博士論文

Motive Analysis of Decisions in the Long-term Disaster Recovery Process

－A Case of House Reconstruction after the 2004 Sri Lanka Tsunami –

(長期災害復旧プロセスでの意思決定の動機分析

- 2004 年スリランカ津波後の住宅再建事業を例に -)

Choi Chang Yeol

崔 暢 烈

Graduate School of Engineering

THE UNIVERSITY OF TOKYO

September 2014

Supervisor

Professor Riki HONDA

Advisors

Professor	Kimiro MEGURO
Professor	Yoshimitsu TAJIMA
Visiting Professor	Megumi MUTO
Senior Researcher	Miho OHARA

ABSTRACT

Long-term disaster recovery is a crucial phase in terms of sustainable development as well as disaster resilience. Increasing roles of various players make it hard to manage implementation process. Even though there is a general consensus on idealistic aim, it is not easy to achieve long-term recovery goals effectively. In reality, there are many unexpected situations after disaster impacts. In such urgent situation to take action for recovery, it is almost impossible to make perfectly rational decision. Therefore, identifying the mechanism of actual decision-making in disaster recovery can contribute to achieve the recovery objectives through sustainable process.

Previous researches on long-term recovery have mainly focused on identifying desirable decisions and efficient strategies. However, consideration on the cause of irrational decision under disaster conditions was limited. Although there were recent researches on recovery players' motives and interactive decision-making respectively, the analysis framework unifying both characteristics in decisions of long-term recovery was not suggested.

This research aims to identify the cause of divergence of recovery process from the desirable direction in terms of decisions. For that purpose, the analysis on decisions in long-term recovery that focuses on multifaceted motives varying with the context and interactive decision-making between associated players is applied.

As a case of long-term recovery, the permanent housing reconstruction by International NGOs in Sri Lanka after the 2004 Indian Ocean Tsunami is analyzed. This case clearly showed the gap between lessons learned in normative approach and actual decision-making in the field, and the necessity of the analysis framework on decisions in terms of interactive decision-making among players with multifaceted motives.

Analysis procedure consists of four steps: (1) Identification of key decisions and associated players, (2) Motive analysis based on the context of decision, (3) Interactive decision analysis, and (4) Identification of key conditions to improve decisions.

In Sri Lanka case, two key decisions were identified. One is the Government of Sri Lanka's failure of relocation policy using uniform distance line from the coastline at initial planning. Another is International NGOs' temporary or permanent withdrawal of reconstruction projects during implementation.

The analysis using classic game theory shows the difficulty of sustainable long-term disaster recovery process. Even when players had the long-term goal, or shared the long-term goal, such long-term goals may not be implemented due to the decisions of interactive decisions-making process. Although players make a rational choice depending on their own motives and contexts, the decision as result of interactive decision-making can hamper the achievement of recovery objective.

For achieving long-term recovery goals, it is important that recovery policy and institutions are corresponding to each player's motive at specific time. Motive compatible policy and institutions can achieve the long-term recovery goals as subgame perfect equilibrium by making the condition for all players to match their own motives at each phase. Suggested practical solutions are reviewed in terms of motive-compatibility and applicability to actual complex conditions of Sri Lanka after the 2004 Tsunami.

Because of various uncertainties immediately after the disaster, the influence of uncertainties on irrational decision-making of each player should be considered. Hypergame analysis is applied to the government's hasty decision of relocation. As the result of hypergame analysis, the outcome of interactive decision itself is the same with previous analysis. However, misunderstanding, which represented as differently perceived counterpart's preference order, became one of causes that prevented desirable decision in terms of long-term recovery objectives.

In this research, it indicates that adjustment of recovery policy and institutions considering players' motive is important to achieve the long-term recovery goals. To develop such findings to concrete recovery policy, accumulation of research results on other cases in different context is needed as further research.

THESIS SUMMARY

Long-term disaster recovery such as infrastructure and housing reconstruction, especially in developing countries, is a crucial phase in terms of sustainable development as well as disaster resilience. Increasing roles of various players including International Non-Governmental Organization (INGO) and the private sector make it hard to manage implementation process. Even though there is a general consensus on idealistic aim, it is not easy to achieve long-term recovery goals effectively. It is because each recovery player has multifaceted motives, which vary with the context, and makes interactive decisions with other players for cooperation. In reality, there are many unexpected situations after disaster impacts. In such urgent situation to take action for recovery, it is almost impossible to make perfectly rational decision. Therefore, identifying the mechanism of actual decision-making in disaster recovery can contribute to achieve the recovery objectives through sustainable process.

Previous researches on long-term recovery have mainly focused on identifying desirable decisions and efficient strategies. However, consideration on the cause of irrational decision under disaster conditions was limited. Consequently, accumulated lessons learned by recovery experiences have not been linked to the efficient achievement of recovery goals, and similar mistakes in long-term recovery have been repeated. Although there were recent researches on recovery players' motives and interactive decision-making respectively, the analysis framework unifying both characteristics in decisions of long-term recovery was not suggested.

This research aims to identify the cause of divergence of recovery process from the desirable direction in terms of decisions. For that purpose, the analysis on decisions in long-term recovery that focuses on multifaceted motives varying with the context and interactive decision-making between associated players is applied. It shows the limitation of existing normative approach focusing on single decision-maker's will. It also discusses the decisive conditions for changing key decisions, which seriously hindered achievement recovery goals,

as well. In this research, it is ultimately aimed to contribute to the improvement of long-term recovery process.

As a case of long-term recovery, the permanent housing reconstruction by INGOs in Sri Lanka after the 2004 Indian Ocean Tsunami is analyzed. With abundant financial support and participation of INGOs as implementers, the Government of Sri Lanka (GoSL) had planned to relocate 30,602 houses, one third of total 98,525 houses for reconstruction, by INGOs-driven reconstruction. However, as a result of long process, only 16,578 houses are completed by INGOs-driven program. Besides, it resulted slow progress and low occupation rate of new houses, which reached to 37% in Hambantota. Although many researches on Sri Lanka case had found several factors that caused limited outcomes, these factors were enumerated without unifying framework of actual decision. Moreover, some suggested solutions, such as consideration of future vulnerability, were already included the 'Guiding Principles', which were shared to all involved players before the start of reconstruction. This case clearly showed the gap between lessons learned in normative approach and actual decision-making in the field, and the necessity of the analysis framework on decisions in terms of interactive decision-making among players with multifaceted motives.

This research analyzes the decisions in long-term recovery focusing on multifaceted motives varying with the context and interactive decision-making between associated players in Sri Lanka. Analysis procedure consists of four steps: (1) Identification of key decisions and associated players, (2) Motive analysis based on the context of decision, (3) Interactive decision analysis, and (4) Identification of key conditions to improve decisions. As the analysis method for interactive decision-making between recovery players, the game theoretic approaches are applied. Two different methods are suggested according to the focal points: (a) Classic game theory-based analysis is applied to sequential decisions in terms of process aspect in long-term recovery, and (b) Hypergame-based analysis is applied to the decision at the early stage of cooperation in regard to uncertainty and misunderstanding during the disaster situation.

In Sri Lanka case, two key decisions were identified. One is GoSL's failure of relocation policy using uniform distance line from the coastline at initial planning. Another is INGOs' temporary or permanent withdrawal of reconstruction projects during implementation. As key

players, GoSL and INGOs are considered. Based on the literature review, each player's payoff table regarding possible decisions is evaluated.

In terms of decision of coastal buffer zone, no reconstruction zone for the safety from tsunami, hasty introduction of uniform distance relocation policy by GoSL was the result of complex conditions and motives including GoSL's political conflict, lack of relocation experience, and INGO's competition for recovery participation. For GoSL's failure of relocation policy, it was shown that if the INGOs had declared their appropriate strategy, which served as the thread, GoSL's right choice could be the relocation policy using subdivided criteria. However, it did not happen because of competition among INGOs. Therefore, permanent coordination system among INGOs in housing field can be a practical solution.

INGOs' projects withdrawal was made based on motives and conditions including accumulated limitation of uniform relocation plan, political regime change, and emergence of new vulnerable people. For INGO's withdrawal, the situation was analyzed by the game theoretic framework and it was shown that even though INGOs and GoSL might have recognized that there was an Pareto optimal solution, they had to take another solution, Nash-equilibrium of the game, without mutual trust. It indicates that GoSL could have prevented INGOs' withdrawal during the recovery, as a motive-compatible solution, by shared responsibility for housing reconstruction, which will increase INGO's expected payoff in long-term participation.

The analysis using classic game theory shows the difficulty of sustainable long-term disaster recovery process. Even when players had the long-term goal, or shared the long-term goal, such long-term goals may not be implemented due to the decisions of interactive decisions-making process. Although players make a rational choice depending on their own motives and contexts, the decision as result of interactive decision-making can hamper the achievement of recovery objective.

For achieving long-term recovery goals, it is important that recovery policy and institutions are corresponding to each player's motive at specific time. Motive compatible policy and institutions can achieve the long-term recovery goals as subgame perfect

equilibrium by making the condition for all players to match their own motives at each phase. Suggested practical solutions are reviewed in terms of motive-compatibility and applicability to actual complex conditions of Sri Lanka after the 2004 Tsunami.

The analysis also indicates the importance of the initial stage of the process since the failure in the initial phase had a lasting effect on players' motives as path dependency. For instance, government's exclusion of INGOs in initial planning demotivated INGOs' continuous participation in long-term recovery, leading to the decline in outcomes of housing reconstruction.

Because of various uncertainties immediately after the disaster, the influence of uncertainties on irrational decision-making of each player should be considered. Hypergame analysis is applied to GoSL's hasty decision of relocation. Strategies of players will be defined according to each player's subjective perspective. Subjective perspective on counterpart's preference order is identified according to shared information between players and the characteristics of each recovery player. Individual games based on interpretation of others are analyzed in the context of each player. Finally, the influence of misunderstanding on recovery process and practical solution are discussed.

As the result of hypergame analysis, the outcome of interactive decision itself is the same with previous analysis. At the same time, misunderstanding, which represented as differently perceived counterpart's preference order, became one of causes that prevented desirable decision in terms of long-term recovery objectives. As a practical solution to reduce misunderstanding, the complemented list of information for NGO registration system is suggested.

The problems discussed in this research have a game theoretic structure. It indicates the importance of coordination and information sharing among associated organizations would be helpful to overcome those problems. It is not an easy task, but would deserve the efforts.

In this research, it indicates that adjustment of recovery policy and institutions considering players' motive is important to achieve the long-term recovery goals. To develop such findings to concrete recovery policy, accumulation of research results on other cases in different context is needed as further research.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ADB	Asian Development Bank
CNO	Centre for National Operations
DAP	Donor Assisted Program
GFDRR	Global Facility for Disaster Reduction and Recovery
GoSL	Government of Sri Lanka
GSDMA	Gujarat State Disaster Management Authority
IASC	Inter-Agency Standing Committee
IDPs	Internally Displaced People
IFRC	International Federation of Red Cross and Red Crescent
INGO	International Non-Governmental Organization
MDF	Multi Donor Fund for Aceh and Nias
ODP	Owner Driven Program
RADA	Reconstruction and Development Agency
TAFREN	Task Force for Rebuilding the Nation
UDA	Urban Development Authority
WB	World Bank

Chapter 1
INTRODUCTION

1.1 Background

The frequency and severity of natural disasters are on an increasing trend since 1980 (Ghesquiere & Reid, 2012). According to the statistics on worldwide disasters between 1980 and 2012, 8 of the 10 deadliest disasters and 7 of the 10 costliest disasters in terms of overall losses are occurred during the last ten-year period (Munich RE, 2013). There is a growing need for disaster management measures in preparation for unexpected large-scale natural disaster. The Great East Japan Earthquake and Tsunami in 2011, the costliest disaster, showed that no country, no matter how well prepared, can perfectly protect itself from large-scale disasters with low probability of occurrence (Ghesquiere & Reid, 2012).

Disaster damage consists of initial loss by impact and recovery time (Miles & Chang, 2006). Ideally, initial loss should be prevented by physical mitigation measures. In spite of the same scale of initial damage, however, the damage can be also reduced by quick and effective recovery process. Therefore, understanding of post-disaster recovery process becomes important for minimizing inevitable disaster impact on society. The growing interest in disaster resilience reflects the importance of post-disaster recovery process.

Long-term recovery such as infrastructure and housing reconstruction, especially in developing countries, is a crucial phase in terms of sustainable development as well as disaster resilience because it becomes the prerequisite for development. However, damage by large-scale natural disasters generally exceeds ordinary capacity of local

government and people in developing countries. For quick recovery, the assistance of foreign aid agencies is essential. In marginalized area, exceptional assistance from outside can be a rare opportunity for local development as well as the momentum of recovery.

Long-term recovery aid for permanent housing and infrastructure has been increased in importance. According to the study by the World Bank, overall funds available had not increased for 20 years since 1980, but the share of loans supporting housing reconstruction had grown (Gilbert, 2001 as cited in Lyon, 2009). In the 2010 Haitian Earthquake recovery, for instance, construction partnership was the second largest part of partnership between International Non-Governmental Organization (INGO) and local agency after partnership for food distribution (Coles & Zhuang, 2012). Various actors including INGOs and the private sector have taken on increasing influential roles in disaster recovery (Pelling & Dill, 2010). However, when aid agencies take part in long-term recovery programs as an implementer, recovery cooperation becomes more complicated than short-term recovery in which aid agency works as a supporter. By increasing roles of various actors in several phases, it is not easy to manage long-term recovery process and achieve the expected goals.

