lost their homes due to the disaster, following approaches can be defined to deal with housing after the disaster, the variety of these approaches introduces different features i.e. one approach may fit a situation but not suitable for all cases. This diversity may be utilized by adopting one or more approaches to best meet the requirements of the community, the location conditions, and the economic situation.

3.2.1 Transitional and Temporary Housing

This approach is applied when the level of urgency is high, for instance, when the number of the affected people is high and/or the climate conditions are tough, which requires to provide the housing soonest. So, the imported prefabricated shelters of temporary housing are likely to be the best option (Barakat, 2003).

This approach is not preferred from the economic point of view because of the high cost of this type of housing, especially as it serves as a temporary solution, and it does not involve the local community and their economy (Barakat, 2003).

SWOT Analysis – Transitional and Temporary Housing

Strength	Weaknesses	Opportunities	Threats
Provides shelter	Lacks individualism	Emergency material recycling	Culturally alien
Communal buildings released to original use	Limited community participation	Supports 'host' families	May become permanent
Possible to stockpile	Expensive cost	Reduce of tension	Damage during transport
Speed of construction	Difficult to target beneficiaries	May have alternative uses in the future	Delay in Delivery and installation

Table 9: SWOT analysis - temporary and transitional solutions²⁰

²⁰ (Barakat, 2003)

3.2.2 Repairing Damaged Housing

The fastest and cheapest in case of small and minor damages occurred to the houses and when the skill to repair is available. It is the favorite option for affected people who do not prefer to move to temporary shelters or collective relief centers and prefer to continue living in their homes. (Barakat, 2003)

Based on the scale of the damages and ability of owners to do the repair by themselves, the donors or supporting organizations will determine the type of assistance should be given, normally the supply of building materials and maintenance tools are essential, and the skillful labor is an option depending on the needs. (Barakat, 2003)

SWOT Analysis - Housing Repair

Strength	Weaknesses	Opportunities	Threats
Speeds reconstruction process	Required certain level of skills	More houses repair for less money	Lack of safety measures
Major role for affected people	Not all the people can use the kits	Reduce of tension	Kits may end up in market
Effective in rural and remote areas	Materials availability in local market not guaranteed	Culturally suitable	Loss of identity in heritage areas
Clear ownership			

Table 10: SWOT analysis - Housing repair²¹

3.2.3 Building New Housing

Creating totally new housing campus is a good chance to build an environment-friendly settlement that fulfills the requirement of the residents and offers them a better life condition. The new urban plans should take into account the characteristics of the location, construction method, and design (Barakat, 2003).

²¹ In conformity with (Barakat, 2003)

3.2.3.1 Location

Constructing the new settlement close the existing one keeps the connection between the displaced people with the location and enable them to continue their normal activities. While moving displaced people to a totally new location need to ensure the accessibility to the labor market (Barakat, 2003) and the good connection to public services.

In all cases, the new location should be safer towards disaster with less vulnerability, has a good connection and reachability, and provide a sustainable environment with better living conditions.

3.2.3.2 Construction Materials

Using local construction materials has advantages in the reconstruction process because of the following characteristics: matching the traditional image, compatible with building techniques, suitable for climate conditions. In addition, utilizing local construction resources – materials, skills and experience- would accelerate the economic recovery of the local community (Barakat, 2003).

Another option is to use prefabricated houses in case of a large number of displaced people, and this option is usually taken into consideration when it is difficult to keep the affected people in their place, and they have to move away such the case of war refugees.

3.2.3.3 The Design

The layout of the new settlement site should include enough spaces for public facilities and common spaces while the design of entire homes should ensure good ventilation, served with electricity, water, and connected to the sanitary system (Barakat, 2003) .

SWOT Analysis – Building New Housing

Strength	Weaknesses	Opportunities	Threats
Bigger occupancy	Long time of building	Organized plans	Delay in delivery
Integrated services	High cost	Reduce of tension	Loss of the access to residents' livelihood
Avoid of the vulnerability			Loss of identity in heritage areas

Table 11: SWOT analysis - building new housing

3.2.4 Building Yard Approach

The application of this approach depends on the ability of the local community to build and reconstruct their homes by themselves or by hiring local contractors. The availability of building material in the location is another important requirement to apply this approach. The participation of the donors, relief agencies or governments is limited to material supplement and/or technical support. (Barakat, 2003)

SWOT Analysis – Building Yard Approach

Strength	Weaknesses	Opportunities	Threats
Utilize existing abilities	Difficult to justify for funding agencies	Capacity building by training of local builders	problems in local market due to providing building materials for free
Benefit from local materials	Difficult to target beneficiaries	Develop small contractors	Materials may be resold and not used in construction
	Take long time to see results	Improve building materials and techniques	Stockpiles may be looted

Table 12: SWOT Analysis - Building yard approach²²

²² In conformity with (Barakat, 2003)

3.3 Reconstruction Implementation Models

Choose of the implementation model is the last step before commencing the reconstruction process; the final decision about the implementation model depends on many factors such as (Barakat, 2003):

- Scale and spread of destruction
- Building method
- Local community's knowledge and experience in construction techniques
- Capacities of stakeholders
- The timeframe of the project and
- The availability of resources

Mainly there are three models for implementing the reconstruction projects: self-build model, community contribution model, and contractors' model.

3.3.1 Self-build Model

This model is common and more applicable in the reconstruction of rural areas if the community has certain knowledge about building and construction; this knowledge comes when locals traditionally build their own homes by themselves. So, this model aims to benefit from this feature and encourage the local community to implement the rebuild of their homes. Therefore, the possibility of considering this model depends on the availability of labors in the local market and the simple-design of houses (Barakat, 2003).

Main external support in this model takes the form of material supply to the beneficiaries, and main household's contribution is performing the rebuild-work, and this does not guarantee the quality of the work and pre-disaster vulnerability may continue after the reconstruction; hence technical assistance in the form of code Implementation, supervision (Barakat, 2003) and training would improve the outcomes.

Community benefits from this model in many ways such as the ability to occupy the house during the work and the engagement in the work for a large number of locals

as this model is labor-intensive; the latter also helps community to recovery after trauma (Barakat, 2003).

3.3.2 Community-Cooperative Model

This model requires good arrangement and close coordination between community components since it is based on the collective efforts of the entire community, this cooperation facilitates the recovery after trauma, restore livelihood and enhance the relationship between community members. External assistance and aids are given to the entire community rather than individual families, which means the community should cooperate, organize the operation, and keep a good relationship with supporting agencies to ensure good practice and successful reconstruction process (Barakat, 2003). Setting goals, understanding the components of the projects, and exchanging the experiences are essential features to success and achieve the satisfaction of all stakeholders.

3.3.3 Contractor Model

Contracting construction companies, whether local or international, considered the fastest and easiest way to provide housing for the affected people and shorten their humanitarian suffering since this companies have the ability to build large number of housing, to do so, they tend to import resources from outside the community and impose certain housing solutions/technologies in order to provide housing with better disaster-resistance. This model is more effective in urban areas where no building-experience and in case of large-scale devastation (Barakat, 2003).

3.3.4 Compatibility of Reconstruction Approaches with the Implementation models

Reconstruction Approach	Implementation Model	
CA	Self-Build	Contractor Model
ODR		
CDR	Community-Cooperation	
ADRIS		
ADRRS		

Table 13: Compatibility of reconstruction approach with implementation models²³

²³ Own Work

4. Post-Disaster Urban Development

Urban development due to reconstruction is distinguished from urban development at normal conditions because it comes after disaster and deals with previously developed areas, unlike regular urban planning, which initiates development on plain land. Indeed there are many commons at least in the goals like improvement of living conditions, upgrading the housing standards, enhancing the infrastructure, and expanding the extent of services provided to the residents.

Rebuilding devastated areas require fulfillment of certain aspects and should meet essential requirements which can briefly introduce in the following paragraphs.

4.1 Urbanization of Rural Area

Damages in the countryside due to disasters usually spread to cover wide areas, so devastation extends to large numbers of houses and infrastructures. Which necessitates the reconstruction process to upgrade the infrastructures and services and impose to rebuild the collapsed houses in the same location or in a new location.

Reconstruction is a unique opportunity to cluster the housing in rural areas to ease the delivery of service to them – in case of applying ADRRS-, and in case of ADRIS; it gives the chance to generate urban plans with the newly added service and installed infrastructures. Implementing these aspects means that rural areas get a kind of urbanization. This urbanization can easily noticed via upgraded housing, enhanced infrastructure, and improved public services.

4.2 Build Back Better (BBB)

Build Back Better (BBB) is a very important concept in post-disaster reconstruction, therefor Sendai framework for DRR include this principle in priority 4.b. Applying BBB to the recovery, rehabilitation, and reconstruction phases would result in enhancement of the disaster preparedness, minimizing the vulnerability and improvement of living conditions after the reconstruction (IRP, 2010).

Successful BBB should have three characters:

4.2.1 Build Back Stronger

This means new buildings should meet the requirement of the disaster-resistant design by applying structural codes specifications to reduce the losses in case of disaster occurrence in the future.

4.2.2 Build Back Faster

To ensure the ability of residents to cope and restore their living conditions, source of incomes and livelihood (Hallegatte, et al., 2018)

4.2.3 Build Back more Inclusively

The reconstruction support should reach all the affected people, particularly the poorest households who are the most exposed and vulnerable to the disaster (Hallegatte, et al., 2018).

4.3 Resilient Development

Resilience can be defined as:

- 'The ability of societies to resist, cope with, and recover from shocks' (World Bank, 2014). Or more comprehensively as:
- 'The ability of a system, community or society potentially exposed to hazards to resist, absorb, adapt to and recover from the stresses of a hazard event, including the preservation and restoration of its essential basic structures and functions' (Jha, et al., 2010).

This ability can be achieved by integrating disaster risk reduction with post-disaster recovery and reconstruction.

Upgrading of rebuilt housing by applying standards will lead to limit the damages and negative impact of the disasters and this will reflect in a long-term resilient housing. Resilient houses consequently reduce the losses in terms of the number of casualties or in the economy.

4.4 Preserving Place's Identity

Based on the applied reconstruction trend, there would be a significant influence on the appearance of the place (city, village, etc...) but it should in all cases preserve the identity of the location because people tend to keep their place memory and prefer to feel the attachment with the surrounding location. Therefore the following defined terms should be considered during the planning and implementation of the reconstruction.

4.4.1 Place Identity

Place identity is part of the social identity, and it is composed of two types of several elements; emotional elements such as ideas, values, memories and thought, and physical elements such as home, neighborhood, and school, etc... (Qazimi, 2014),. Identity is characterized by individuality and oneness, and it implies to distinction from other places (Lynch, 1960) .

4.4.2 Place Image

Abu Baraka (2018) conclude from the (Lynch, 1960) that image can be described as a 'sentimental combination between objective city image and subjective human thoughts' (Abu Baraka, 2018), another definition of the place image is 'the sum of beliefs, ideals, and impressions people have toward a certain place.' (Kotler, et al., 1993).