In spite of increasing importance, disaster recovery represents the least understood aspect of emergency management for both researchers and practitioners (Smith & Wenger, 2006). Most researches and reports on long-term recovery have addressed several aspects of sustainable recovery mainly as normative solutions or effective strategies (World Bank, 2005; IFRC, 2006; Jha et al., 2010; UN-Habitat, 2011). For instance, Peru and Turkey experienced huge earthquake respectively in 1970. Both governments initiated large reconstruction including relocation with unprecedented assistance from external humanitarian agencies (Sadiqi et al., 2012). However, relocation without community participation resulted in unoccupied houses and remained vulnerability to risks even after 40 years (Schilderman, 2010). Such experiences left lessons for importance of community participation in long-term recovery. After 30 years, however, the same problems by exclusion of community had been repeating in Turkey after 2000 Earthquake, India after 2001 Earthquake, and Indonesia after 2004 tsunami

(Sadiqi et al., 2012). Even for other normative lessons on sustainable recovery process, such as considering local needs and minimizing forced relocation, the repeating failures in implementation are much the same with case of community participation (Leon et al., 2009; Jha et al., 2010).

The cause of repeating same problems is that lessons learned are fragmentary considered in normative approach, without consideration of complicated characteristics in actual decision-making process. According to Sadiqi et al.'s research (2012) on problems in housing reconstruction, though communities participate in recovery planning and implementation, another unexpected problem was occurred. After the 2004 Indian Ocean Tsunami, there were some cases of community participation in housing reconstruction in Sri Lanka and Maldives. In Sri Lanka, in some projects, 2nd floor houses were constructed reflecting opinions of disaster-affected people, who concerned about another tsunami (Shaw & Ahmed, 2010). However, it was revealed that 2nd floor was uninhabitable space because of inappropriate design without consideration of local condition. In another case of Maldives, house-owners were participated in 250 houses reconstruction. However, unreasonable interfere by house-owner who obsessed by quality of their own house made the government of Maldives excluded community participation (Lawther, 2009). It shows that only consideration of community participation had clear limitation when recovery player's motive in recovery is not considered.

There are similar instances related to players' complex motives. The reason why forced relocation is often included in recovery planning is that the government has motive to isolate affected people from risk prone areas (Dikmen, 2005, as cited in Sadiqi et al., 2012). In the same manner, in the recovery aids programs, lack of consideration for local needs and cultures are closely related to aid implementers' interest mainly in their project costs and speed (Sadiqi et al., 2012). In spite of accumulated knowledge on principles for sustainable disaster recovery in normative approach, previous researches have not been linked to a unifying theory that helps to clarify how sustainable recovery can be achieved, and practitioners have failed to establish an integrated policy framework to improve recovery outcomes (Smith & Wenger, 2006). Without identifying

mechanism for recovery process to last long, complicated influential factors had been addressed as a list. Although it is true that numerous aspects of the society influence long-term recovery process, a mere listing of influential factors could not be led to improve outcomes in practice.

Another cause of limited implementation of lessons learned from recovery experience is that the role of single decision-maker was emphasized. Most suggestions for better disaster recovery were made focusing on knowledge and the will of single decision-maker, usually policy-maker of the government. In the long-term recovery process, however, recovery outcomes are determined by accumulated results of several phases including planning, design and construction in which various players' decisions are involved (Amaratunga & Haigh, 2011). Moreover, in chaotic situation after disaster, many recovery players often made somewhat irrational decisions in terms of long-term objective. Therefore, decision-making in disaster recovery should be understood in the actual context of interdependent relation of various actors during long-term recovery.

Based on the understanding of decision-making, it will be possible to identify the key factors for sustainable process. To achieve this, two characteristics of actual decision-making in long-term recovery process should be considered as shown in **Figure 1.1**. One characteristic is multifaceted motives for recovery in a recovery player. Another characteristic is interdependence of various players in decision-making during cooperative process. Multifaceted motives and interactive relation are continuously changed according to changing context and conditions through long-term process of recovery. Researches on these characteristics of decision-making in disaster recovery process are partially conducted.

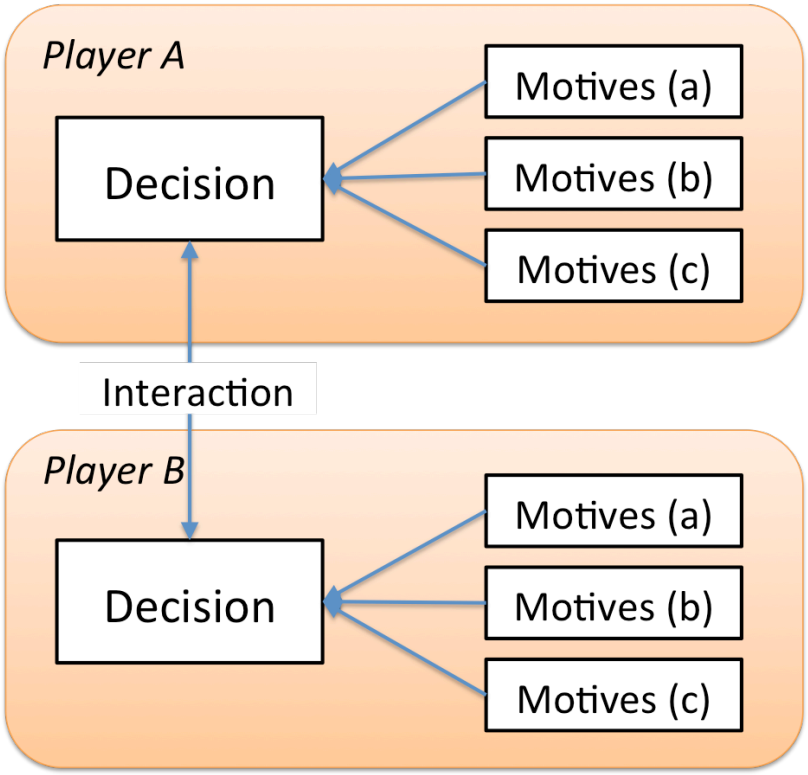


Figure 1.1 Characteristics of decision making in long-term recovery

Various recovery players including the government, disaster-affected people and INGOs share the common objective for long-term recovery cooperation. At the same time, however, they have respective objective and motive as well. Regarding perception of risks, for example, the government and NGO focus on hazards related risk, while people tend to think basic needs related risk as more important risk (Bosher, 2011). There is also difference in the viewpoint on root causes of disasters, recovery objective, and motives even between the government and NGO (Bankoff & Hilhorst, 2009). Both aim to support disaster-affected people basically through disaster recovery. While the government agencies keep their taxpayers' response in mind when the government makes a decision, NGOs have to meet the fund raising requirements for maintaining their works (Ebrahim, 2003; Werker, 2010). Various standpoints and motives according to recovery players can be complementary to some extent, but it can hamper the recovery process by conflicts among players (Jha et al., 2010). In the housing reconstruction, for

instance, allocation of houses based on identified needs is generally consented. Unlike the agreed objectives, the government sometimes selects ineligible beneficiaries without time-consuming process of strict screening under great pressure to decide as soon as possible (Vaes & Goddeeris, 2012). On the other hand, some aid agencies abandon their housing projects before completion because donors divert attention to the new flashpoint (Silva, 2009; Linnerooth-Bayer et al., 2005). Such different motives existing in cooperation process can be a challenge to achieve the agreed goals in long-term recovery (Pyles & Hilhorst, 2012; Bankoff & Hilhorst, 2009).

Each player's decision is dependent on not only its own multifaceted motives but also decision of other players (Chamlee-Wright & Storr, 2009). According to the research of Chamlee-Wright and Storr (2009) on housing reconstruction after the Hurricane Katrina, rebuilding strategy of disaster-affected people was dependent on their expectation of the government's capacity and intention to help victims. If people expect that the government is incapable of helping and has no intention of doing so, people select the strategy to rebuild or relocate for themselves. On the other hand, when people hold the optimistic expectation such as 'the government wants to help and is capable of doing so' people decide to wait as tentative strategy (Chamlee-Wright & Storr, 2009). In this case, the government's recovery strategy also can be dependent on people's collective reaction. Such interdependent decision-making can be found at cooperative relation between the government and INGOs for recovery as well. Therefore, recovery process can be understood as the result of interaction among players who choose the best strategy to achieve their objectives.

Reflecting these two characteristics of actual decision-making in long-term recovery process, researches on recovery decisions based on recovery actors' motives and interaction have been conducted using game theoretic approach. However, it is still in the beginning stages. In terms of short-term recovery, Coles and Zhuang (2010) analyzed interactions between international and local players for relief resource utilization using game theory. The authors discussed cooperative strategies using perspective from game theory in the problem of cooperative interactions between international and local players. After the case analysis of Hurricane Mitch, Indian Ocean Tsunami, and Haitian

Earthquake, the authors suggested the external actors to change their utility function, the objectives in recovery, to integrate a success of meeting local conditions. Regarding long-term recovery, Keraminiyage (2011) evaluated the applicability of game theory concepts to housing reconstruction as three players game by actors with different objective. The author focused on two possible strategies, externally managed reconstruction and community-driven reconstruction, and differently defined payoffs according to each player. However, these two researches focused on distinguishing different objectives according to types of actors. The concrete analysis methodology to identify the cause of decision, which is irrational choice in terms of long-term objective and hampers sustainability of recovery process, was not suggested.

1.2 Objective

This research aims to identify the cause of divergence of recovery process from the desirable direction in terms of unreasonable decisions. For that purpose, the analysis on decisions in long-term recovery that focuses on multifaceted motives varying with the context and interactive decision-making between associated players will be applied. It will be shown the limitation of existing normative approach focusing on single decision-maker's will. It also discusses the decisive conditions for change key decisions, which seriously hindered achievement recovery goals, as well. In this research, it is ultimately aimed to contribute to the improvement of long-term recovery process.

Previous researches on disaster recovery have presented directions of decision to improve recovery process. For example, importance of understanding the risk-benefit balance in post-disaster reconstruction is well known (Keraminiyage, 2011). Ingram et al. (2006) emphasized maintaining distinct objectives between short-term and long-term recovery goals. However, such contradictory elements reflect multifaceted objectives and motives of a player in disaster recovery. Several motives in one player do not always coincide. When conflict of motives occurs, the priority of motives at that moment became the criteria of decision. Therefore, to improve decisions for sustainable recovery, it is necessary to understand decision-maker's main motives and its priority. At the same time, the decision of a player should be considered as the outcome of whole interdependent decision-making process with other related players because of interactive relation of other players in cooperative system (Shin, 2002). Based on these two aspects, the analysis framework for interactive decision-making process by players with multifaceted motives will be presented using game theoretic approaches.

By application of this analysis framework to long-term disaster recovery case, the cause of divergence of long-term recovery process from the expected and desirable direction will be identified. The limit of normative approach focusing on single decision-maker's role will be analyzed as well. By understanding of interactive decision-making process by players with multifaceted motives at that moment, practical suggestion for

improving actual decision can be made in terms of motive compatibility. Further, this approach will be helpful to identify key influential factors for sustainable recovery process from the list of numerous complicated factors.

1.3 Thesis Outline

Chapter 1 has given a general introduction of long-term disaster recovery issues. By the literature review, limitations of previous researches in terms of implementation and characteristics of actual decision-making were addressed. For practical suggestion for sustainable recovery implementation, the need of analysis in consideration of interactive decision-making process by players with multifaceted motives was shown as the objective of this research.

Chapter 2 will introduce the long-term housing reconstruction in Sri Lanka after the 2004 Indian Ocean Tsunami. In the actual recovery process, the gap between lessons learned in normative approach and decision-making in the field will be discussed. It will show the necessity for analysis of decisions in terms of interactive decision-making among players with multifaceted motives.

Proposed analysis procedure consists of four steps: (1) identification of key decision and associated players, (2) motive analysis based on the context of decision, (3) interactive decision analysis, and (4) identification of key condition to improve decision. As the analysis method for interactive decision-making between recovery players, the game theoretic approaches are applied. In chapter 3 and 4, two different methods are suggested according to the focal points.

Chapter 3 explains about the analysis procedure using classic game theoretic approach, which can be applied to sequential decisions in terms of process aspect in long-term recovery. In Sri Lanka case, two key decisions are identified. One is the government of Sri Lanka's failure of relocation policy at initial planning. Another is INGOs' temporary or permanent withdrawal during reconstruction implementation. These decisions will be analyzed in detail, and the conditions to improve decisions will be discussed based on actual circumstance of Sri Lanka after the tsunami.

Chapter 4 shows hypergame-based analysis that is applied to the decision at the early stage of cooperation in terms to uncertainty and misunderstanding during the disaster

situation. Subjective perspective on counterpart's preference order is identified according to shared information between players and the characteristics of each recovery player. Individual game based on interpretation of others will be analyzed in the context of each player. Finally, by mapping of both individual games, the influence of misunderstanding on recovery process will be discussed.

Chapter 5 will present the conclusion, limitation of the current work and future work to continue this research.

The outline of thesis is shown in **Figure 1.2**.

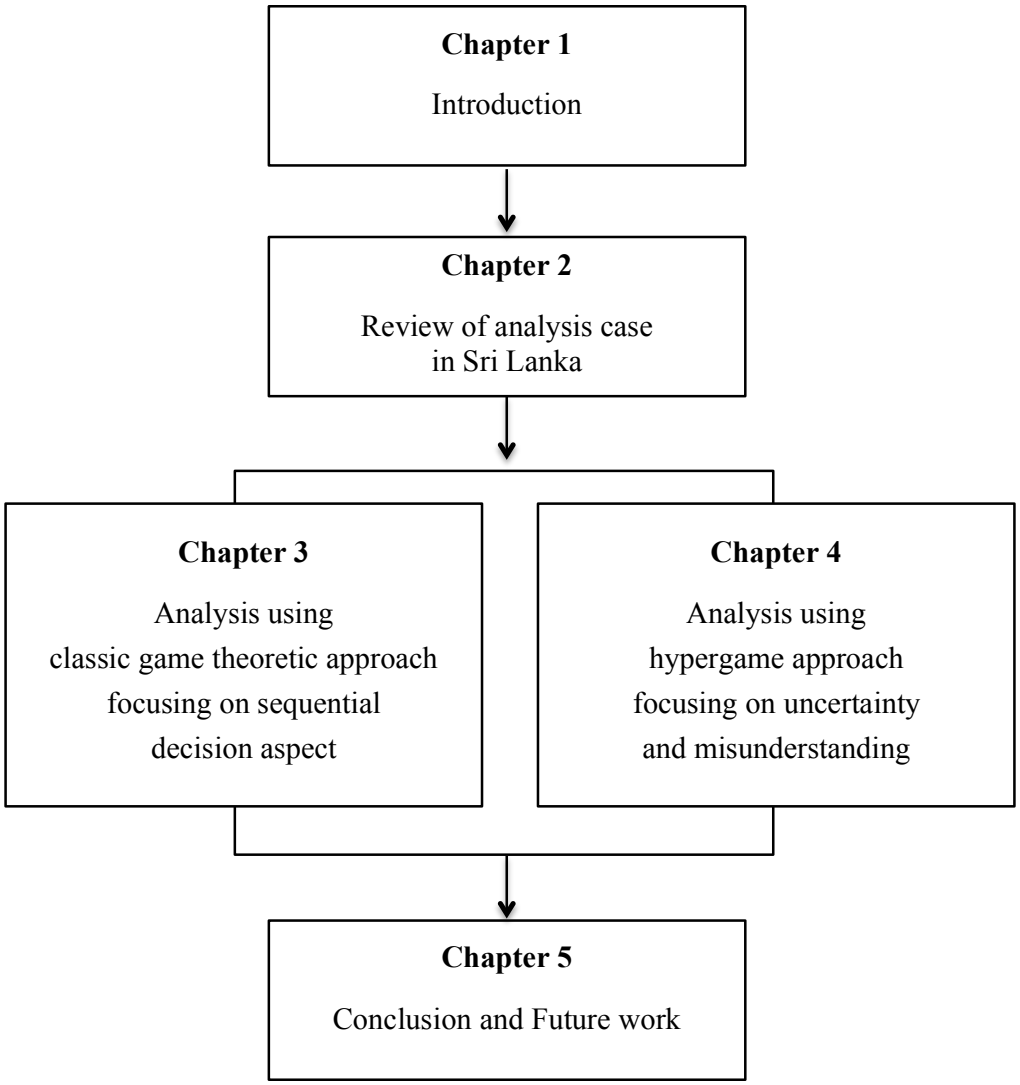


Figure 1.2 Outline of Thesis

Chapter 2

CASE: HOUSING RECONSTRUCTION IN SRI LANKA AFTER THE 2004 TSUNAMI

As a case to study, the permanent housing reconstruction by INGOs in Sri Lanka after the 2004 Indian Ocean Tsunami is discussed.

2.1 Introduction of Long-term Recovery of Housing

At 6:58 a.m. on December 26, 2004, an earthquake measuring 9.0 on the Richter scale occurred off the Sumatran coast, triggering a tsunami of unprecedented proportions that killed almost a quarter of a million people in India, Indonesia, Thailand and Sri Lanka (UN-Habitat, 2011). The 2004 Indian Ocean Tsunami was the significant event in terms of recovery aids as well as disaster magnitude. Although the scale of the disaster in terms of casualties and economic loss has been exceeded several times in the past, the response to the tsunami was unprecedented (Belgian Red Cross–French Speaking Community, 2009). Instant disaster reporting by global media led to the quick mobilization of an international humanitarian response including the pledge of approximately 13.5 billion USD, an equivalent of annual global aid budget (Silva, 2009; Khasalamwa, 2009). The total funding was equivalent to more than 7,100 USD for every affected person (Telford et al., 2006 as cited in Khasalamwa, 2009). Disaster affected countries, mainly developing countries, could complement limited capability for

recovery by huge international aids from emergency relief to long-term reconstruction. Especially, the participation of aid agencies in long-term recovery project as implementers based on unprecedented fund was remarkable. However, increasing role of various decision-makers had exposed many difficulties in recovery implementation due to complicated long-term recovery process.

One of examples showing the difficulties in recovery implementation was the permanent housing reconstruction in Sri Lanka by help of INGOs. The tsunami had caused severe impact in Sri Lanka including 35,322 people killed, 516,150 Internally Displaced People (IDPs) and 99,480 completely destroyed houses (Government of Sri Lanka & Development Partners, 2005; ADB, 2005). Tsunami swept away belongings, equipment and wrecked infrastructure. More than 150,000 people lost their livelihoods (UN-Habitat, 2011). Because 26% of the population lived very densely within a mile of the coast, damage in housing field was severe (World Bank, 2005). Damage was concentrated in a relatively narrow coastal strip of 12 districts, covering approximately 2/3 of the coastline like **Figure 2.1** (Lyons, 2009). In terms of economic loss, ADB (2005) estimated that the loss only in housing, 341 million USD, was more than one-third of Sri Lanka's total loss, 970-1,000 million USD. It was the greatest share of total loss in Sri Lanka, and damaged houses comprised 13% of houses in the affected districts (Lyons, 2009).

At the severe damage of houses in coastal area, the Government of Sri Lanka (GoSL) saw the necessity to implement coastal development regulation that had not been successfully enforced before the tsunami in 2004. Only days after the tsunami struck, GoSL announced a "no reconstruction" coastal buffer zone that varied in width from 100m in the South to 200m in the East and North (Ingram et al., 2006). By these criteria of buffer zone, GoSL adopted two different programs to reconstruct total 98,525 houses. One was the Donor Assisted Program (DAP) for 30,602 houses by which external donors mainly INGOs construct new houses in relocation site for beneficiaries who lived in buffer zone area. GoSL could complement limited capability of housing reconstruction through this policy with the help of INGOs as implementers. Another was the Owner Driven Program (ODP) for 67,923 houses by which tsunami-affected people reconstruct

their own houses in situ by help of the government (RADA, 2006). Financial and technical support from the government was decided according to scale of damage.

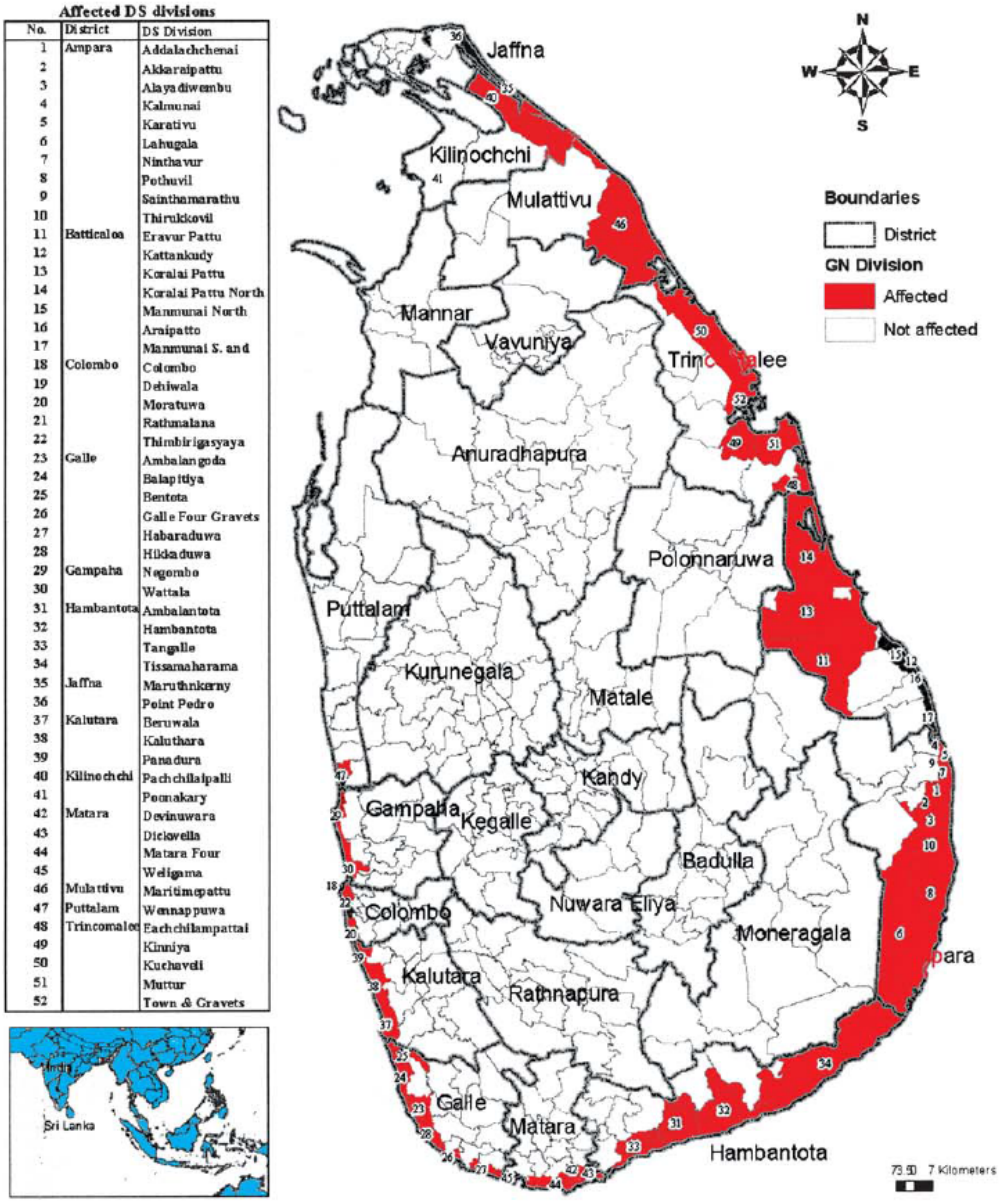


Figure 2.1 Map of Tsunami Affected District of Sri Lanka (Government of Sri Lanka & Development Partners, 2005)

Largely as the outcome of the global media attention, ‘one of the largest relief and rehabilitation operations ever launched by humanitarian organizations around the world’ could be implemented in Sri Lanka (Rawal et al., 2005 as cited in Silva, 2009). Foreign aid donated to Sri Lanka was estimated at more than 3 billion USD with more than 1 billion USD being given for housing alone, and as the response of huge needs, about 130 agencies developed housing projects in their programs (UN-Habitat, 2011). While participation of INGOs in housing bridged the gap between required recovery resources and limited capability of GoSL, as a result of long process, housing reconstruction by INGOs hadn’t much success. Eventually, while permanent housing policy had been expanded beneficiaries’ number up to 120,000 households, only 16,578 houses were completed by INGOs-driven construction. Housing construction by INGOs was much slower than ODP (RADA, 2006). Besides, due to design without enough consultation with people and delayed schedule, non-occupation of new houses by tsunami victims reached to 37 %, for instance, in Hambantota. Some empty houses that were built outside the buffer zone by INGOs for tsunami-affected communities have ended up being given to non-affected households (Barenstein & Wickramagamage, 2009).

In this research, the Donor Assisted Program case will be analyzed focusing on cooperative recovery process among recovery players. Firstly, most of problems in housing reconstruction in Sri Lanka were concentrated in DAP. Because INGOs were implementer of reconstruction, decision making of both players, GoSL and INGO, should be considered as important factor each other on an equal footing. Such relationship represented common characteristics of relationship between the government of disaster-impacted countries and external aid agencies. Therefore, it is easy to apply this analysis result to another disaster recovery cases. On the other hand, the Owner Driven Program progressed satisfactorily comparing to progress of DDP. In ODP, INGOs’ role was limited only as supporter and people’s decision became important. However, individual decision-making revealed quite wide variety of characteristics according to cultural or environmental background of each recovery case. So, it becomes difficult to apply analysis result to other cases. Therefore, this research focuses on the Donor Assisted Program as analysis object.

2.2 Previous Researches and Limitations

Many researches found various factors contributed to limited progress in housing reconstruction in Sri Lanka (Barenstein & Wickramagamage, 2009; Vaes & Goddeeris, 2012; Brun & Lund, 2008; Harsha et al., 2007; Hyndman, 2009; IFRC, 2006; Ingram et al., 2006). Silva (2009) summarized six interconnected factors that cover almost all of influential factors found by other researches in various viewpoints like below.