4.5 Reconstruction Trends

Aftermath reconstruction planning is a very important process because it will affect the lifestyle of the residents and form their city's/place's future image; therefore, the planner should take in consideration 'people's physical, emotional and economic attachment to the place' (Alexander , 2004). The trends of the reconstruction may differ from place to place and from disaster to disaster for instants, in case of post-conflict disasters people may have the choice between memorizing or oblivion but in post-natural disaster people many not have that chance to choose as they may have to move from their location due the vulnerability of the location and start new life at a totally new place.

Generally speaking, there are four main drivers of the reconstruction trend/plan: memory, oblivion, conservation and new development (Alkazei & Matsubara, 2018), these four aspects drive the four reconstruction trends which are: restoration, monumentalism, memorialism, and neoliberalism.

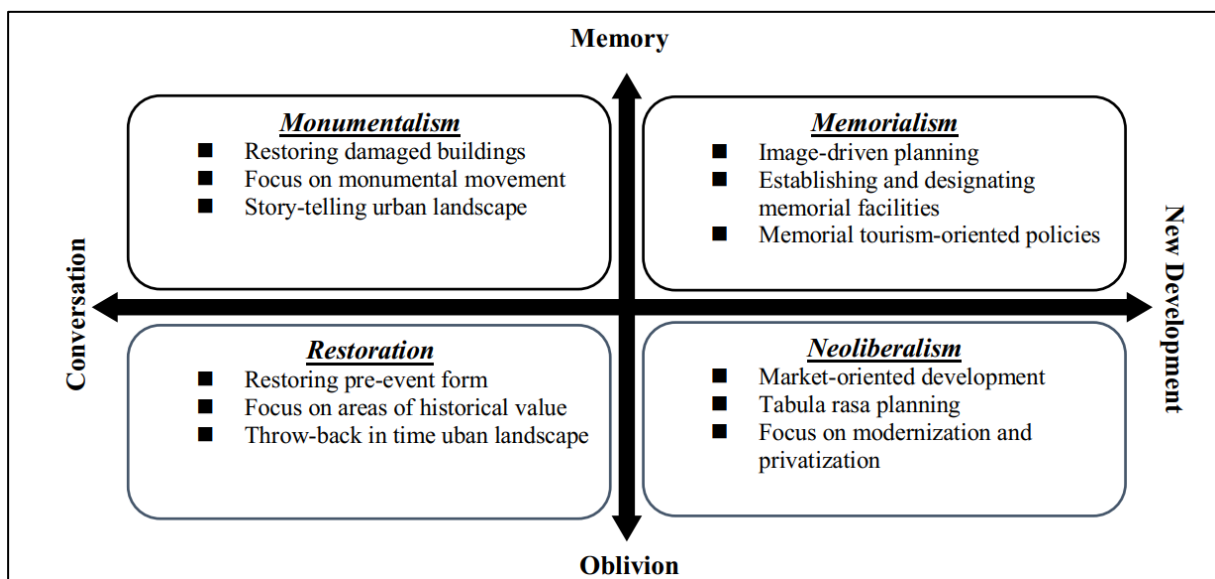


Figure 14: Drivers to Recovery (Alkazei & Matsubara, 2018)²⁴

²⁴ (Alkazei & Matsubara, 2018)

4.5.1 Restoration

This trend is concerned with the restoration of damaged historic buildings -usually have special symbolic value- to their intact condition before the disaster, it also taken in consideration when the community needs to preserve the original land planning in order to preserve identity and existence, this trend requires an advance-accurate documentation for the historical and symbolic buildings and monuments.

The rebuilding of the old town of Warsaw is a very good example of this trend of reconstruction, the process which took place after WWII and continued till the mid-1960s (UNESCO/WHC, n.d.). The operation aimed to restore the Polish architecture from the 14th -18th centuries and remove all western influence (Chrościcki & Rottermund, 1978). The recreation of the whole urban plan of the old town, which 85% of it was destroyed, includes all the historical buildings, monuments, town market, streets, and city wall (UNESCO/WHC, n.d.).



Figure 15: Warsaw's marketplace in 1945 (left) and now (right) © Public Domain (left) Dennis Jarvis (right)

4.5.2 Monumentalism

This trend focuses on the symbolism of the event rather than on the construction itself, and it aims to keep the impact of destruction in the building as it is to preserve memory and show the horror of war, disaster or event. Applying this model is limited to buildings/monuments that have special symbolic value, or it refers to certain event that related to peoples' sentiment.

Good example of this trend is Berlin's wall memorial, which is the only remaining part of the wall at a length of 1.4 km (Berlin.de, n.d.). It serves as a symbol of Berlin's

division era showing the 'divided city and the victims of communist tyranny as well as the window of remembrance' (Berliner-mauer-gedenkstaette, 2019).



Figure 16: Berlin Wall Memorial²⁵

4.5.3 Memorialism

When a disaster has a catastrophic impact, i.e. has a significant number of fatalities and huge damages on the physical structure; People tend to keep remembering the victims of the disaster especially in case of war.

The catastrophe of attacking Hiroshima by the atomic bomb was not only a disaster on Japan, but it was also a disaster on humanity. So, the people in Hiroshima decided to reconstruct their destroyed city to a 'Peace Memorial City' (Alkazei & Matsubara, 2018).

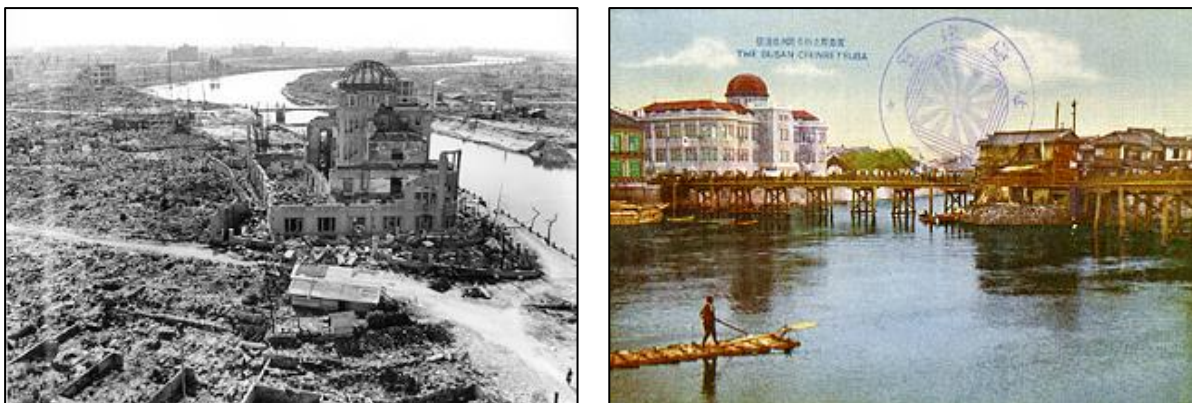


Figure 17: Hiroshima prefectural industrial promotion hall before attack (right) and after the attack (left)²⁶

²⁵ (Berliner-mauer-gedenkstaette, 2019)

²⁶ Hiroshima City Archive

The Peace Memorial Construction plan changed the land-use of the commercial Nakajima district -the location where the bomb was dropped- to a memorial park known as Hiroshima Peace Memorial Park. The park contains several monuments, the core monument in the park is the Atomic Bomb dome, located at the center of the park, the dome is a ruin that is still standing after the bomb attack. (Alkazei & Matsubara, 2018). Other important monuments in the park are children's peace monument, rest house, Hiroshima Peace Memorial Museum.

4.5.4 Neoliberalism

This model is usually driven by the desire to erase the bad events from the collective memory or by the desire to improve the urban environment and avoid the negative or bad status of the previous plans. In this model, urban planners would have the chance to create a new sustainable design that fulfills the requirements of the local community.

Applying this model requires demolishing huge number of damaged buildings to obtain new spaces so the designer would be able to widen the roads and streets, create public squares, and increase the green spaces. The new design is obligated to accommodate the proposed economic growth, which usually accompanies the reconstruction process.



Figure 18: Dresden city center in 1945 (left) and in 2015 (right) Source: ADN (L.) Jens Meyer (R.)/AP

Dresden is a typical sample of this trend of reconstruction as it keeps the ruins of destroyed buildings in the city center for decades, and later decided to modernize the city rather than rebuilding it as per the plans before the destruction. Only few

monuments were rebuilt with its design such as the Frauenkirche, some ruins still standing till today, and most of the ruins of destroyed houses were removed after the fall of Berlin Wall, and the land use was changed (Noak, 2015).

5. Case Studies

In this chapter, exploratory studies will be run for each reconstruction approach – except for CA since its principal included in the ODR- figuring out how implanting these approaches would impact the urban development of the affected cities and rural areas.

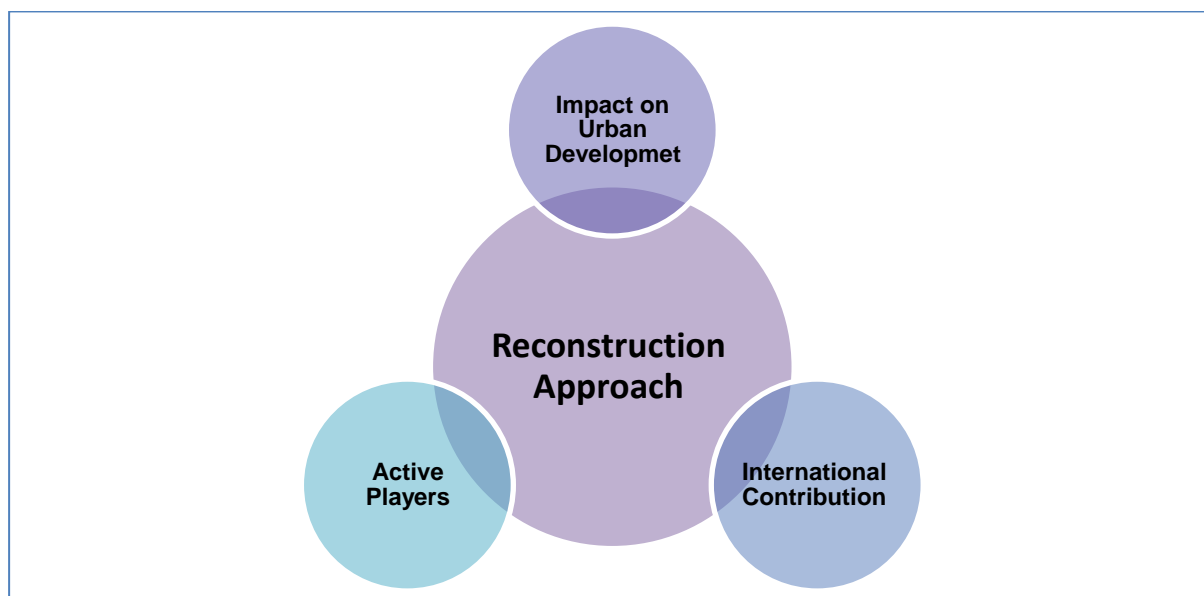


Figure 19: Case study main axes²⁷

The structure of the case study will follow the structure of the literature review and all the aspects discussed will be analyzed.