> *First, there occurred a flight of INGOs after an initial spurt of activity centered on relief and recovery operations.*
>
> *Second, one of the controversial policies that the government introduced was the declaration of a coastal buffer zone where housing construction, including rebuilding of houses damaged by tsunami, was not permitted as a preventive measure against any future tsunamis.*
>
> *Third, resumed fighting between the government and the LTTE after December 2005 seriously affected housing construction in the north and east.*
>
> *Fourth, the flow of funds for tsunami-affected people has been seriously distorted by political interference in the allocation of funds at various levels.*
>
> *Fifth, organized civil society response from within Sri Lanka has been increasingly organized along ethnic and religious lines in a way that was uncommon in the past.*
>
> *Finally, tsunami relief and recovery operations by numerous agencies without proper coordination between them or plans for cost recovery of some kind have a led to a high sense of dependency among the beneficiaries.*

These influential factors show how difficult to manage long-term recovery process the way recovery players intended. In the previous researches, however, these factors are enumerated one by one without unifying framework to actual decision. So, it is hard to

identify the key factor in terms of sustainability of recovery process. In such conditions, only normative solution for each impediment could be suggested focusing role of single decision-maker. Ingram et al. (2006), for instance, reviewed the housing reconstruction in Sri Lanka focusing on the influential factors, the declaration of a coastal buffer zone. Authors addressed that hasty introduction of the buffer zone policy had resulted in socio-economic disparities, threatened livelihoods, disruption of communities and environmental threat by massive construction. In the vulnerability framework, authors suggested solution focusing on policy-maker as below.

> *Hurricanes Katrina, Rita, Stan and Wilma, in their paths of destruction, have created similar massive relief and reconstruction needs for many coastal communities. These disasters represent opportunities to address the pre-existent vulnerabilities of affected communities and to rebuild in a way that seeks to mitigate these problems in the future. To be successful, however, these processes require a combination of short-term recovery and long-term planning that involve negotiating with affected people on a continual basis, while maintaining distinct objectives between short-term and long-term goals. As the Sri Lankan experience has shown, confusion between these objectives can delay the recovery process and increase vulnerability of affected populations.*

Only a month after the Tsunami, however, the government of Sri Lanka and partners supporting the reconstruction effort already endorsed a set of eight 'Guiding Principles' (details are below) before they started reconstruction implementation (the Government of Sri Lanka & Development Partners, 2005). Within these principles that all actors involved in the reconstruction of Sri Lanka are expected to keep in their implementation, suggestion by Ingram et al. was already included.

Eight Guiding Principles consented by GoSL and recovery partners in January 2005

(1) Resource allocation based on identified needs and local priorities, without discrimination on the basis of political, religious, ethnic, or gender considerations. There is need for sensitivity to neighboring communities unaffected by tsunami.

(2) Subsidiarity - provides for locally appropriate solutions and allows a range of sub-national structures and organizations to be directly engaged in the recovery process. Recovery activities should be decentralized as much as possible, involving the lowest and most locally situated governance structures.

(3) Consultation with local affected communities and stakeholders. Interventions need to respond to clearly identified and articulated needs of the local communities on policy decisions.

(4) Communication and transparency in decision-making and implementation must be ensured at all levels. There is need for feedback to implementation authorities, grievance redress, transparent resource use and accounting, and zero tolerance of corruption.

(5) Future vulnerabilities ought to be reduced – the reconstruction processes should reduce future vulnerabilities to natural disasters through effective disaster management and early warning systems for possible future disasters.

(6) Analysis of individual interventions through conflict sensitivity (the distribution of aid across geographic regions and ethnic communities), sustainability, governance, gender, environment, land issues, and human rights concerns.

(7) Prudent management of debt relief.

(8) Coordination of the recovery effort in order to maximize benefits, prevent duplication, and minimize the burden on stretched government departments.

This case shows the gap between shared knowledge for sustainable recovery and still remained limits in actual implementation. For another example, the principles such as

consideration of long-term vulnerability reduction or maximizing impact through coordination of associated organizations are shared among all recovery players as well. However, in actual process of long-term recovery, such factors are not fully implemented. It shows the limitation of normative approaches to decision itself and practical improvement of actual decision-making process. Therefore, for improvement of actual decisions during long-term recovery, it is necessary to analyze the actual decision-making process focusing on decision-maker's motives as direct cause of decisions and interrelation with other players' decisions.

2.3 Decisions Hindered Recovery Outcomes

In the disaster recovery process, involved many players make their own decisions almost continuously through the whole process from planning to completion in interrelation with other players. Although it is desirable to consider all decisions in the process, a few key decisions determine overall recovery process. In many researches on recovery cases, wrong decision, which delays the recovery progress or hampers the achievement of recovery goals are emphasized as an object for improvement. Therefore, this research will focus on analysis of key decisions as the first step. Key decision can be identified based on its influence on divergence of long-term recovery process. To identify it, the whole process of recovery will be reviewed in chronological sequence from the beginning phase of reconstruction planning with enough financial support from external actors to final phase in which expected new houses were not fully constructed.

The timeline of housing reconstruction in Sri Lanka is shown in **Figure 2.2**.

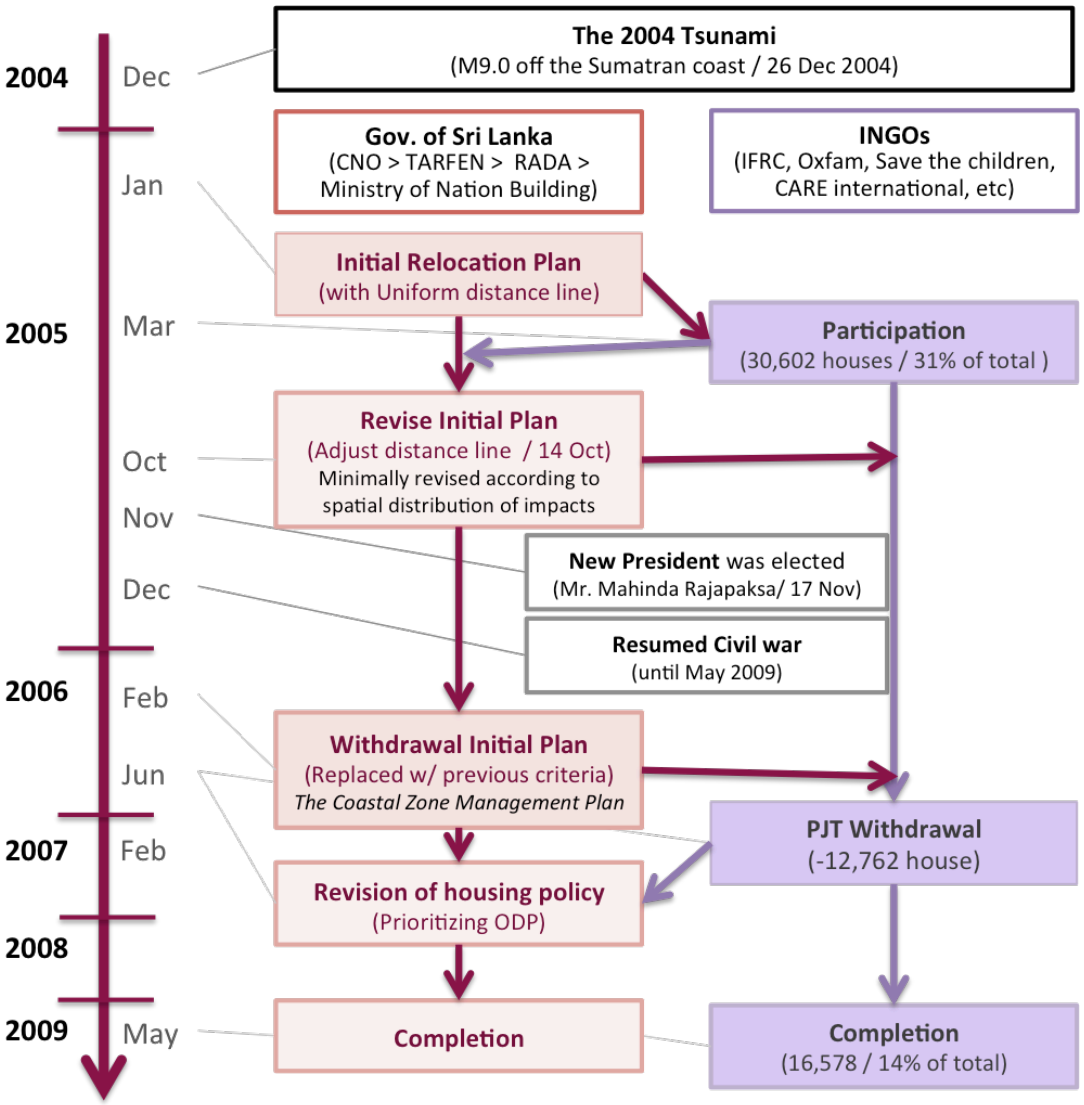


Figure 2.2 Timeline of housing reconstruction in Sri Lanka

One month after the tsunami, GoSL announced the permanent housing reconstruction plan with the criteria of uniform distance line from the coastline. However, because this plan included massive relocation plan up to 31% of total caseload, it was impossible to implement without enough support from outside. Based on unprecedented concentration of recovery aids from all over the world, many INGOs participated in GoSL's reconstruction plan. However, hasty plan without consideration of tsunami impact and people's condition resulted in feasibility issues such as lack of suitable

relocation site during implementation of plan (Samaranayake, 2006). This induced several changes of relocation criteria, the buffer zone until 1 year after disaster. Eventually, in February 2006, newly elected president who tried to quickly distance himself from former president decided to withdraw the buffer zone policy that became a politically sensitive matter (Hyndman, 2009). However, reduction of relocation zone meant the stop of ongoing construction project for some INGOs because expected beneficiaries of new houses in relocation site will return to the original place. Therefore, policy change was very important consideration for INGOs' to decide whether to progress housing construction or not. Number of houses that was not implemented by INGOs due to concern about the halt by the government and so on run to 12,762 houses in June 2006, one and half year after the tsunami (RADA, 2006). On the other hand, GoSL had strong motive to promote delayed housing reconstruction by INGOs. Through the Revised Tsunami Housing Policy in June 2006, GoSL replaced the implementer of suspended projects and expected the completion of reconstruction by the end of 2006 (RADA, 2006). However, housing reconstruction, for instance, some projects of Belgian Red Cross lasted until May 2009 (Belgian Red Cross–French Speaking Community, 2009).

According to several researches on housing reconstruction in Sri Lanka, two decisions are mainly blamed for slow progress and smaller number of constructed houses than expectation as shown in **Table 2.1** (Barenstein & Wickramagamage, 2009; Vaes & Goddeeris, 2012; Brun & Lund, 2008; Harsha et al., 2007; Hyndman, 2009; IFRC, 2006; Ingram et al., 2006). One is government's relocation plan using uniform distance line from the coastline at initial planning phase. The other is NGOs' temporary or permanent withdrawal of projects during reconstruction implementation.

Table 2.1 Key decisions and related decisions in housing reconstruction in Sri Lanka

Reconstruction Phase	Actors	
	Gov. of Sri Lanka	INGOs
Initial Planning	Relocation Plan by Uniform Distance Line *	Participation in Housing Field
Implementation	Change of Relocation Criteria	Temporary or Permanent Withdrawal Project *

* : key decision

Firstly, GoSL's failure of relocation policy at initial planning phase of housing reconstruction remained negative impacts on overall recovery process even after revision of policy (Ingram et al., 2006). GoSL introduced uniform distance, 100m in the South and Southwest coasts and 200m in the North and East coasts, buffer zone in a hurry (Silva, 2009; Government of Sri Lanka & Development Partners, 2005). Uniform distance criteria were introduced without any consideration of actual tsunami impact or people's opinions. During implementation, the buffer zone policy incited massive relocation of people and remained negative impact on recovery (Ingram et al., 2006). For instance, lack of consultation with people who earned their livelihood at the coasts worsened livelihood conditions in remote relocation site from the coasts. After the completion of construction, it led to low occupancy rate of new houses. The buffer zone policy was not just an issue of housing field. It intensified the social conflicts. Social turmoil by implementation of the policy without feasibility became the cause of delay of recovery not only in housing but also in the society at large.

Second decision was INGOs' temporary or permanent withdrawal of projects. At the implementing phase of housing reconstruction, INGOs' withdrawal of projects resulted in limited outcome of housing reconstruction as well. 65,000 pledges for donor driven had been made, but only 18% had been completed until 2 years after disaster (Harsha et al., 2007). INGO's withdrawal was occurred by various reasons including GoSL's criteria changes, security problem by civil war, and budget diversion to newly appeared

vulnerable people such as IDPs. Fulfillment of aids in housing below initial plan induced inevitable revision of housing reconstruction plan. It became another reason of delayed housing recovery. Delay of reconstruction schedule also induced low occupancy of new houses because some people had to find alternative way before delayed completion of new houses.

Regarding these decisions, two main actors can be identified: Government of Sri Lanka (GoSL) and International Non-Governmental Organization (INGO). At the first decision, GoSL's initial relocation policy, INGO, which has a key role in implementation of housing relocation plan, should be considered together. It's same to the second decision. INGOs decision of project withdrawal was closely related to GoSL's policy revision. GoSL and INGOs made their decisions under the interdependent relation for housing relocation projects in Sri Lanka. In this research, GoSL means only administration organization related to housing reconstruction. INGOs are defined as INGOs that joined in housing relocation projects in Sri Lanka. Because of lack of accessible data on decision-making of INGOs during recovery, International Federation of Red Cross and Red Crescent (IFRC), Belgian Red Cross, and FORUT (Norwegian INGO) are mainly considered (Belgian Red Cross–French Speaking Community, 2009; Vaes & Goddeeris, 2012; Brun & Lund, 2008). In Sri Lanka case, IFRC was the biggest single housing donor taken the responsibility of implementing 15% of the national housing reconstruction after 2004 tsunami (IFRC, 2006).

In general cases of relocation project, affected people's participation and opinion play an important role in implementation. However, in Sri Lanka case, while people's role was gradually increased as recovery progressed, it was very limited in relocation process through INGO-driven programs (Uyangoda, 2005). Although INGOs tried to reflect people's opinion at planning, it was hard to do so in practice. It was because the government controlled the initial process of relocation and gave only limited information on people to INGOs. Regarding the second decision, INGOs' withdrawal of project, people's influence was also limited because people's role was not significant under the INGO-driven construction approach. Therefore, in this case study, GoSL and INGOs are considered as main players of recovery process.

Chapter 3
ANALYSIS OF INTERACTIVE DECISIONS AMONG RECOVERY PLAYERS

3.1 Methodology

For the analysis process of long-term recovery in terms of interactive decision-making process, first of all, key decisions in long-term recovery process were selected on the basis of two aspects, negative influences on final recovery outcomes and interactions among actors. Sometimes independent decision may influence on recovery process, but this research considers interaction between players as the criteria for key decision to focus on cooperative process of long-term recovery. In Sri Lankan case, two key decisions were identified as GoSL's relocation plan using uniform distance line and INGOs' temporary or permanent withdrawal of projects based on the literature review and consideration of whole recovery process.

Two key decisions in housing reconstruction process of Sri Lanka showed the characteristics of actual decision-making in long-term recovery process very well. Both of GoSL and INGOs consented on the common objectives of recovery. However, in actual decision-making process players made their decision inconsistent with consented principle because of multifaceted motives. Therefore, as the first step of analysis, it should be considered how various motives influence on decision-making. At the same time, those decisions were interdependent on the other player's decision of the time.

Each player tried to make the best decision corresponding with its motive and objective under the given circumstance. As the second step of analysis, interdependent decision-making will be analyzed with game theoretic approach. These two steps of analysis will identify key influential factors for sustainable recovery process from numerous factors revealed by previous researches.

3.1.1 Motive Analysis

Previous researches on motive are mainly conducted in economics, psychology, politics, and so on. As the methodology, two approaches, experiment-based and survey-based, are commonly used. As experiment-based approaches, an experiment in controlled conditions is conducted focusing mainly on output as economic value (Croson & Konow, 2009; Karagonlar & Kuhlman, 2013). On the other hand, as survey-based approaches, types of motives are defined by literature review and these are verified by survey using rating (Fadardi et al., 2010; Ligon & Schechter, 2012; Angst & Borowiecki, 2014; Okeke & Godlonton, 2014).

For the analysis of overall recovery process, decision at the level of recovery organizations by multiple-motives should be analyzed. For multiple motives, previous researches analyze mainly conflicting motives such as cooperative or individualistic motives (Schei et al., 2011). Difference of behavior according to different level of each motive is analyzed (Kim et al., 2013). For organization level, only clear motive such as pursuit of profit was mainly dealt in terms of economic aspect (Reniers & Soudan, 2010; Zhao et al., 2013). It is difficult to define motive at organization level regarding comprehensive aspect. There is also possibility to lose consistency in motive at different temporal points because of leader change and so on.

In terms of recovery process analysis with organizations by multiple-motive, which varies this context, both methodologies, experiment-based and survey-based, are difficult to apply because of impossible condition to control situation for experiment and mixed motives in actual decision-making during recovery process. Therefore, based on

available literature describing actual decision and their various motives, priority of multiple motives will be defined, and it will be applied to decide preference for possible options. For each player's preference of decision sets can be inferred by preference of decision sets according to each motive and its combination with the priority of motives.

For the analysis at the organizational level, motives of organization are identified by literature review on documents from various viewpoints. Motives are identified at each decision point. Because the priority of motives can be change in different situation, possible decision sets can be determined based on the each priority of motives according to context.

At each key decision, for both decision-maker of key decision and interacting counterpart, multifaceted main motives related to the decision will be defined by literature review. When a player makes an actual decision, various motives of the player are considered together. For instance, when INGO makes a decision during disaster recovery, INGO has to consider several aspects such as supporting the vulnerable people, utilizing limited budget effectively and keeping support by donors at the same time. Identification of such multifaceted motives became the precondition for analysis of actual decision-making. In the context of cooperative reconstruction among organizations, each recovery player can have three representative types of standpoints: (a) Recovery participant, (b) Cooperation partner, and (c) Organization manager. First of all, all players are basically recovery participants who want to meet the long-term objective of recovery. Secondly, in terms of cooperation for recovery, a player can be considered as a cooperation partner who aims to achieve the result of project. Finally, each player takes account of continuation of organization itself fundamentally. According to different standpoint, three fundamental motives of recovery actor are classified as **Figure 3.1** below.

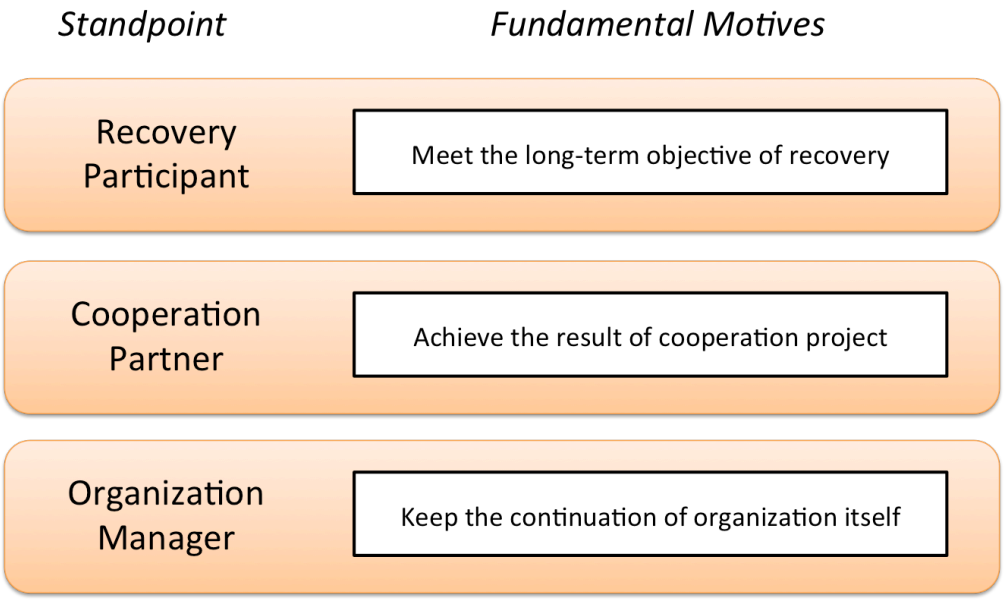


Figure 3.1 Recovery player's standpoints and related fundamental motives

According to each player's characteristics, main motives will be differently defined. For example, in terms of cooperation partner, INGOs have different perspective with GoSL because INGOs' position is the donor unlike GoSL. INGO will try to focus on investment aspect while GoSL concerns about securing external support. Main motives can be inferred by not only corresponding decision but also other decisions of the time. Actual decision shows what kind of motive recovery player has.

For each motive, criteria of decision will be differently identified as the context of actual decision-making. For example, although the government had consistent motive to meet the long-term objective of recovery, specific criteria of decision can depend on the situation. Criteria of decision can be 'reduce physical risk exposure' or 'reduce socio-economic vulnerability' according to the context at specific point.

Several motives of a recovery player are not considered as the same weight. When several motives influence on a decision at the same time, the priority of motives became important yardstick to analyze decision-making process. There is priority of motives that is differently defined according to unique characteristics of a player and situation.

Therefore, main motives' priority order will be determined as well by literature review. Literature review will cover related researches, report by players, news and survey results from various point of view. Results of researches on general tendency in motive of recovery players are also considered to infer the main motives because actual motives in decision-making, such as political consideration, are not explicitly stated at player's reports or interview sometimes (Ebrahim, 2003; Bosher, 2011; Bankoff & Hilhorst, 2009; Werker, 2010).

3.1.2 Interactive Decision Analysis

Decision-making in recovery is decided by not only multiple motives but also interactive relation with other recovery players. Game theory has proven useful in the analysis of complex dynamics within disaster management processes (Shermemetov et al., 2004, as sited in Coles & Zhuang, 2011).

Game theory deals with strategic decision-making between intelligent rational decision-makers (Myerson, 1991). It was applied in various fields such as economics, political science, psychology, biology and so on. In the game theory, 'players' denotes the decision-makers and 'game' denotes interactive decision-making among decision-makers. Game theory helps the understanding of complex phenomenon as interaction among decision-makers. For instance, one of well-known examples is "Prisoner's Dilemma" (McCarty & Meirowitz, 2007). It shows that individual rationality can lead to socially inferior outcomes. It can be closely related to the complicated situation of disaster recovery where all actors pursue 'good' recovery outcomes but actual outcomes of system show divergence from their intentions. Game-theoretic models can have multiple solutions as equilibrium (Aoki, 2001). This feature can be appropriate to analysis long-term disaster recovery that shows wide divergence in the process according to various conditions in different cases.

For analysis actual decision-making as a game form, first of all, all possible strategies, which player can have, and corresponding payoff should be clearly defined.

Actual decision during the recovery process is one of possible decisions at that specific situation. Therefore, preference of possible decision is essential to analyze actor's alternative decision according to the different condition or different decision of counterpart. In case of economic payoff that can be expressed as a simple number, we can easily decide the priority of strategies according to number. However, actual payoff during recovery process is complex types of benefit including immaterial benefits as well as economic benefits. As an example of immaterial benefits, GoSL will consider people's support as benefit while INGOs considers vulnerability reduction as benefit. Even though some methodologies simply replace all types of benefits by the number in a single criterion to decide order, such approaches are not corresponding to actual disaster situation with time pressure to make decision. Therefore, in this research, relative priority among possible strategies in terms of each player's motives is defined. By consideration of priority among motives, relative preference of strategies can be defined. According to priority order of motives in each player, preference for possible decisions can be evaluated. With this data, decision-making in the recovery process will be analyzed closer to reality.

As the last step of analysis, to identify the direct cause of decision, interactive decision-making process among recovery players will be analyzed as the game between players based on the assumption that each actor will pursue the preferred decision if possible. The best strategy depends on counterpart's decision. For example, GoSL's massive relocation plan was the best strategy based on INGO's support for implementation. Without enough support, however, it might not be the best option for GoSL any more because of big financial burden. With this analysis framework on interdependent decision-making, the actual causes of discordant decisions with long-term recovery objective will be identified in comprehensive context. Based on this analysis, the reason why normative solutions by previous research were not implemented in reality could be identified. Finally, the conditions for shifting decisions from actual decision to desirable and motive-compatible decision will be presented.

3.2 Analysis of Decision on Relocation Plan

First of all, the first key decision of GoSL, 'Relocation plan using uniform distance line criteria', will be analyzed with contexts of initial planning phase. In the initial planning phase of long-term recovery such as permanent housing and infrastructure, the government decided the overall recovery scope, target and method. Under the cooperative framework given by the government, aid agency could decide its scope of participation. Each player's role in cooperation for long-term recovery is mainly determined in this earlier phase.

The key decision by GoSL in the initial planning phase was 'Relocation plan using uniform distance line criteria'. GoSL adopted two different housing reconstruction programs for 98,525 houses, the Donor Assisted Program (DAP) by which external donors construct new 30,602 houses in relocation site and the Owner Driven Program (ODP) by which affected people reconstruct their own 67,923 houses in situ by help of the government like **Figure 3.2** (RADA, 2006).

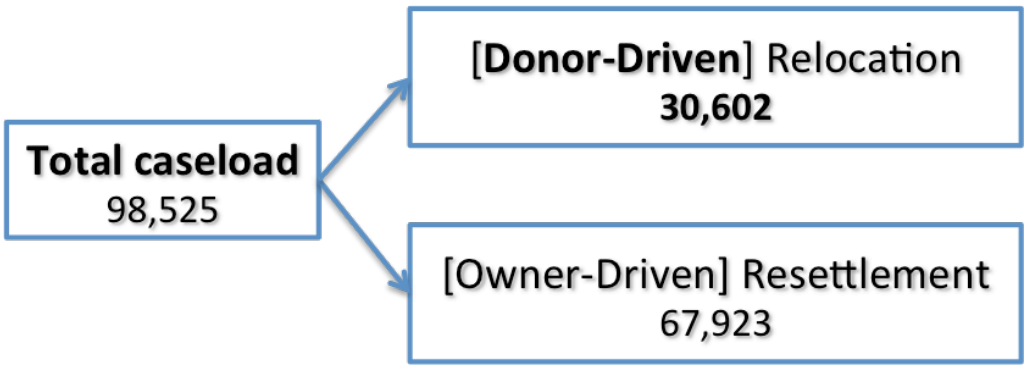


Figure 3.2 Permanent housing reconstruction program – January 2005

By this policy, GoSL planned to relocate about one third of tsunami-affected houses in a short period of time. Not surprisingly, it required huge resource and implementing capacity that exceeded the capability of GoSL because relocation is more expensive option accompanying new infrastructure construction than reconstruction in situ. GoSL tried to bridge this gap of capability by long-term cooperation with aid agencies. Massive relocation plan could be implemented because enough number of houses was promised by INGOs based on the unprecedented aids immediately after the tsunami (Belgian Red Cross–French Speaking Community, 2009). In terms of recovery budget, ADB et al. (2005) estimated financial need in housing as 437-487 million USD. Within six months after the tsunami, more than 1 billion USD was donated to support housing reconstruction (UN-Habitat, 2011). Therefore, this key decision of GoSL cannot be analyzed separately from INGOs' decision to take part in housing reconstruction.