Background	Disaster Management	Recovery and Reconstruction	Urban Development
Brief info about Location, Disaster	Emergency Response	Housing Approach	Reconstruction Trend
Damages in Housing	Role of Stakeholders	Reconstruction Approach	Impact of Reconstruction
	International Contribution	Implementation Model	

Figure 20: Structure of the case study

Selection of case studies based on how they implement the designated reconstruction approach and the availability of data.

²⁷ Own work

5.1 Case Study 1: 2001 Gujarat - India (ODR)

5.1.1 Background

Gujarat is a state located in the northwest of India; it has thirty-three districts with about 6,000,000 population and approximately 200,000 sq. km of land. (Gujarat, 2019). On 26th of January 2001, an earthquake with a magnitude of 6.9 on the Richter scale struck the state, the disaster left 14,000 of deaths, 167,000 of injuries and 1.2 million of destroyed homes. Five districts severely affected, and the most affected district was Kutch district, where 90% of the fatalities and 85% of the asset losses occurred. (Balachandran, 2005).

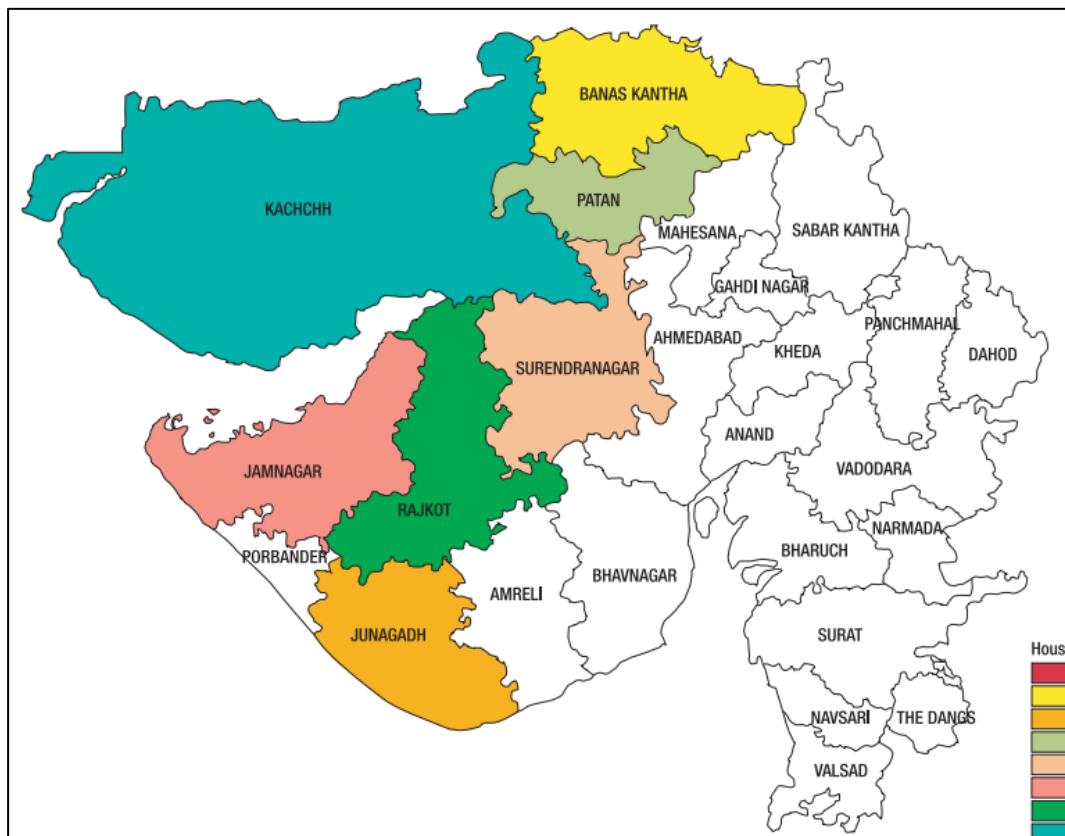


Figure 21: Earthquake-affected districts in Gujarat State - Source: UNDP

The earthquake, also known as Bhuj earthquake, where Bhuj is the most affected city -it is also the largest urban cluster in Kutch district-, 50% of its historical walled city destroyed among other urban areas and 400 villages. The losses in the economic sector were huge; assessment of the statewide losses was \$ 3.5 billion (UNDP, 2001).

Primary Losses	Secondary Losses	Tertiary Losses
<ul style="list-style-type: none"> ▪ Human lives ▪ Livestock, other animals ▪ Private property ▪ Municipal infrastructure ▪ Power and telecom infrastructure ▪ Health and education assets 	<ul style="list-style-type: none"> ▪ Export/import ▪ Agricultural output ▪ Industry/services output ▪ Remittance income ▪ Fall in earning potential due to disability, trauma ▪ Unemployment ▪ Health hazard 	<ul style="list-style-type: none"> ▪ Long-term development ▪ Overall investment climate ▪ Funds reallocation ▪ Community migration / reallocation

Table 14: Losses Resulting from the Gujarat Earthquake, 2001²⁸

5.1.2 Emergency Response

Two weeks after the disaster, the state government established new authority to be responsible of the recovery and reconstruction project in addition to preparing future preparedness plans. Gujarat State Disaster Management Authority (GSDMA) is mainly responsible for (GSDMA, 2017):

- Providing relief to affected people
- Minimize the impact
- Analyzing the reasons
- Efficiently manage the funds, donations, grants, and assistance.

5.1.3 Role of Different Stake Holders

- **National Government:** The government of the state of Gujarat created the official body that represents the government and do all the tasks/missions related to recovery, reconstruction, receiving the donations and coordinate/supervise the activities of Different focal points.

In addition, the government waived the sale tax and provided the construction materials at subsidized prices. (Hausler, 2004)

- **Community:** The community plays the major role as the applied reconstruction approach was ODR where each household take the responsibility for managing their home's rehabilitation activities. Many Civil

²⁸ (Thiruppugazh & Kumar, 2012)

Society Organizations (CSO's) contribute to the relief activities, recovery operation, and organizing the community's activities during the Different phases of the disaster management process (UNDP, 2001). Donation from all over the world reaches \$ 130 million; most of it comes from Gujaratis living abroad. (Buchanan & Solanki, 2011)

- **Local Authorities:** State-level departments, local governments, and other state agencies take the responsibility to execute the reconstruction work and procurement of goods and services with coordination and monitoring of GSDMA. (World Bank, 2002)
- **Private Sector:** Participation of the private sector the disaster response and reconstruction process takes many forms, such as financing NGO's projects, providing relief materials to displaced people, or/and partnership with the government.
- **NGOs:** Eighty Non-Governmental Organizations (NGOs) were approved by GSDMA and conducted reconstruction works in 280 villages building and rehabilitate more than 41.000 houses and schools. (Johnson & Olshansky, 2016).

5.1.4 Damages in Housing

Housing sector severely affected by this catastrophic event as 215,255 houses were totally destroyed and 928,369 were slightly to severely damaged, including medical facilities and schools (Hausler, 2004). Due to this massive destruction in houses, the aftermath of housing was one of the most important and urgent needs to help displaced people.

Damage severity	Slight – Non-structural	Slight Structural	Moderate	Severe	Collapse
No. of houses	414,903	260,337	146,483	106,646	215,255

Table 15: Classification of house damages. Source GSDMA progress report Sep. 2003

The main reason behind this huge number of damaged and destroyed houses is that more than 90% of rural homes were not structurally designed or comply with seismic standards (Hausler, 2004), keeping in mind the type of houses, construction methods, and building materials.

5.1.5 International Contribution

Many international agencies and funds participate in disaster relief, recovery, and reconstruction operations, it is hard to statistically list all of them, so this paper will mention the role of main partners.

UNDP's Partner	Amount (\$)	Supported Program
The Department For International Development/Conflict and Humanitarian Assistance of the united Kingdom	650.000	UNDP coordination mechanism
Gov. of Italy	1.300.000	UNDP mechanism - Shelter-recovery
Tata Relief Committee in India	1.400.000	Reconstruction of houses and schools in three districts
Gov. of Japan via Human Security Trust Fun	1.150.000	Drought-proofing and securing vulnerable livelihoods against climatic hazards
EC HAO	700.000	Temporary shelter program
Gov. of the Netherlands	571.000	Kutch Ecological Fund- repair of dams
USAID	400.000	Shelters-family kits - coordination mechanism UN and CSO's
The Norwegian Agency for development	330.000	Livelihoods - Seismically safe reconstruction
UN OCHA	215.000	Relief materials
UNDP	100.000	Immediate relief in partnership with SEWA and Kutch Mahila Vikas Sangathan

Table 16: Partners contribution in UNDP programs²⁹

World Bank participate by funding and financing a total sum of \$ 503.7 million (World Bank, 2002). UNDP had a major role in the “transition from relief to recovery” with ‘focus on Shelter, livelihoods, information coordination and governance structure’ (UNDP, 2001). Many local and international bodies participate, support, or finance UNDP’s activities; main UNDP partners with their contribution are listed in the table above.

In addition to many donations/partnerships from many international bodies and governments who contribute via bilateral direct support.

²⁹ (UNDP, 2001)

5.1.6 Reconstruction Approach

The government of Gujarat state represented by GSDMA in cooperation of the World Bank initiates an owner-driven reconstruction (ODR) housing approach as it considered the fastest and most effective approach (Thiruppugazh & Kumar, 2012). Owners of the houses involved into the execution of construction while the government and NGO's provide financial and technical assistance.

World bank financed the project of reconstruction of permanent housing for a total of 75,000 partially damaged and 135,000 totally collapsed houses in rural and urban areas by \$ 197.2 million (World Bank, 2002) while the total number of repaired houses was more than 911,000 of damaged houses and reconstructed was over 201,000 of totally collapsed – as by March 2006-. (GSDMA, 2006)

The ODR approach was provided to 82% of households in which the owners rebuild, repair or construct new homes by themselves or by hiring contractors. While the remaining homeowners in addition to the public buildings – schools, government offices- and infrastructure were reconstructed by NGO's with government funding. (Johnson & Olshansky, 2016).

ODR proves its effectiveness as 70% of the damaged and collapsed houses were repaired and reconstructed within two years after the disaster and as the quality of construction improved with a reduction in cost in addition to the household satisfaction (Barenstein, 2006).

ADRRS were implemented by NGO's in some rural areas while ADRIS approach where applied in some urban areas but the main approach was the ODR.

5.1.7 Impact on Urban Development

- Reconstruction trend applied in the reconstruction was the restoration trend.
- 'The biggest reconstruction program in terms of number of houses and geographical area' (Barenstein, 2006)
- Individual planning for urban areas -Bhuj, Bhachau, Anjar and Rapar- by establishing the "Area Development Authority". (Johnson & Olshansky, 2016)
- Developing of Gujarat State Disaster Management Policy.

- Improvement in urban development by widening roads and street, creating new open spaces and extending of infrastructure taking in consideration the safety requirements. (Johnson & Olshansky, 2016).
- Satisfaction of the residents
- Some of the benefits of the reconstruction (Thiruppugazh, 2009):

Indicator	Before the Earthquake	After the Earthquake
Number of Pucca houses	66%	100%
Beneficiaries living in houses with separate toilets	32%	53%
Insurance of reconstructed houses	6%	49%
People knowing what to do before, during and after disaster	0%	80%
Employment level among women	42%	92%
Water supply through pipelines at homes	30%	34%
Quality of life index	1.00%	1.143%

Table 17: Some benefits of reconstruction³⁰

³⁰ (Thiruppugazh, 2009)

5.2 Case Study 2: Banda Aceh – Indonesia (CDR)

5.2.1 Background

On December 26, 2004, an earthquake with a magnitude of 9.1 Richter scale generated a devastating tsunami, the epicenter of the quake located in the Indian ocean and its generated tsunami was the largest ever recorded. Tsunami waves reach all Indian ocean countries, causing severe devastation, Indonesia was the most affected country and Banda Aceh- the north-west district in Sumatra island- was the most affected city since it is the nearest urban area to the center of the earthquake (NOAA, 2014). Many resources refer to this catastrophic event as Sumatra Earthquake and Tsunami.

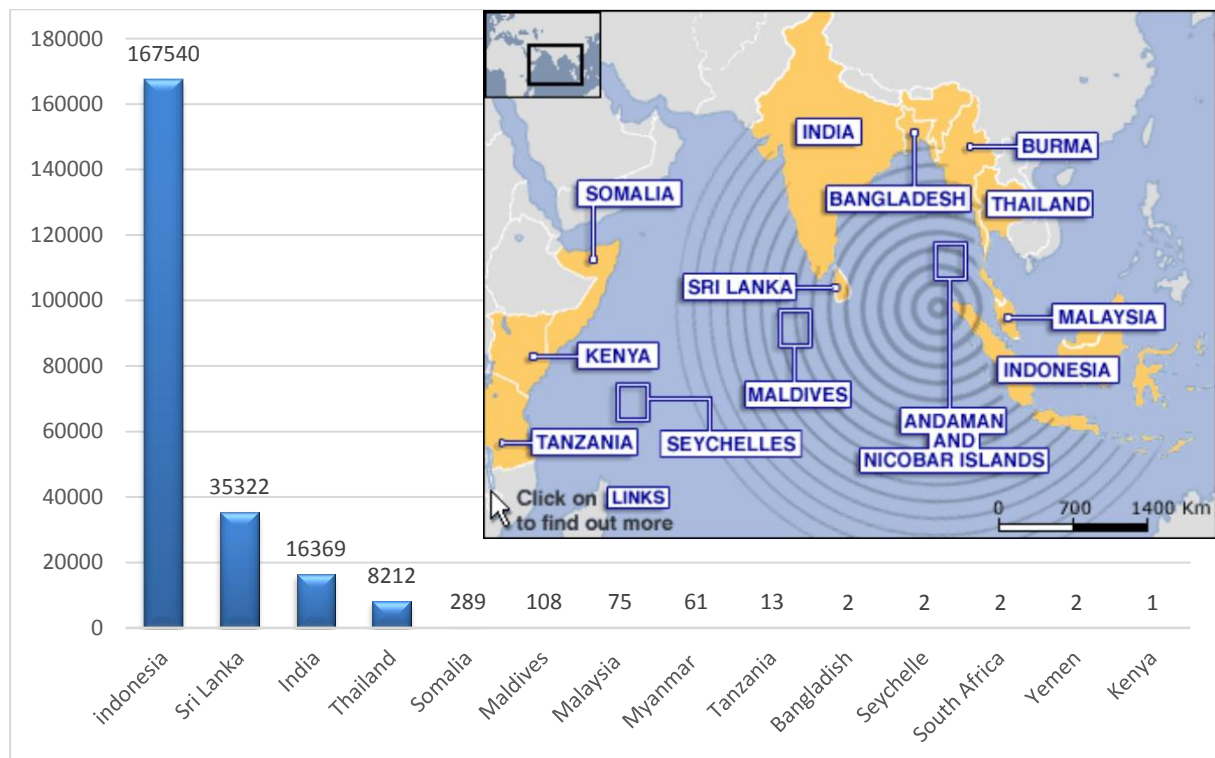


Figure 22: Number of fatalities due to Sumatra tsunami 2004³¹- Source of image to right corner: BBC

Aceh province suffered the most, some resources estimated the number of casualties in Aceh by 221,000 dead and missing (World Bank, 2012), and more than 680,000 were displaced (UNDP, 2008). The disaster worsened as another

³¹ (NOAA, 2014)

earthquake hit the neighboring island of Nias a few months after the great one causing additional load.

World Bank and Indonesian government estimated the losses due to the tsunami by \$ 4.45 billion, the distribution of this amount on the Different sectors and types of ownership shown in the table below (BAPPENAS; CGI, 2005).

	Total Impact			Property	
	Damage	Losses	Total	Private	Public
Social Sectors	1674.9	65.8	1740.7	1440.6	300.1
Housing	1398.3	38.8	1437.1	1408.4	28.7
Education	110.8	17.6	128.4	9	119.4
Health	82.5	9.4	91.9	23.2	68.6
Culture and religion	83.4		83.4		83.4
Infrastructure	636	240.8	876.8	325.9	550.8
Transport	390.5	145.4	535.9	165.8	370.1
Communications	18.9	2.9	21.8	8.6	13.2
Energy	67.8	0.1	67.9	1.1	66.9
Water and Sanitation	26.6	3.2	29.8	18.3	11.4
Flood control, irrigation and sea protection works	132.1	89.1	221.2	132.1	89.1
Productive Sectors	351.9	830.2	1182.1	1132	50.1
Agriculture and Livestock	83.9	140.9	224.8	194.7	29.9
Fisheries	101.5	409.4	510.9	508.5	2.5
Enterprises	166.6	280	446.6	428.9	17.7
Cross sectoral	257.6	394.4	652	562.9	89.1
Environment	154.5		154.5	548.9	
Governance and administration	89.1		89.1		89.1
Bank and Finance	14		14	14	
Total Impact	2920.4	1531.2	4451.6	3461.4	990.1

Table 18: Summary table of damages and losses (\$ million)³²

Damages are ' the replacement value of totally or partially destroyed physical assets' (GFDRR, 2019) while loss is the resultant impact of the absence of the damages on the economy flow. (GFDRR, 2019).

5.2.2 Emergency Response

The first and most immediate response was made by the Acehnese themselves as they played the primary role in the emergency response at the early time after the disaster occurred, '91 percent of those interviewed by the Fritz Institute reported that they had been rescued by private individuals' (Telford, et al., 2006).

After that, national and international response from all over the world give hands in the evacuation of the victims and providing them with necessary medications, first-aid, and shelters.

³² (BAPPENAS; CGI, 2005)

5.2.3 Damages in Housing

Housing was the most affected sector due to this catastrophe which was the worst natural disaster in Indonesia's history, one-third of the houses in the affected district partially or totally destroyed; 151,000 units (19%) suffered from 50% damage while 127,000 units (14%) were totally destroyed. In the coastal zone, the percentage of damaged houses raised to 80% of the houses (World Bank, 2012).

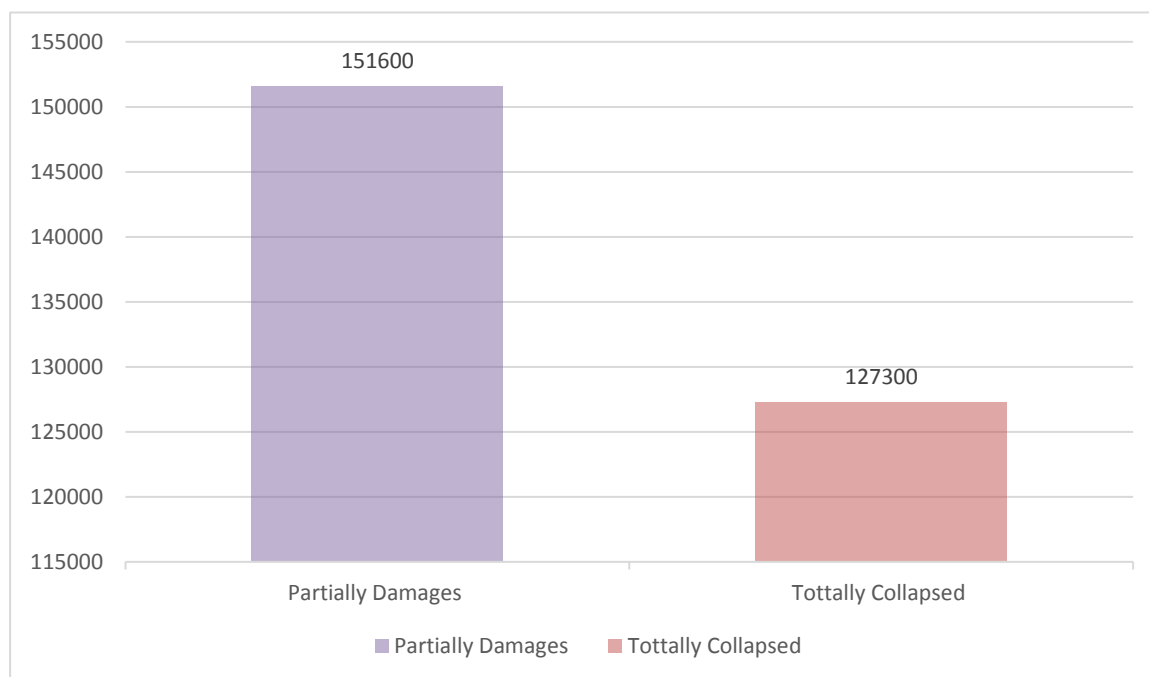


Figure 23: Number of Damaged Houses in Aceh Province

5.2.4 Role of Different Stakeholders

- **National Government:** The Indonesian government led the reconstruction operation via BAPPENAS (National Development Planning Agency) and MPW (Ministry of Public Works). BAPPENAS was the authority responsible for the coordination of the national and international efforts in the emergency response and reconstruction operations.

In addition; the government initiate the Authority for the Rehabilitation and Reconstruction of Aceh and Nias (BAPEL) to accelerate the reconstruction by implementing the master plan and supervise the coordinated Community-Driven Reconstruction and development plan (Indrawati, 2006)

- **Community:** as mentioned above, the individuals had a significant role in the immediate response; also the local community was the main provider of shelter to the displaced people as 70 percent of the displaced people were accommodated by their neighbors, friends, and relatives within few weeks (Wolfowitz, 2006).
In the later stage, the communities drive the reconstruction and rebuild/repair their homes by community-based committees with assistance from the government or the donors.
- **Local Authorities:** Local government, in association with some NGOs, carried out community consultations to generate a feasible community-based reconstruction approach. (UNDP, 2008)
- **Private Sector:** from the early stage of the disaster, private sector – national and international- donated for the emergency response and continued its contribution during the reconstruction stage. The private sector engaged in a partnership with public sector PPP in the reconstruction stage (Indrawati, 2006).
- **NGOs:** President of the World Bank, Wolfowitz (2006) praised the civil society organizations' reaction and named Muhammadiyah as an example since it appeared in the field within a day or two after the disaster. NGOs coordinated with UN agencies, donors, and international cooperation agencies and worked as a mediator between them and the local communities.

5.2.5 International Contribution

The reaction from the international community governments, NGOs, or the private sector show solidarity towards this humanitarian catastrophe. The sympathy and emergency response from different international bodies helped the Indonesian government to expedite emergency relief and later in the reconstruction.