In spite of unusual complete support for permanent housing reconstruction, actual outcome fell short of expectation. First of all, the plan with large number of houses in relocation site required many implementing agencies. Consequently, when INGOs participated in housing construction, it was not considered whether they have enough experience in housing field or not. Such inexperienced aid agencies revealed several problems not only delay of schedule but also the quality of houses (RADA, 20065; UN-Habitat, 2011). Moreover, hasty planning missed consultation with people regarding their livelihood condition. It led to low occupancy rate of new houses after completion of construction. **Figure 3.3** shows abandoned new houses in relocation site by people because relocation plan didn't reflect people's opinion. In Hambantota, for instance, non-occupation of new houses by tsunami victims reached 37% (Barenstein & Wickramagamage, 2009). In terms of resource allocation, GoSL's decision to relocate all houses within uniform distance line, 100m in the South and 200m in the East and North, resulted in ineffective resource utilization. Finally, initial relocation plan intensified the social conflicts (Ingram et al. 2006). Longer distance of buffer zone in the East and North, the area with preponderance of minority ethnic group, than distance in the South was perceived as ethnic discrimination (Silva, 2009).

Figure 3.3 Abandoned houses in relocation site after construction (Barenstein & Wickramagamage, 2009)

In consideration of negative impacts on whole recovery process by relocation decision, another decision at the same condition can be considered as an alternative. Above all, oversimplified distance for relocation as 100m or 200m can be pointed out as the main cause of problems in following process. If GoSL set not uniform but subdivided distance criteria for relocation according to actual inundated distance and local communities' condition, it was possible to obtain the desirable outcome that is consistent with consented objective of recovery. In the case of INGOs, if the target of relocation was selected according to actual tsunami impacts, INGOs could focus on supporting more vulnerable people within limited budget. INGO could minimize withdrawal of projects to cope with change of relocation criteria during implementation as well. Therefore, two decisions, uniform distance relocation and subdivided distance relocation can be considered as possible option for GoSL of the time. INGOs' possible strategies were participation in reconstruction or not. As the first step of analysis, multifaceted motives of GoSL and INGO will be identified.

3.2.1 Motives and Criteria of Decision

Both players' main motives in cooperative recovery process can be considered according to three standpoints as below.

a) Recovery Participant - to meet the long-term objective of recovery

b) Cooperation Partner - to achieve the result of cooperation project

c) Organization Manager - to keep the continuation of organization

First of all, as a recovery participant, recovery player has the motive to meet the long-term objective of recovery. It becomes common objective of long-term recovery that disaster recovery improves revealed existed vulnerabilities and prepares the next disaster in the future. For instance, many recovery organizations adopted the concept 'Build Back Better' as recovery principle. It implies to improve the physical, social and economic conditions of a community through post-disaster reconstruction (Mannakkara & Wilkinson, 2013). In this context, GoSL and INGO had the same motive, 'Vulnerability Reduction' through housing reconstruction.

Secondly, achieving the results of cooperation project becomes another main motive as a cooperation partner in terms of project with fixed time limitation. Regarding this standpoint, GoSL and INGO revealed the motive, 'Effective Resource Utilization'. Both recovery players, INGO who had limited budget and GoSL who expected maximum effect, have the same motive to utilize budget effectively. It becomes important criteria for decision-making whether a strategy can utilize budget effectively or not.

Thirdly, keeping the continuation of organization is another main motive as an organization manager. This standpoint goes beyond the bounds of long-term recovery issues and fundamentally related to each organization's continuation. For the government, consideration of political factors is the result of its management characteristics based on

the election system. Such standpoint of the government sometimes made policy makers pay more attention to evaluation by people, the electorate, than the fair distribution of resources. Aid agencies such as INGOs, on the other hand, depend on grant funds by donors for their project budgets. This feature also closely related with the motive to meet donors' expectation. When INGO made a decision during recovery process, INGO has to consider both aspects of supporting disaster-affected people and keeping the fund-raising at the same time. Even though it is not clearly stated by player itself, it is important motive in actual decision. In short, to keep the continuation of organization itself, GoSL had the motive to 'Match Expectation of People (the electorate)' while INGO had the motive to 'Match Expectation of Donors'. **Table 3.1** shows different motives according to players.

Table 3.1 Recovery players' main motives according to standpoints

Standpoints	**Main Motives in decision**	
	Gov. of Sri Lanka	**INGOs**
Recovery Participant *- to meet the long-term objective of recovery*	Vulnerability Reduction	Vulnerability Reduction
Cooperation Partner *- to achieve the result of cooperation project*	Effective Resource Utilization	Effective Resource Utilization
Organization Manager *- to keep the continuation of organization*	Match Expectation of People	Match Expectation of Donors

3.2.1.1. GoSL's Motives

For comprehensive understanding of GoSL's decision to relocate with uniform distance line, details of motive will be identified according to GoSL's three main motives: 'Vulnerability Reduction', 'Effective Resource Utilization', and 'Match Expectation of People'. Based on the context and other decisions of GoSL of the time, major criteria for actual decision-making will be defined according to each motive. Then, using criteria of decision in each motive, possible decisions will be evaluated. As the final step, GoSL's priority among motives will be identified.

The government's decision to relocation using uniform distance line from coastline can be understood with the motive, 'Vulnerability Reduction'. One of the causes of severe damage by the tsunami was unregulated development in coastal area of Sri Lanka for long time. For this issue, GoSL had introduced regulation policy in 1981 and 1997 (Birkmann et al., 2010). The Coast Conservation Act No. 57 of 1981 declared that no development was to take place within the 'Costal Zone', in which special permission of the Urban Development Authority (UDA) is required for any construction. In 1997, the Coastal Zone Management Plan was established and specifying a number of other setback zones for construction and development (Birkmann et al., 2010; IFRC, 2006). However, coastal regulation policies could not been fully enforced by conflict with other policies for tourism industry or development. Such repeated failures of regulation in the past strongly motivated planners of GoSL to perceive that "*the tragedy of the tsunami had one positive consequence in that it created the opportunity to address the chronic problem of unplanned and inappropriate coastal development*" (Mulligan & Shaw, 2007). For that reason, GoSL hastened to decide the criteria for relocation before people returned to original risk prone coastal area. Moreover, GoSL focused on not various aspects in vulnerability but only risk exposure reduction (Jayasuriya, 2006). It was because GoSL had no experience and manuals of massive relocation. As only risk exposure aspect was considered in decision-making, the relocation policy caused other vulnerability factors during following process of recovery. GoSL's official defense of uniform distance line in relocation plan was that it is needed for physical safety of people. For instance, the chairman Mano Tittawella of the Task Force to Rebuild the Nation

(TAFREN) said, "*The tsunami provided a good rational to enforce this law more vigilantly. This 'Exclusion/Buffer Zone' is for the safety of the inhabitants of that land strip*" (The Government of Sri Lanka, 2005). In sum, GoSL's criteria of decision were to 'Reduce Risk Exposure' regarding the motive 'Vulnerability Reduction'.

Under the constraints of recovery budget, the motive of 'Effective Resource Utilization' became another main motive for government's decision. In terms of 'Effective Resource Utilization', massive relocation plan that was more expensive than reconstruction in situ was inconsistent decision with effectiveness aspect. When it is considered that total loss was up to 4.5% of GDP of Sri Lanka, adaptation of massive relocation plan shows that GoSL put other two motives before resource effectiveness (Lyons, 2009). At the beginning of recovery, GoSL asked all diplomatic missions and international organizations in Sri Lanka for help to housing reconstruction through the official note such as **Figure 3.4**. In terms of motive of 'Effective Resource Utilization', GoSL's criteria of decision became to 'Secure reconstruction budget by aids'.

No:EA/GEN/645

The Ministry of Foreign Affairs of the Democratic Socialist Republic of Sri Lanka presents its compliments to all Diplomatic Missions and International Organisations in Colombo and has the honour to inform that the following procedures are being followed by authorities in Sri Lanka for identifying donors/ well-wishers for construction of houses for persons affected by the Tsunami disaster.

(1) Lands for construction of houses will be identified by the Urban Development Authority (UDA) in consultation with GAs, Divisional Secretaries and other relevant Agencies;

(2) All donors / well-wishers willing to construct houses need to be registered with the Task Force for Re-build the Nation (TAFREN). The registration already received by the UDA will also be forwarded to TAFREN for perusal.

(3) Once the donors inspect the lands and confirm their willingness to proceed, the Ministry of Urban Development & Water Supply and the UDA will make arrangements to sign MOUs with the donors, as appropriate.

(4) In order to facilitate this process a "Tsunami Housing Reconstruction Unit" has been established at the UDA, 7th Floor, "Sethsiripaya", Battaramulla. Further details may be obtained by contacting Mr. Nihal Fernando or Ms Rita Nalawatte on the following Telephone Nos.
2864158, 2864160 & 2875919.

The Ministry of Foreign Affairs of the Democratic Socialist Republic of Sri Lanka avails itself of this opportunity to renew to all Diplomatic Missions and International Organisations in Colombo the assurances of its highest consideration.

All Diplomatic Missions and
International Organisations
Colombo.

28th February 2005, Colombo.

Ministry of Foreign Affairs
Democratic Socialist Republic
of Sri Lanka

Figure 3.4 The official note of Sri Lanka for asking housing construction (The Ministry of Foreign Affairs of Sri Lanka, 2005)

Finally, the significant motive of GoSL was the motive to 'Match Expectation of people'. In Sri Lanka, political consideration had strongly influenced on the decisions through recovery process. For example, the composition of organizations for disaster management such as Centre for National Operations (CNO) was reflected political power struggle of the time (Boano, 2009). According to Uyangoda (2005), four days after the tsunami, President Kumaratunga who had been abroad on the tsunami day returned to Colombo, dismantled the machinery for disaster response that the Prime Minister had set up, and established a new entity under her direct control. CNO was headed by one of President Kumaratunga's trusted advisors, but neither the Prime Minister nor any other cabinet Minister was included in the CNO (Uyangoda, 2005). Moreover, regional distribution of relief resource was distorted by political influence of each region (Silva, 2009). These contexts support that political consideration was the main motive in recovery decision-making especially in the initial planning phase. Hasty announcement of insufficient relocation plan can be understood by the motive to show that the present government has enough capability to control disaster situation for people. For this motive, it can be inferred that GoSL thought 'Showing situation control' as criteria of decision for decision-making.

Although actual decision was not corresponded with long-term objective, the direct causes of that decision can be found at the short-term motives of the time. Basically uniform distance relocation plan was selected because it was consistent with 'Vulnerability Reduction' and 'Match Expectation of People'. As the causes in details, limited knowledge on massive recovery and need to quick planning were revealed regarding 'Vulnerability Reduction'. In terms of 'Match Expectation of People', pressure to response quickly for showing the capability to control disaster situation resulted in decision of uniform distance relocation plan. Subdivided distance plan was corresponded with only 'Effective Resource Utilization' that was considered as less important motive than other motives. Because the plan with subdivided criteria required relatively long time to reflect tsunami impact and people's opinion, this decision did not correspond to other motives of GoSL of the time.

GoSL's priority of motives can be inferred with relocation decisions and other decision of the time. First of all, regarding relocation planning, GoSL put 'Vulnerability Reduction' and 'Matching Expectation of people' above 'Effective Resource Utilization'. Basically, relocation plan requires more budgets to implement than reconstruction in situ. When relocation using uniform distance line is widely applied without consideration of tsunami impacts, relocation plan require much more budgets. However, GoSL decided this plan for quick response and physical isolation of people from risk-prone area in spite of decrease of efficiency. Therefore, it can be inferred reasonably that GoSL put other two motives above 'Effective Resource Utilization' at the same condition.