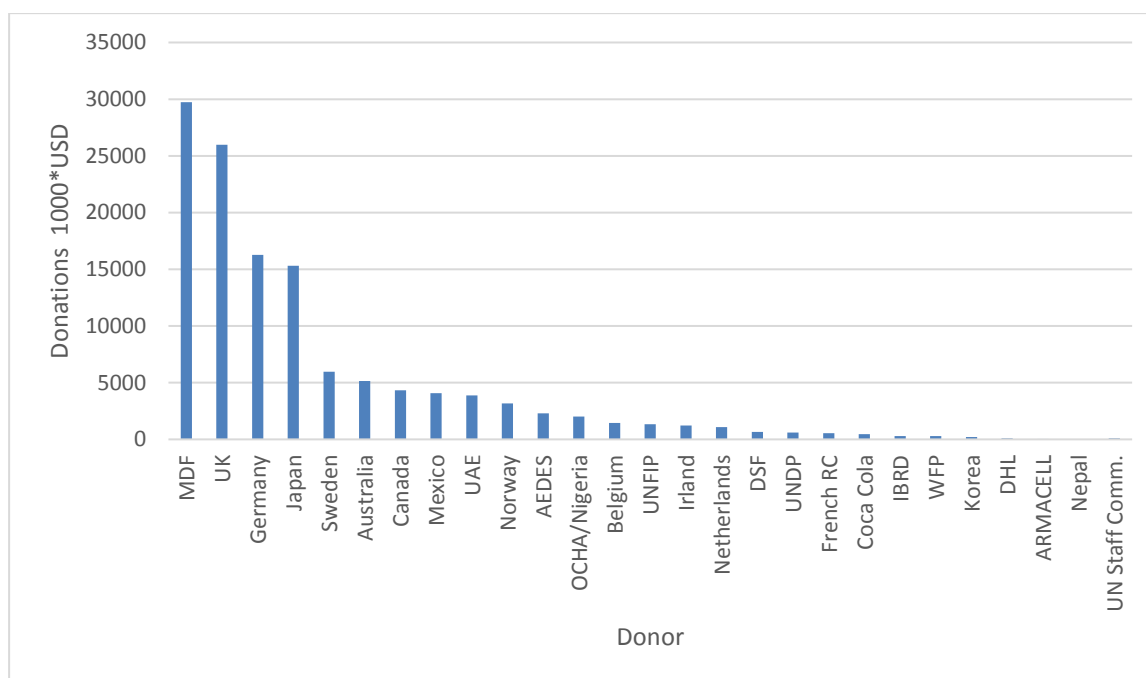


Figure 24: Donation as per February 2008 to ERTR program via UNDP³³

UNDP was the key player of the UN programs and agencies, more than \$ 125 million were collected via Emergency Response and Transitional Recovery (ETRT) program during the period from the beginning of the disaster until February 2008 (UNDP, 2008). World Bank managed a Multi-Donor Fund (MDF) for Aceh and Nias, which contributed by \$ 700 million, while the total cost of recovery was about \$ 7 Billion offered by the government of Indonesia and many other international donors (World Bank, 2012).

5.2.6 Reconstruction Approach

The approach applied in the reconstruction of Aceh was CDR, the government announced that the community participation is necessary for the success of the reconstruction process and it issued a directive stating that all affected households are entitled for rehabilitation assistance, for the totally-destroyed homes there will be a grant of 36 square meters, and for partially damages there will be an adequate assistance helping them to repair their houses (Steinberg, 2007). One hundred thirty villages choose to apply the CDR (World Bank, 2012b).

In addition to the government, many donors such as UN-Habitat, KfW (The German Development Bank), and UPLINK (Urban poor Linkage Indonesia) adopted CDR to

³³ (UNDP, 2008)

the projects they financed. The main difference between each project is the degree of interaction of the community-based reconstruction community and the extent of their involvement in the design and material selection (Jha, et al., 2010).

Communities groups of 10-15 families undertake the rebuild of their homes, and village committees formed to rebuild the infrastructure (World Bank, 2012b).

A Korean NGO implemented ADRRS in Banda Aceh; the organization acquired the land and built the new housing, the levels of satisfaction to this project was adequate (Jha, et al., 2010).

5.2.7 Impact on Urban Development

- Kuntoro Mangkusubroto³⁴ described the reconstruction of Aceh and Nias: 'The most successful post-natural disaster reconstruction and rehabilitation program in the world' (Mangkusubroto, 2018).
- Rebuilding of:

140,000	New Home
1000	Health Center
2000	School
3000	Masjid
176 Village	Basic Community Infrastructure

Figure 25: Number of rebuilt houses and public facilities³⁵

- Establishment of National Board for Disaster Management (BNBP) and the Indonesia Disaster Fund (IDF).
- Through this experience, the Indonesian government gained significant expertise in disaster management helped and improved the disaster risk

³⁴ Head of Rehabilitation and Reconstruction Agency (BRR) Aceh-Nias from 2005 to 2009.

³⁵ (Mangkusubroto, 2018)

reduction of the following disaster, especially as Indonesia is vulnerable to various natural disasters.

- Satisfaction levels of the project implemented by CDR ranged from 80.4 to 90.6 percent (World Bank, 2012b).
- `600 organizations, including local and national government institutions, multilateral and bilateral agencies, NGOs involved in implementing more than 20.000 projects (BRR, n.d.).

5.2.8 Reconstruction Trends

The primary trend in Aceh was the Restoration trend since most of the reconstruction took place in the same location with the traditional building model.

There were some exceptions were villagers decided to modernize their settlement by rebuilding a new village in a relocated site, which considered Neoliberalism trend.

Another significant trend was Monumentalism, and this is expected since the disaster was catastrophic. A boat thrown by the tsunami into the inland kept in place as a monument.



Figure 26: Monument of a boat thrown by tsunami – Source: Christopher Zinn

5.3 Case Study 3: Beirut Central District 1995 - Lebanon (ADRIS)

5.3.1 Background:

During the period 1975-1990 Lebanon suffered from a devastating civil war caused a dramatic humanitarian crisis with high numbers of casualties were 144.000 died, 17.000 disappeared, 184.000 wounded and 144.000 emigrated (Ilyés, 2015) and a massive destruction on the physical structure as 25% of the housing buildings was damaged, and more than 50% of the people were displaced temporarily or permanently (Charif, 1994). Most of the capital city Beirut was destroyed as the city was the main field of war battles.

The war in Lebanon was a very complicated case due to the long period in which there were periods of peace, the ethnic and religious dimensions, the local, regional and international players and the nature of the fighting troops (organized army or militias) (Nasr & Verdeil, 2008).

Beirut was one of the most destructed areas in Lebanon during the war period; the city was a battlefield used by the various armed parties. The city was divided into eastern and western parts; each of them was controlled by one of the fighting troops.

5.3.2 Reconstruction Attempts

On 31st of January 1977, i.e. less than two years after the start of the war, during one of the peace periods, the government create the “Council for Development and Reconstruction (CDR-L)” which was initially specified to:

- Planning and scheduling the reconstruction process
- Securing the necessary fund
- Supervising the execution

Within the time, many other tasks and responsibilities were added to the mission of CDR until it ‘become the body responsible for all the major projects of reconstruction and development in the country’ (CDR-L, n.d.)

CDR-L put a reconstruction plan in 1977 aiming to restore the Mediterranean city and revive the image of unity, the plan suggested a maximum height for building to be 30m, and it included new streets and roads that should foster the economy, but the plan was not implemented because of the resume of the war. (Nasr & Verdeil, 2008).

Reconstruction resumed during another peace period 1983-1984, at which a reconstruction task was assigned to one contractor (OGER) who changed the official plans and executed his own vision. The contractor extended the demolishing of the war-affected building to include parts of the ancient Souq (Market) in the center of Beirut, causing a reconstruction trend toward the modernization (Neoliberalism) of the city center over the reservation of the heritage. (Nasr & Verdeil, 2008).

In 1994 CDR-L founded Solidere (French acronym for the Lebanese Company for the Development and Reconstruction of Beirut Central District), which is a PPP company launched the project of reconstruction of Beirut Central District (BCD).

5.3.3 Post-War Reconstruction

According to Nasr & Verdeil (2008), the reconstruction process passed through three main phases:

Phase 1: Private boom and ground laying of public projects (1991-1994)

During this phase, reconstruction activities covered the whole city as demolitions, repair and rebuilding spread all over due to individual initiatives while government efforts focus on emergency response tasks, in particular: assisting refugees' relocation, infrastructure repairing.

Phase 2: Economic slowdown and the implementation of public projects (1995-1998)

During this phase, the public sector bloomed the reconstruction process via launching Solidere's activities such as: demolishing of damaged buildings, remove the ruins, renovate the historic buildings, maintaining and expanding the road network, and starting the work on waterfront projects and many other projects.

The big governmental expenditure on infrastructure projects -to achieve the transformation of BCD-, in addition to other internal and external factors, led to economic slowdowns and affected the reconstruction progress in the private sector.

Phase 3: Economic recession and slow of the "reconstruction" (1999-2004)

It is a normal extension to the previous phase; the main reason behind the downturn is the increment of the public debt, which lead to the fade of the reconstruction projects.

5.3.4 Reconstruction of Beirut Central District (BCD)

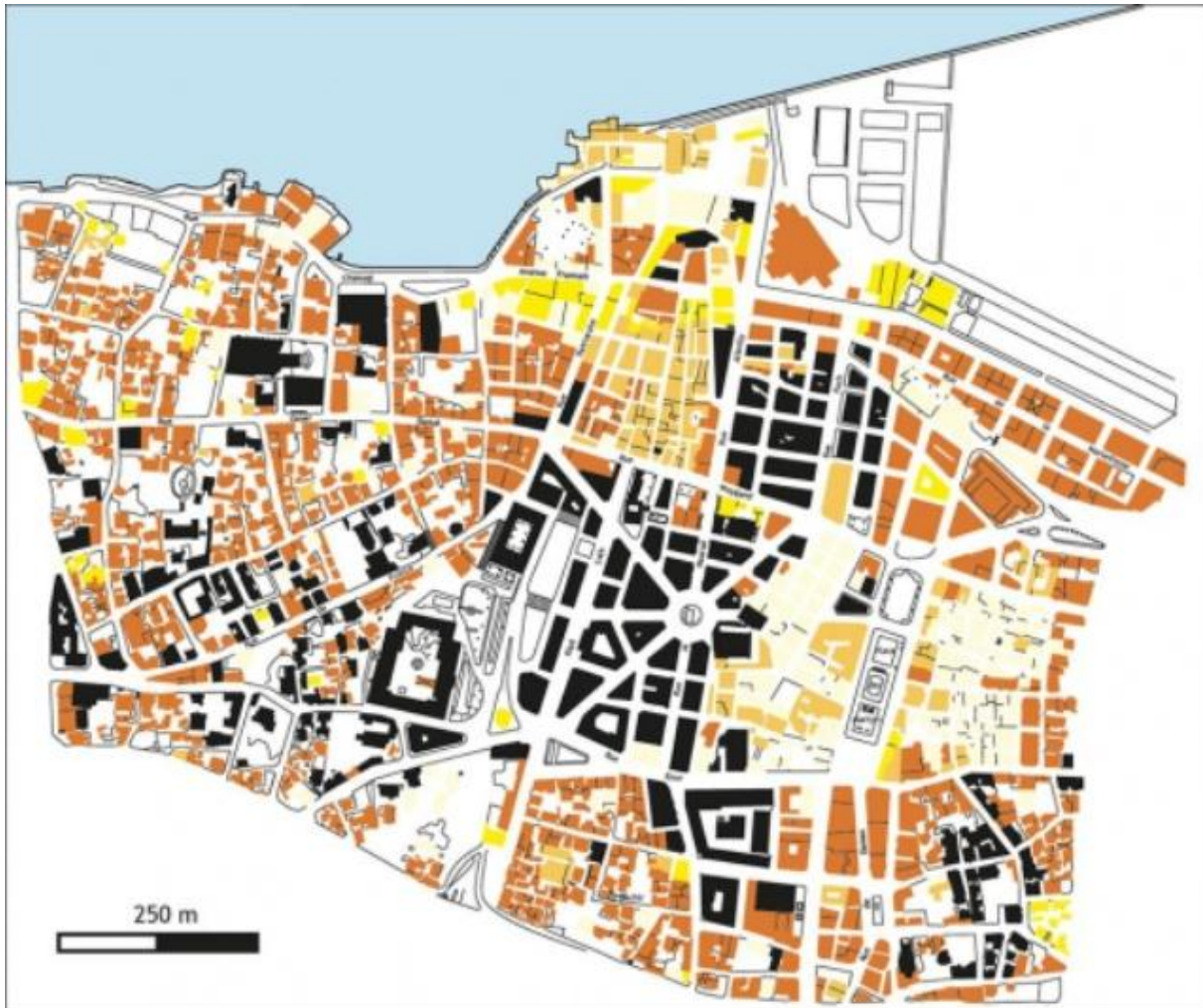


Figure 27: Volume of demolition in BCD as of 1998: all demolished except in black³⁶

Reconstruction vision of the vital area of Beirut centre aims to erase the conflict memory by modernizing the city, enhance its image as a vibrant business and commercial hub, restore the city's status as a tourist attraction point. Achieving these goals push the company to demolish a huge number of buildings 80% of the buildings (Verdeil, et al., 2012), some of them were listed in the official protected list (Ilyés, 2015).

³⁶ (Verdeil, et al., 2012)



Figure 28: Newly developed master plan of BCD³⁷

The developer of the BCD creates a master plan that covered 184.5 ha: 120 ha is the original BCD, and 64.5 ha is the new waterfront area which reclaimed from the sea, the newly generated master plan insured the installation of integrated infrastructure and preserve city's heritage (Solidere, 2002).

5.3.5 Role of Different Stakeholders

The main argument about the reconstruction of BCD is the concentration of all the tasks and the whole process on one player, which is the main contractor: "Solidere." Solidere has the eminent domain of Beirut central district, while the right of former owners transferred to shares in Solidere (Nasr & Verdeil, 2008). This full control of one party results in a weak contribution of other actors, especially the community, and a feeble contribution of the government even as it still represented in Solidere.

³⁷ (Solidere, 2002)

Due to the privatization mode and the profit-driven contribution, the reconstruction process mainly financed by the investors; Solidere sold real estates to local and international investors (Ilyés, 2015) who looked for benefit from the opportunity of holding a real estate in the heart of the capital city of Lebanon.

5.3.6 International Contribution

Many countries and organizations participate in the reconstruction of Lebanon, not only in the reconstruction of Beirut. The contribution continues for an extended period of time and takes the form of technical assistance or financial funding (grants or loans).

5.3.7 Reconstruction Approach

The approach used in this project was the ADRIS, as the reconstruction work was granted to one agency that takes the performance of all activities in site. The main contractor, “Solidere,” demolished a bigger area than planned and construct/build a modern city centre. The reconstruction includes the renovation of historic buildings, the construction of main roads – ring road and airport highway-, and laying down the infrastructure.

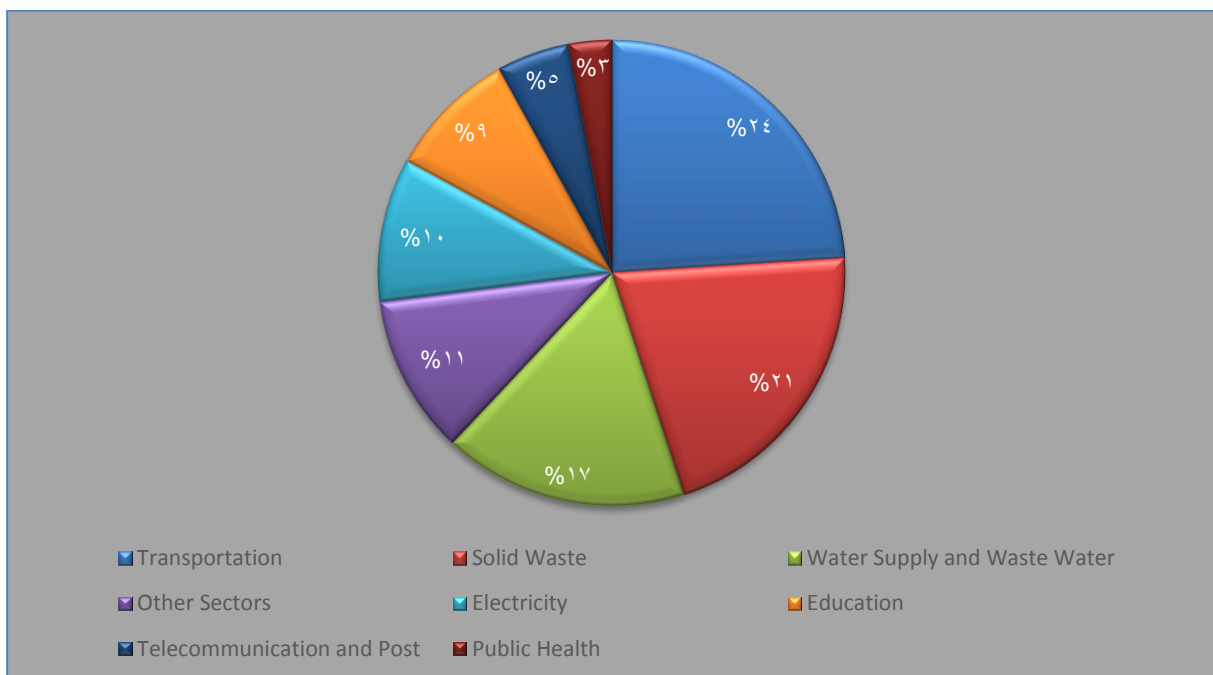


Figure 29: Distribution of contracts over infrastructure sectors. Source: CDR report 2017

The implemented approach has characterized by three aspects (Kabbani, 1992):

- Privatization as the projects focus on attracting investors -local or international- to transform the city into a commercial, financial, business, and tourist center (Solidere, 2002).
- Centralization, as the whole process was controlled by Solidere which was assigned by governmental Council of Development and Reconstruction (CDR-L)
- Lack of community participation is the third main character, as the main contractor executed his vision without real participation from the community.

5.3.8 Impact on Urban Development

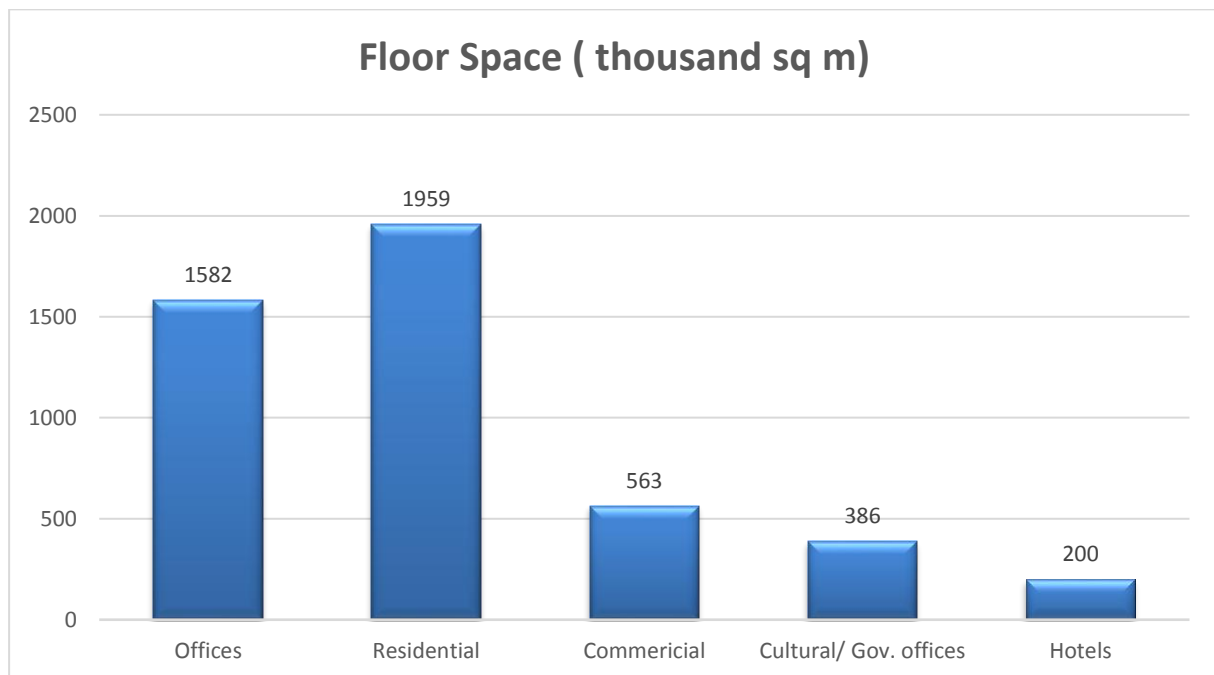


Figure 30: Floor space per category in the master plan³⁸

Positive Impact

- New master plan
- Creation of the waterfront
- Change of land use
- Upgraded infrastructure
- Enhanced city image and strong city branding

³⁸ In conformity of (Solidere, 2002)

- Demolish of slums
- Integrated highways network
- Preserve of only some historical buildings
- New inner-streets, walkway alleys, and public squares.

Negative impact

- Huge demolish affected the social fabric
- Demolish of some historical building listed in the preservation list
- Ownership of properties converted to shares on the developing company with no choice of the owners

5.4 Case Study 4: Beichuan 2008-2011 - China (ADRRS)

5.4.1 Background

An earthquake measuring 8.0 in Richter scale hit Wenchuan county in Sichuan province- China and affects five other provinces (World Bank, 2018), causing more than 15,000 geohazards in many areas of the provinces. Both; the earthquake and following geohazards caused severe damage to housing, infrastructure, and agricultural land.