Between two preferred motives, it can be inferred that GoSL prioritized 'Matching Expectation of people' to 'Vulnerability Reduction' because GoSL put political consideration before actual damage distribution in relief resource distribution of the time. The progress of housing reconstruction by districts after 2 years in **Table 3.2** shows that many of the new houses were built in the area of major ethnic group, the Sinhala, exceeding actually tsunami-affected number (Silva, 2009; Khasalamwa, 2009). According to Perera (as cited in Silva, 2009), the Ampara District which suffered 24% of total housing damage, received 58 million USD of total pledges as against Hambantota, which sustained much less house damage yet received 45 million USD, which has been estimated to be almost five times its actual requirement. While only 57% of required houses were completed in Ampara, 188% of houses were constructed in Hambantota. The number of houses allocated to districts is the indicator showing GoSL's criteria in decision-making at the early phase of reconstruction. Therefore, such result, which revealed that political consideration was more important factor than real disaster damage, supports that GoSL's top priority was 'Matching expectation of people'. Besides, disaster response organizations, which established and dismantled by political struggle, also support that GoSL put a bigger emphasis on political aspects than effective response to reduce vulnerability (Boano, 2009). Therefore, priority of motives can be decided in the order of 'Matching Expectation of People', 'Vulnerability Reduction', and 'Effective Resource Utilization'. GoSL's motives, criteria of decision in decision-making and its priority are summarized in **Table 3.3.**

Table 3.2 Progress of post-tsunami housing reconstruction in November 2006 (RADA, 2007, as cited in Silva, 2009)

Province & District	Number of houses required	Number of houses completed	Completed (%)
Western & North Western Provinces	**6,600**	**919**	**14**
Colombo	5,639	347	6
Gampaha	887	498	56
Puttalam	74	74	100
Southern Province	**33,917**	**34,972**	**103**
Hambanthota	3,193	5,997	188
Galle	14,713	13,788	94
Matara	8,216	7,791	95
Kalutara	7,795	7,396	95
Eastern Province	**61,322**	**36,141**	**59**
Ampara	28,349	16,067	57
Batticaloa	22,648	15,294	68
Trincomalee	10,325	4,780	46
Northern Province	**16,488**	**4,555**	**28**
Jaffna	9,140	3,380	37
Mullaitivu	5,457	1,032	19
Killinochchi	1,891	143	8
Total	**118,327**	**76,587**	**65**

Table 3.3 GoSL's main motives and criteria of decision of relocation plan using uniform distance line

Motive	Criteria of decision	Priority of Motive
Match expectation of people	Show disaster situation control	High priority
Vulnerability reduction	Reduce risk exposure	↕
Effective resource utilization	Secure reconstruction budget by aids	Low priority

3.2.1.2. INGO's Motives

GoSL's relocation plan could be implemented because of complete support of INGOs. Therefore, for the analysis of GoSL's relocation decision, INGOs' decision to participate in housing reconstruction should be understood in terms of complex motives and related considerations.

INGO's decision to take part in housing relocation using uniform distance line can be understood with the motive, 'Vulnerability Reduction'. Like GoSL, INGOs aimed to 'Vulnerability Reduction', too. In detail, however, INGOs focused on supporting the most vulnerable people while GoSL focused on entire society. It can be easily found at INGOs mission. For example, International Federation of Red Cross and Red Crescent (IFRC), which had take the responsibility of 15% of housing reconstruction in Sri Lanka, aims to promote the wellbeing of vulnerable people by its vision and mission as below (Vaes & Goddeeris, 2012; IFRC, 2008).

IFRC Vision - *To conquer vulnerability created by humanitarian emergencies and promote humanitarian values*

IFRC Mission - *To promote the health and wellbeing of vulnerable people and to extend humanitarian assistance in times of natural and manmade disasters, through mobilization of volunteers and communities irrespective of religion, class, caste, gender, race, ethnicity, according to the humanitarian values and ideals of the Red Cross and Red Crescent Movement. (IFRC, 2008)*

On the other hand, at the initial housing policy, GoSL planned to give one new house for each destroyed house. Because this policy didn't consider the number of owned houses, it included some people who had several houses (Vaes & Goddeeris, 2012). So, for appropriate and equitable assistance in accord with INGO's motive, INGOs tried to apply additional assessment for beneficiary identification based on population size, damage levels and needs. In this respect, GoSL's relocation plan using uniform distance line did not correspond with INGOs' motive to reduce vulnerability. Regarding the motive 'Vulnerability Reduction', INGO's criteria of decision was to 'Help the most vulnerable people'.

The motive of 'Effective Resource Utilization' became another main motive of INGOs. It is because INGOs, like GoSL, had only limited amount of budget for specific reconstruction project. To maximize the impact of limited budget, for example, IFRC had tried to improve design by feedback at the meeting with community (IFRC, 2007). It was another example of this motive that Belgian Red Cross FL's tried to enhance effectiveness of budget by selecting appropriate relocation site within GoSL's list of possible sites (Vaes & Goddeeris, 2012). On this criterion, uniform distance relocation was not preferred to subdivided distance relocation plan as well. For this motive, INGO's criterion of decision was to 'Invest Budget Effectively'.

Finally, another significant motive of INGO was the motive to 'Match Expectation of Donors'. In spite of other contrary motives to GoSL's uniform distance relocation plan, INGOs decided to undertake reconstruction in relocation site to meet this motive,

'Matching Expectation of Donors'. For INGOs with little or unstable funding, disasters have become an important opportunity for fund-raising, and participation in disaster work is thus crucial to profile (ADB, 2005; Lyons, 2009). In Sri Lanka, funding for reconstruction was not the major challenge because of unprecedented concentration of funds with unusually high proportion of private donors after the 2004 Indian Ocean Tsunami (Belgian Red Cross–French Speaking Community, 2009; UN-Habitat, 2011). Therefore, INGOs felt pressure to show the result of project for continuous fund raising rather than securing fund only for Sri Lanka case (IFRC, 2007). It was the same situation for all INGOs participating in recovery after the 2004 tsunami. In the recovery of Indonesia, for instance, according to Steinberg (2007), many of INGOs such as Red Cross, Oxfam, Care International, and many others had expanded their initial commitment from emergency aid to reconstruction despite it was not their traditional field of specialization, as they met an unprecedented flow of funds. However, as fund was available and housing reconstruction was seen as the biggest basic need, INGOs felt obliged to engage in housing sector (Steinberg, 2007). In Sri Lanka, according to UN-Habitat (2011), among 500 new agencies had arrived in Sri Lanka, about 100 agencies developed housing component even though more than 75% of agencies didn't have any experience in housing. In such contexts, INGO thought 'Taking part in housing reconstruction' as criteria of decision for decision-making.

In terms of INGOs' motives, participation in subdivided distance plan was desirable decision because it was possible to focus on more vulnerable people with limited budgets. However, in the actual decision, INGOs decided to participate in uniform distance relocation plan due to strong motive to take part in housing reconstruction. Unprecedented concentration of aids after the 2004 tsunami made INGO's participation itself unclear. It was exceptional situation because the government strongly requires the support from INGOs in ordinary cases. Eventually, INGOs' participation in GoSL's relocation plan using uniform distance line was the result of one strong motive, 'Matching Expectation of People' even though the decision was not consistent with other two motives. It reveals that 'Match Expectation of Donors' was top priority of three motives. This priority can be found at the case of Belgian Red Cross FL as well. When

the reconstruction project was decided, donors' liability was considered as top priority for Belgian Red Cross FL. According to the report of Belgian Red Cross FL (2012), "*The RC/RC initially chose for a donor driven solution claiming this was the only way to limit donor liability in construction. It is stressed that this is not the case and that owner driven housing construction can be done perfectly without any responsibility for the funding party*". It shows that the selection of construction methods depended on only donor's liability. There was possibility that different priority of motives was applied to decision making by other INGOs in Sri Lanka as well. However, there are only limited documents showing internal consideration for decision-making during disaster situation, and Belgian Red Cross is one of them. Fortunately, Red Cross took the largest part of housing reconstruction in Sri Lanka, and the overall trend of INGOs' decisions in the macro scale process of housing reconstruction was correspond to Red Cross's priority.

Regarding priority between other two motives, 'Vulnerability Reduction' and 'Effective Resource Utilization', 'Vulnerability Reduction' can be considered as high priority. Belgian Red Cross FL felt the pressure to promote reconstruction quickly by GoSL because it started reconstruction relatively late, 6 months after the tsunami. For that reason, Belgian Red Cross FL felt the need to show the capability and willingness to undertake relocation work to GoSL. Because GoSL was not keen to give land to INGOs unless INGOs showed the start of work, Belgian Red Cross FL conducted unnecessary soil tests for expected sites only for showing the capability to GoSL as described in their report as below (Vaes & Goddeeris, 2012).

> *"We decided to organize a soil test in each land that would be allocated to us in the near future only to show the Government that something was happening. This soil test is normally something that is organized by the consultant as he needs to have this information to make the calculations of the foundation. We were able to provide the consultant a complete report of the soil test before the design phase even got started. However, the three soil tests were done without any result as the land got taken away" (Vaes & Goddeeris, 2012)*

Despite they knew that it will be the waste of budget because the project site was not fixed, they put the motive to help the most vulnerable people ahead of effective resource

utilization. In sum, the priority among motives of INGOs can be defined in the order of 'Match Expectation of Donors', 'Vulnerability Reduction' and 'Effective Resource Utilization'. INGO's motive, criteria of decision in decision-making and its priority are summarized in **Table 3.4.**

Table 3.4 INGO's main motives and criteria of decision of participation in housing relocation plan

Motive	Criteria of decision	Priority of Motive
Match expectation of donors	Take part in housing reconstruction	High priority
Vulnerability reduction	Help the most vulnerable people	↕
Effective resource utilization	Invest budget effectively	Low priority

3.2.2 Analysis of Interactive Decisions

The GoSL's decision to relocate house within uniform distance line resulted in divergence of long-term recovery process from the expected direction. However, this key decision of GoSL cannot be analyzed separately from INGOs' decision to take part in housing reconstruction. Therefore, analysis framework for interactive decision-making process by players with multifaceted motives is needed for the exact analysis of causes. In this research, it is considered as a game between two players who tried to select preferred option through the interactive decision-making. First of all, possible option as a set of both actors' decisions will be defined. Preference ranking of possible options can be evaluated based on the multifaceted motives. For that, three preference rankings by

each motive's criteria of decision will be decided. Then, these results will be taken together based on the priority of motives. Interactive decision-making process using each player's preference will show the reason why players made actual decisions inconsistent with long-term objective.

Possible options for GoSL at planning phase can be considered as two options: relocation with uniform distance line, and relocation with subdivided distance line even though it will take some time to survey the damage situation. Immediately after disaster, about 65% of people were reluctant to return to their original place (The Government of Sri Lanka & Development Partners, 2005). In that situation, GoSL could not exclude the relocation plan. Unlike emergency relief works, INGOs were strongly influenced by GoSL in housing reconstruction through plan and regulation. It was totally impossible to make plan for permanent housing by INGO itself. Therefore, INGOs' possible strategies are only participation or not within the given condition by GoSL. In the reality, INGOs joined to the government's relocation plan using uniform distance buffer zone area. However, it was incompatible decision with INGOs' all motives. To meet those motives, it could be considered as possible option that INGOs ask government to develop subdivided distance criteria for relocation even if it takes some time to make plan. Based on that, four possible decision sets can be defined as **Table 3.5**.

Table 3.5 Possible decision sets at the housing relocation planning

Decision Set	GoSL's decision	INGO's decision
(a)	Uniform distance line Relocation plan	Participate in
(b)	Uniform distance line Relocation plan	Not Participate in
(c)	Subdivided distance line Relocation plan	Participate in
(d)	Subdivided distance line Relocation plan	Not Participate in

3.2.2.1. GoSL's Preference

Each decision sets can be evaluated according to motives of GoSL. First of all, in terms of 'Match Expectation of People' motive with high priority, the criteria of decision to show disaster situation control will be applied to evaluate preference of possible decisions. Based on 'quick response to control situation', decision set (a) {*Uniform distance relocation, Participate in*} is the most preferred case because it is the quickest way to make plan as well as implementation. However, even though planning was quick, it was impossible to implement quickly without INGOs support. Therefore, decision set (c) {*Subdivided distance relocation, Participate in*}, which might delay the start of recovery at planning phase, will be preferred to decision set (b) {*Uniform distance relocation, Not participate in*}, not implemented after planning phase. Finally, decision set (d) {*Subdivided distance relocation, Not participate in*} will be the last option because it takes time without enough implementation capability. Therefore, preference based on this motive is decided as (a)>(c)>(b)>(d).

Secondly, regarding 'Vulnerability Reduction' especially in 'risk exposure reduction' aspect, uniform distance line is suitable decision for minimize tsunami risk exposure. Therefore, the preference depends only on level of risk exposure, which is influenced by only relocation plan of GoSL. Preference order of decision set becomes (a)=(b)>(c)=(d).

Thirdly, for 'Effective Resource Utilization', preference is decided as (a)=(c)>(b)=(d) because the participation of INGOs is preferred option. In the viewpoint of securing budget from external actors, preference is decided by whether support is possible or not. Although the amount of financial support will be changed according to types of planning, both cases are assumed as the same preference because GoSL can get as much as GoSL want at both cases.

When these results are taken together based on the priority of motives, GoSL's preference order of decision sets is decided as (a)>(c)>(b)>(d) like **Table 3.6** below. The most preferred case and the least preferred case are the same as (a) and (d) regardless of motives. However, decision set (b) and (c) shows conflicting preference order according to motives. Between these two options, decision set (c) {*Subdivided distance relocation,*

Participate in} can be considered as preferred case to (b) {*Uniform distance relocation, Not participate in*} because (c) is preferred to (b) in the high priority motive, to show situation control, as well as motive to secure budget. Preference ranking is denoted as from 'A', the most preferred case, to 'D', the least preferred case.