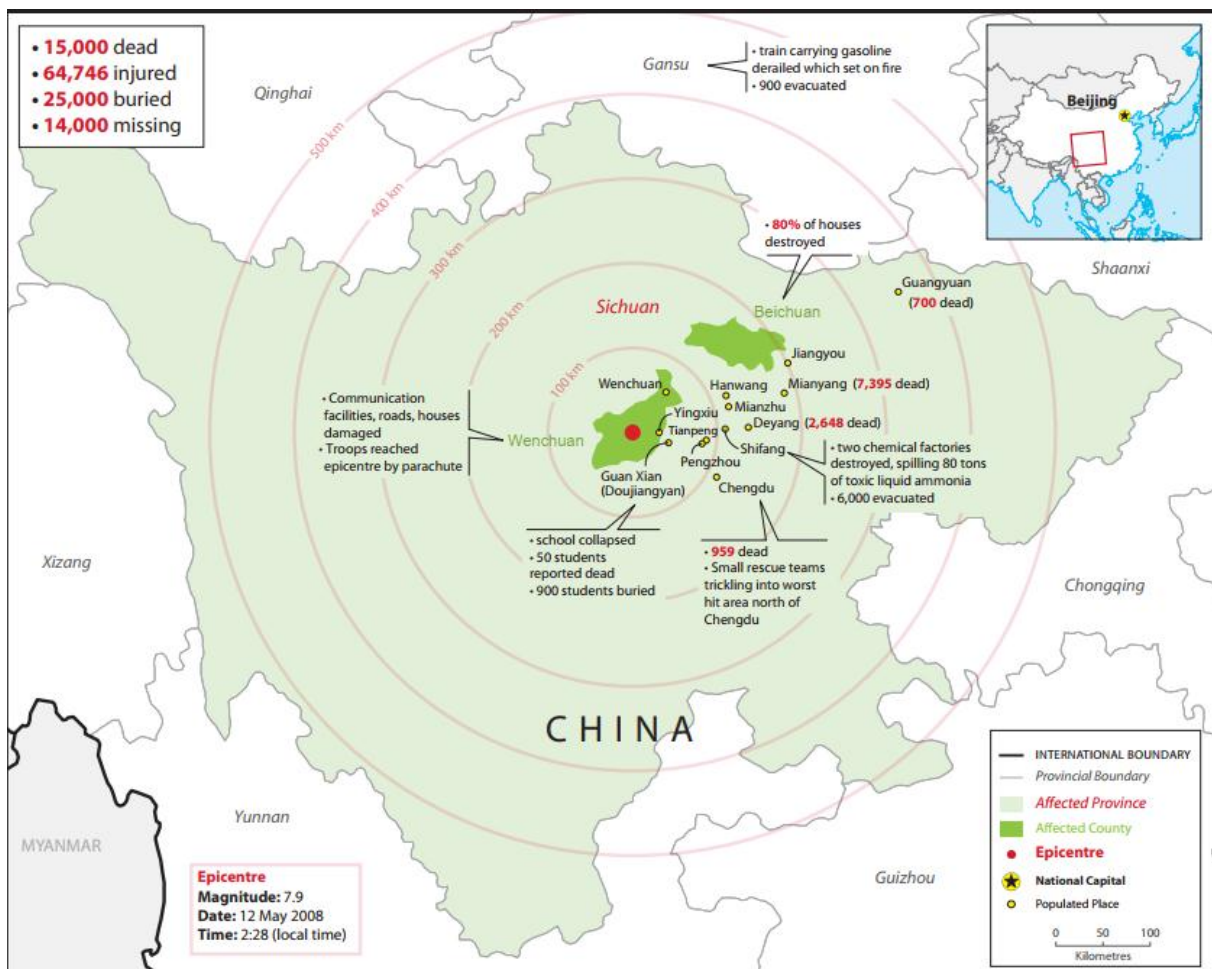


Figure 31: Wenchuan earthquake as of 14.05.2008 - Source: ReliefWeb

The geohazards, which triggered Wenchuan county -located in southwest China-takes the form of landslides, rockfalls, and debris flows. These geohazards have growing risk as they buried some villages, form landslide dams on rivers and landslide lakes, which raised the risk of floods (Yin, et al., 2009). All these hazards result in a disaster with a high number of casualties: 69,227 of fatalities plus 17,923

of missing and 374,643 injured (Zhao, et al., 2010) and in Beichuan only, the number of victims was 15,645 dead, 1,023 missing and 26,916 injured (Han, et al., 2013).

5.4.2 Emergency Response

Due to the widespread of the disaster effect; the number of displaced people was high, about 20 million people, 15 million of them were evacuated as part of the emergency response, and the other 5 million were considered as homeless (Zhao, et al., 2010), as expected; survivors from the affected areas initiate the evacuation and rescue until the national and international emergency reach their.

Command headquarter for response and relief was established by the central government to perform the emergency response. This headquarter -usually headed by the premier or vice-premier- have several work-groups; one of them is the resettlement workgroup, so the response was rapid and no waiting time for creating exclusive authority (IRP, 2010).

5.4.3 Damages in Housing

The earthquake with its following landslides caused massive devastation in houses and public properties in the six provinces, which were the most severed. About 5.4 million buildings collapsed and 21 million buildings damaged (Zhao, et al., 2010), housing of more than four million people were collapsed or partially damaged in addition to damages in 7,444 schools, 11,028 hospitals and clinics, 1,263 reservoirs and more than 34,000 kilometres of highways. Total cost of loss in the economy was estimated at \$ 123 billion (World Bank, 2018).

Beichuan was the most severed city, 80% of the houses were destroyed, the ruins covered the city, and due to this vast destruction, it was not suitable for reconstruction (Ma & Yang, 2010).

5.4.4 Roles of Different Stakeholders

- **Central Government:** The central government led the emergency response and the reconstruction operation and put the master plan for reconstruction. As the disaster level classified as a national disaster level (IRP, 2010).

- **Community:** Local communities in the rural areas formed “Villagers’ committees” to play a mediation role between the local governments and village residents (UNCRD; DMPHO, 2009) , but this role was limited. In urban areas, community participation was almost absent and ignored due to the speed of planning and reconstruction (Abramson & Qi, 2011).
- **Local Authorities:** Central government introduced a supporting program called “Partner Support Program,” where one provinces or city support the recovery, reconstruction, and economic development of one of the “seriously affected county/city.” The support amount was allocated to 1% of the local financial revenue of the supporting area (UNCRD; DMPHO, 2009). Local governments in the most severed counties (Sichuan and Gansu) were the implementation units of the emergency response and reconstruction.
- **Private Sector:** Several private and public companies –national and international-, donated for the reconstruction of specific projects such as the construction of schools, hospitals, and roads (Chinadaily, 2011).
- **NGOs:** many NGOs participated in the emergency response and reconstruction phases and involved in partnerships with government and private sector in several projects. NGOs efforts enhanced the effectiveness of the other partners. (IRP, 2010)

5.4.5 Reconstruction Approach

The applied method in the reconstruction of Beichuan was the ADRRS; the main reason for adopting this approach was the massive volume of destruction in addition to the central mode of reconstruction operation control. A new city was planned and built to host the evacuated people of Beichuan, who settled in a transitional housing camp for about three years until the completion of the new city “Yongchang.”

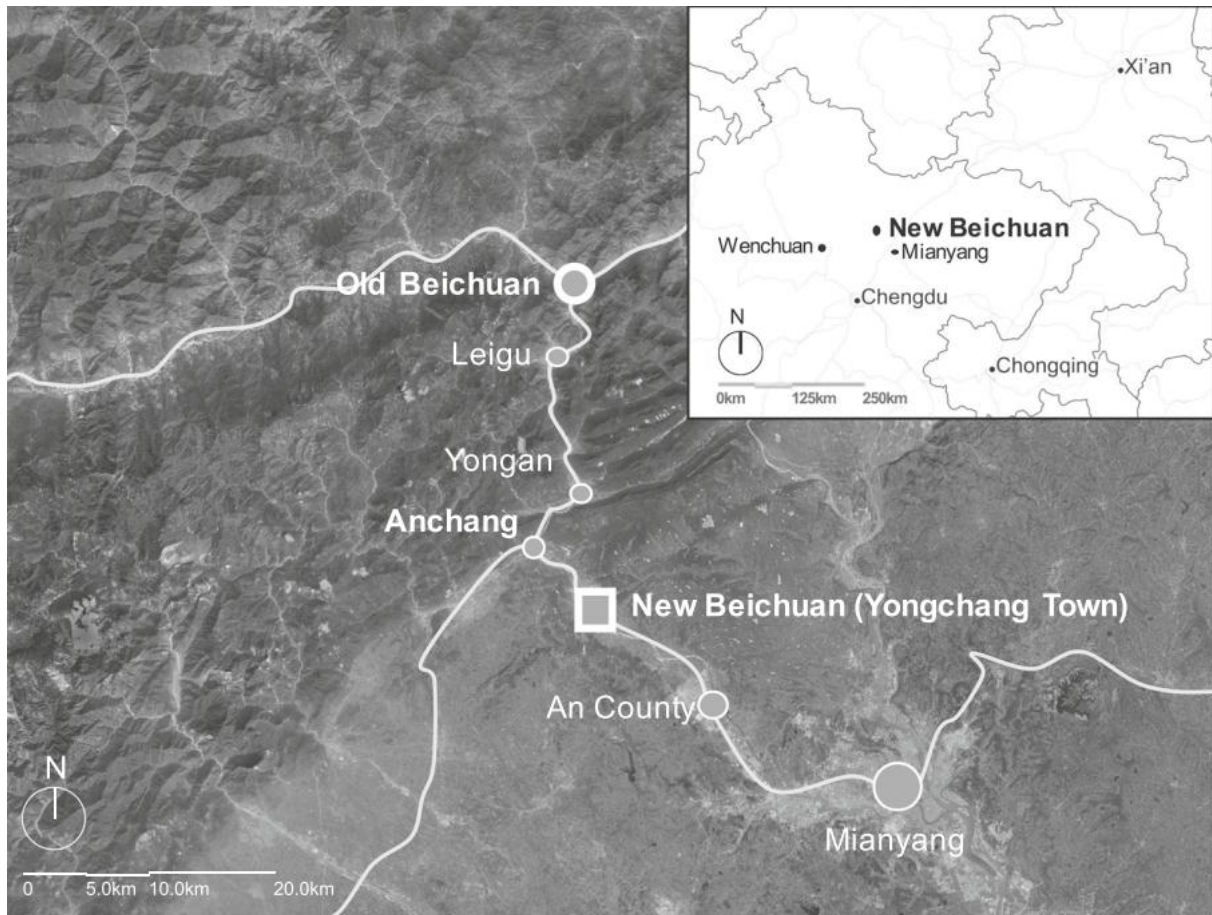


Figure 32: Location of the Old Beichuan and the New Beichuan (Yunchang)³⁹

Yongchang was built on a new location -23 km apart from the ruins of Beichuan- it was the only off-site resettlement due to the earthquake. (Zhang, et al., 2019)

5.4.6 International Contribution

World Bank contributes with an emergency loan of \$ 710 million in addition to a \$ 15 million grant via GFDRR. These amounts were utilized to a project aiming to support the restoration and enhancement of several vital sectors such as roads, health, education, water, wastewater, capacity building, and economic growth (World Bank, 2018).

The Chinese government received many donations and grants from countries, organization and individuals from all over the world.

³⁹ (Zhang, et al., 2019)

5.4.7 Impact on Urban Development

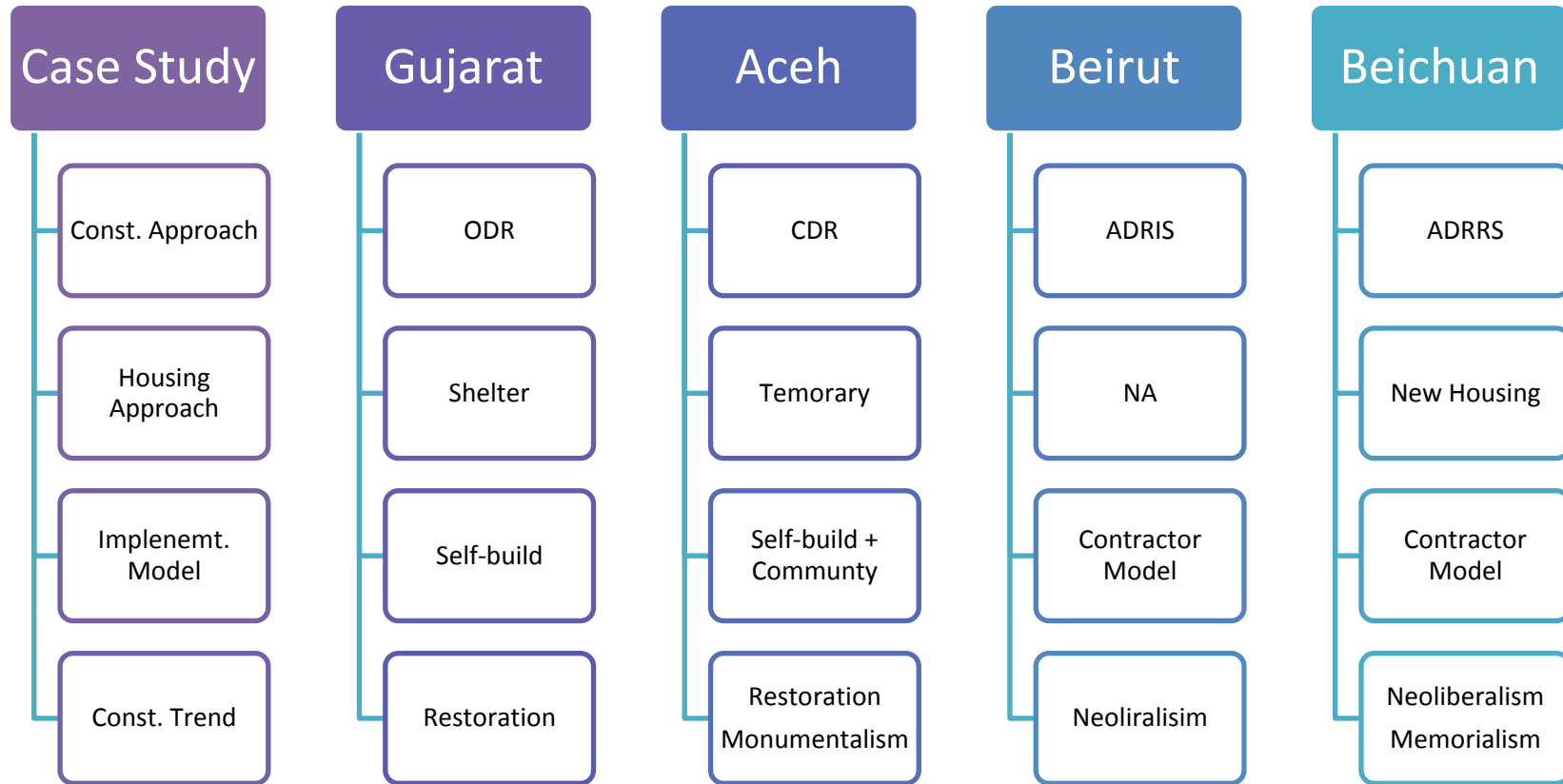
- Creating new city to host the displaced people of the devastated city of Beichuan

2010	
30,000	Residents
2.8 sq km	Land area of new Beichuan(Youngchang)
1.4 sq km	Living function
1.4 sq km	Infrastructure + Industrial zone

2015	
50,000	Residents
6.03 sq km	Land Area of new Beivhuan(Youngchang)
2020	
70.000	Residents
7.13 sq km	Land Area of new Beivhuan(Youngchang)

- 'Concentrating rural residents into "new villages" that created urban environments in the countryside and integrating the governance and economies of rural and urban portions of metropolitan areas' (Abramson and Qi 2011)
- Main reconstruction trend is neoliberalism
- Memorialism trend for the destroyed city of Beichuan to remember the victims and show the volume of the disaster.
- Updating the "Standard for Classification of Seismic Protection of Building Constructions".
- Modification of "Code for Seismic Design of Buildings" (Zhao, et al., 2010)

5.5 Summery



6. Conclusion and Recommendations

6.1 Conclusion

- Natural disasters can not be avoided, but there is a possibility to mitigate their impact by applying disaster risk management principles
- As much as the prediction of disaster is accurate as much as negative impacts are lessened.
- Preparedness to disaster increase the effectiveness of disaster confront efforts.
- Supporting the affected community during the emergency stage -from all other stakeholders- build their confidence, foster the recovery after trauma, and enhance the outcomes.
- Choose of the reconstruction approach depends on:
 - The volume of the disaster
 - Degree of severity on properties
 - Capabilities of the affected community
- Housing is a right for people who lost their homes due to the disaster
- Post-disaster housing takes three main forms:
 - Urgent shelters: during the emergency response
 - Temporary housing: during the recovery and reconstruction
 - Permanent houses: upon completion of the reconstruction process
- Involvement of local communities comes to the benefit of the reconstruction process.
- Success of the reconstruction process is a mater dependent on the beneficiaries' satisfaction
- From the case studies, post-disaster reconstruction removes the negative impacts of the disaster and improve the urban environment, i.e., enhance the city's (more generally: place's) urban development.
- Reconstruction is an opportunity to develop local communities and improve their living conditions
- Reconstruction usually accompanied by temporary growth in the local economy, which helps in community recovery.

- Post-disaster reconstruction is a costly operation, therefore securing trusted finance a must to achieve success.
- International community steps ahead in disaster risk reduction via HFA and Sendai Framework for DRR
- International contribution toward the affected country/community shows human solidarity and allows the exchange of expertise, which comes in favor of the affected community.
- Reconstruction of rural areas results in a kind of “urbanization” as the reconstruction process upgrades the infrastructure -roads, water supply, and sanitation- in addition to building new facilities -Educational and medical-.
- Post-disaster reconstruction upgrades and enhances the structural status of the buildings.
- Disasters drive to generates and improve the disaster management legislation and lead to the application of measures that help to recover.
- Implementing of a specific reconstruction trend does not prevent utilizing another trend
- Yemen: The formation of temporary disaster reconstruction units, funds, or projects to react to the disasters is not effective measure and do not offer sustainable solutions and does not achieve the desired resilience.

6.2 Recommendations

- Reconstructed or newly constructed houses should consider the community's specialty and fulfill their needs
- The rebuilt/reconstructed house must Build Back Better to achieve resilience.
- Reconstruction operations should be fair and inclusive and must reach all the affected people.
- No matter the chosen reconstruction trend, it should keep the place identity and maintain the connection of residents to the place.
- The post-disaster reconstruction process should facilitate the participation of the local communities in the planning, and it shall ensure that their needs are determined.
- Create a clear strategy for the resettlement of the displaced people to ensure that they have proper shelter or houses from the beginning of the disaster until they return to their homes.
- Governments should continue their commitments towards DRR as guided by Sendai Framework for Disaster Risk Reduction.

6.3 Recommendation for Reconstruction plan in Yemen

6.3.1 Organization and Legislation

- Create new authority at a ministerial-level responsible for all reconstruction operations and disaster risk management.
- Consider two paths of reconstruction:
 - Post-conflict reconstruction: aiming to remove the effects of the war
 - Post-disaster reconstruction: aiming to restore and develop the disaster-affected area during the war period
- Hiring local investors/contractors to implement reconstruction projects will foster the recovery of the economy and will create job opportunities for locals helping them to recover after trauma.

6.3.2 Desired Reconstruction Approaches

- Displaced people should get urgent housing solution ie. shelters that:
 - Reserve their dignity
 - Offer them suitable, safe and clean shelter
 - Have access to clean water and sanitation facilities
 - Fulfill their needs in terms of space and determine the privacy.
- Based on the planned schedule of reconstruction, a decision should be taken on building temporary housing camp or not if the reconstruction will not last for a long time.
- The reconstruction approach selection should be based on:
 - The extent of damages -the affected area
 - Degree of severity of buildings
 - Type of the affected area – urban or rural-
- Construction approach for the different areas and various degrees of severity are set in the following matrix:

Area	Degree of Severity →	Collapsed or Serious Structural damages	Medium Structural damages	No structural damages
	Extent of Damages ↓			
Urban	Large	ADRRS	ADRIS	ODR
	Medium	ADRRS	ODR	ODR
	Small	ADRIS	ODR	ODR
Rural	Large	ADRRS	CDR	ODR
	Medium	ADRIS	CDR	ODR
	Small	ADRIS	CDR	ODR

Table 19: Reconstruction Approach Selection⁴⁰

Explanation of the matrix:

1- Collapsed or Serious Structural Damages:

- Apply ADRRS in case of large or medium extent of damages in urban area and in case of large extent in rural areas to generate new settlements with better living conditions and demolish the collapsed buildings in urban areas to create new open spaces with new land use.

⁴⁰ Own Work

- Apply ADRIS in all other cases of small area of damages since it is not feasible to build in a new location for small number of buildings.

2- Medium Structural Damages:

- Apply ADRIS in case of large extent of damages in urban areas since this approach is implemented by contractors who have the capability to perform the work in a professional way.
- Apply ODR in case of medium and small areas of damages in urban areas to assist owners to rebuild and fix their homes. Technical assistance in urban areas is much easier and would be effective.
- CDR is the best option in case of medium structural damages as the Yemeni society in rural areas is more consolidated and can coordinate the reconstruction committees' tasks and benefit from the support.

3- No Structural Damages

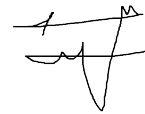
- In this case, applying the ODR approach will solve the problem and guarantee the good practice of work done.
- CA is not recommended in Yemen due to:
- The probability of spending cash for other priorities
 - CA does not offer technical assistance i.e, no guarantee for the quality of work,
 - Market price fluctuation.
 - Delivery of building materials in rural areas.
 - Shortage of self-building skills in urban areas.
 - The high level of humanitarian crises and the acute shortage in liquidity.

Declaration of Authorship

I hereby declare that the attached Master's thesis was completed independently and without the prohibited assistance of third parties, and that no sources or assistance were used other than those listed. All passages whose content or wording originates from another publication have been marked as such. Neither this thesis nor any variant of it has previously been submitted to an examining authority or published.

20.01.2020

Date



Signature of the student

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