Table 3.6 GoSL's preference ranking on possible decision sets at the housing relocation planning

Decision Set		**Motives** *(Criteria of decision)* *High Priority* > *Low Priority*			**Preference Ranking**
GoSL	INGOs	**Match Expectation of People** *(Show disaster situation control)*	**Vulnerability Reduction** *(Risk exposure reduction)*	**Effective Resource Utilization** *(Secure budget by aids)*	
Uniform distance	Participate	A	A	A	**A**
Uniform distance	Not Participate	C	A	D	**C**
Subdivided distance	Participate	B	D	A	**B**
Subdivided distance	Not Participate	D	D	D	**D**

3.2.2.2. INGO's Preference

INGOs' preference can be decided as same manner. For the motive, 'Match Expectation of Donors' with criteria of decision as 'taking part in housing reconstruction', participation is preferred regardless of planning. Because it was only

initial planning phase, it is considered that there was no difference between plans except project participation itself. Preference order of possible decisions becomes (a)=(c)>(b)=(d).

Secondly, for 'Vulnerability Reduction' focusing on helping the most vulnerable people, participation was preferred not to participate. If INGOs participate in reconstruction, subdivided distance plan will be preferred to uniform distance plan. It is because INGO can concentrate their work to only disaster-affected people by subdivided plan. So, preference is decided as (c)>(a)>(d)=(b).

Finally, according to 'Effective Resource Utilization' focusing on effective budget investment, participation in subdivided plan will be the most preferred case because it is possible to focus on vulnerable people. In the viewpoint of INGO, non-participation can save the budget at least while participation in uniform distance plan has possibility to construct new houses for unnecessary relocation. Preference order of decision sets becomes (c)>(b)=(d)>(a).

These results can be taken together based on the priority of motives: the order of 'Match Expectation of Donors', 'Vulnerability Reduction' and 'Effective Resource Utilization'. For all motives, the most preferred case was (c) {*Subdivided distance relocation, Participate in*}. Regarding non-participation cases, both will save the budget, but in terms of supporting vulnerable people, these options become the least preferred case. Therefore, INGO's preference order of decision sets becomes as (c)>(a)>(b)=(d) like **Table 3.7** below.

Table 3.7 INGO's preference ranking on possible decision sets at the housing relocation planning

Decision Set		**Motives** *(Criteria of decision)* *High Priority* > *Low Priority*			**Preference Ranking**
GoSL	INGOs	**Match Expectation of Donors** *(Take part in housing recovery)*	**Vulnerability Reduction** *(Help the most vulnerable people)*	**Effective Resource Utilization** *(Invest budget effectively)*	
Uniform distance	Participate	A	B	D	**B**
Uniform distance	Not Participate	D	D	B	**D**
Subdivided distance	Participate	A	A	A	**A**
Subdivided distance	Not Participate	D	D	B	**D**

3.2.2.3. Interactive Decisions

Government and INGOs sequentially made decisions for housing reconstruction at relocation site. They could know each other' decisions through government's policy announcement or MOU for reconstruction projects. This relationship can be represented by extensive form game between two players like **Figure 3.5.**

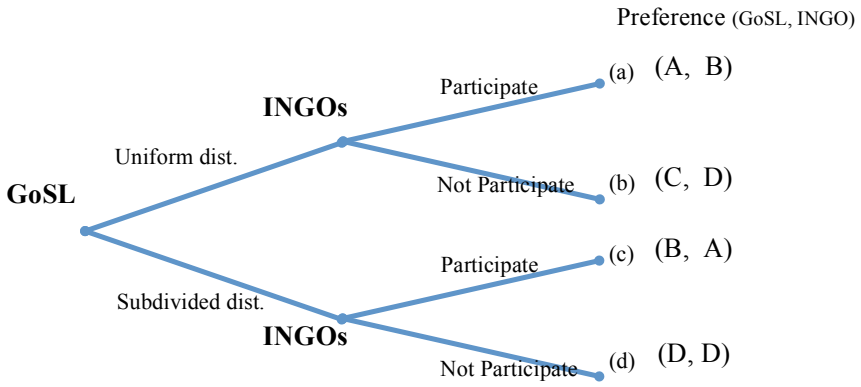


Figure 3.5 Interdependent decision-making between GoSL and INGO on relocation planning in extensive-form game

Actual decisions in Sri Lanka case were decision set (a) {*Uniform distance relocation, Participate in*} as subgame perfect equilibrium. Decision set (c) {*Subdivided distance relocation, Participate in*} is the most desirable decision in consideration of long-term recovery objectives. Actual decision set matched up with GoSL's the best strategy, and desirable decision set was the same with the most preferred decision for INGOs. When backward induction is applied, if INGOs make rational decisions after GoSL's both strategies, INGOs will decide to participate as decision set (a) or (c). When GoSL compared these two expected options, uniform distance relocation became dominant and rational strategy. Therefore, GoSL decided the uniform distance relocation plan. Then, INGOs made the decision to participate in because it can correspond with two motives, vulnerability reduction and match expectation of donors, in spite of inconsistency with the motive of effective budget utilization.

However, there was possibility to obtain desirable outcome, decision set (c) {*Subdivided distance relocation, Participate in*}, if INGO adopted different decision based on GoSL's strategy. In this case, GoSL strongly depended on INGOs' participation to implement massive relocation. Therefore, "Threat" strategy can be considered as possible option for INGOs to declare that '*INGO will not participate in uniform distance relocation because of negative impacts of forced relocation, and INGO will participate if GoSL adopts subdivided distance plan*' like **Figure 3.6**.

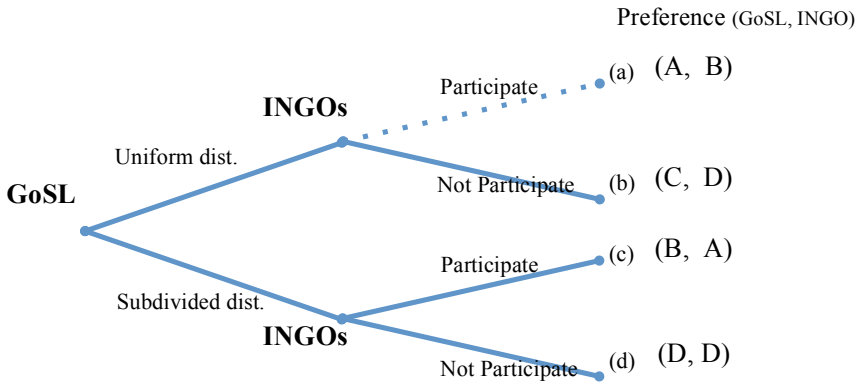


Figure 3.6 Interdependent decision-making between GoSL and INGO on relocation planning in extensive-form game when INGO declares not to participate in uniform distance plan

In this case, GoSL had to adopt subdivided distance criteria for securing reconstruction budget because GoSL could not meet both of motives, quick response and securing budget, without INGOs' participation. Therefore, GoSL had to compromise original plan as the rational strategy. For INGOs, it was reasonable action because INGO could get its best outcome, decision set (c) {*Subdivided distance relocation, Participate in*}, by doing so. It could be considered as credible threat. In the actual example, UN-Habitat had lobbied GoSL to revise the initial relocation plan as soon as the plan with uniform distance criteria introduced. However, it didn't work well (UN-Habitat, 2011). Therefore, the reason why there was no credible threat of participation by INGOs should be considered for practical solution.

The reason why threat could not be made was the competition among INGOs for undertaking recovery work. Because of concentrated funds, among 500 new agencies arrived in Sri Lanka, 100 agencies had developed housing components into their programs (UN-Habitat, 2011). It induced exceptional competition for participation. Limited role of coordination agency for housing reconstruction became another reason. As a partnership of various players in reconstruction, the Inter-Agency Standing Committee (IASC) was established for key UN and non-UN partners in 1992 (Jha et al., 2010). However, there was no global cluster for permanent housing. Even though IFRC acted as a convener of Global Cluster in Emergency Shelter for Disaster situation, its role

was limited. In the context of strong motive for fund raising, exclusion of other INGOs in recovery work gives position of advantage in fund raising. So, it prevented voluntary coordination among INGOs. Eventually, INGOs lost the change to enhance payoff by credible threat for GoSL.

In terms of cooperative relationship between GoSL and INGO, competitive situation among INGO for participation caused GoSL's dominating position in cooperation. As INGOs competed each other to secure the recovery work, GoSL didn't feel the necessity for consultation with INGOs in initial planning. It hindered that a wealth of experience and knowhow of INGOs in housing field redeem the limited planning capability of GoSL. It shows that even favorable conditions such as enough funds and participation of external agencies can hamper the process according to the interdependent relationship.

3.2.3 Conditions to Improve Decisions

GoSL's relocation plan using uniform distance line left long-lasting negative impacts on housing recovery process. GoSL's decision was directly caused by lack of recovery planning capability, political considerations and regulation failure experience. At the same time, in terms of interactive relation with INGOs, it was because INGOs, who had long-term view, lost the chance to lead GoSL to adjust inadequate plan through the threat on participation. The reasons why INGOs couldn't threat GoSL were limited capability of coordination system for housing field and competitive participation of INGOs.

In the viewpoint of long-term vulnerability reduction, the decision set (c) {*Subdivided distance relocation, Participate in*} was the most desirable case. There can be two approaches to change actual decision. In the previous researches, adjusting direct motive of decision-maker in normative approach was considered. In this research, finding conditions for changing decision is presented in terms of interactive decision-making process.

For shifting actual decisions to desirable one, most previous researches suggested normative solution for single decision-maker to change motive or considerations directly

related to decision (Ingram et al., 2006; Coles & Zhuang, 2011). However, normative solution considering only direct motive cannot be enough to change the actual decision because one decision is the outcome of internal and external conflict of various motives. In the case of GoSL's decision on relocation plan, it can be one of representative normative solutions that policy makers' recognition that forced relocation should be minimized and planned carefully by consultation with people. However, it has two limitations in practicability. Firstly, when it is considered that developing countries have only limited capability to prepare unexpected large-scale disasters, it is impractical solution to expect such know-how to cope with all possible large-scale disasters in advance. It means there is still enough possibility to repeat the same mistakes in recovery policy-making at other developing countries. Secondly, even though GoSL could know the importance of considering various aspects in vulnerability through knowledge sharing, it can still conflict with another motive to match people's expectation. It means that only knowledge of necessity to make plan prudently cannot guarantee of changing decision. Because tsunami-affected people are very much concerned about the future tsunami risk especially immediately after the disaster, the government, which has strong motive to match people's expectation, can make massive relocation plan to meet the people's strong demands for relocation despite the knowledge on its limitation.

In this research, conditions for changing decision in terms of interactive decision-making process are considered. When GoSL's dependency on INGO is considered, it can be a practical solution that INGOs make GoSL to improve plan. In the game theory, credibility in threat can be introduced by change of player or change of payoff system (Shin, 2002). Therefore, introduction of 'permanent coordination system among INGOs in housing field' can be a motive-compatible solution.

Firstly, it can change the player in negotiation with the government. As a unified player, coordination system of INGOs can pursue maximizing payoff for overall INGOs and lead GoSL to improve recovery plan. Previous existing partnership or coordination system was mainly built among UN agencies, and it mainly focused on emergency relief works (Jha et al., 2010). For that reason, in the field of housing reconstruction, INGOs participate in reconstruction as limited role to supplement lack of government's

capability under the government-driven policies. Reflection of INGO's experience was entirely determined by the government's will and judgment. That is why previous researches and report have concluded their findings in the form of advice for policy-makers of the government. However, under the coordination system including INGOs in housing fields, more active approach to request policy improvement can be possible. Moreover, as a unified single player of external agencies, reduction of planning time will be possible by effective cooperation as well.

Permanent coordination system in housing field can prevent competitive participation of INGOs, which became another cause of GoSL's hasty planning. Previous partnership between disaster-affected countries and INGOs was usually one-off cooperation. Except some INGOs operated for long-term period in a country, most of INGOs cooperate with specific government only for limited period of recovery because of one large-scale disaster. In this point of view, it is difficult to prevent INGOs to compete with each other for increasing their own payoff. There can be high probability of repeating such competitive situation even in different disaster recovery process. Competitive situation among INGOs in Indonesia after the 2004 tsunami is one of examples (Steinberg, 2007). However, it is possible to change payoff system of INGOs through permanent coordination system, which continued even after one disaster recovery. Unlike the single game between the government and INGOs for a specific disaster, permanent cooperation system between housing field INGOs for several large-scale disasters all over the world will be repeated games. Based on this feature, competitive participation immediately after disaster can be restricted by coordination system's penalty on competitive participation. If competitive participations were restricted in Sri Lanka, INGOs could make a credible threat on participation to lead GoSL.

These two approaches are divided by whether a solution is based on decision-maker's direct motive or interactive relationship. The normative approach focusing on direct motive for problematic decision had shown the limitation in actual change of decision because multifaceted motives and complex interactive relation with cooperative partners determined the decision. Such limitation explains why normative solutions for

improve decisions in recovery process were not easily implemented at different disaster cases in spite of knowledge sharing. On the other hand, interactive decision-based approach can open up new possibilities to improve decisions in the long-term recovery. This research suggests the change of not decision-maker but cooperative partners, who want to different decision. Therefore, consideration of cooperative partners' role based on cooperative relationship can be the motive-compatible and practical solution for improving decision.

The applicability of suggested solution can be checked focusing on motive-compatibility. Motive compatible solution should make the condition that when all players try to match their own motives at each phase, long-term recovery goals can be achieved as subgame perfect equilibrium.

In the context of Sri Lanka after the 2004 tsunami, INGOs could have the motive to establish the permanent coordination system among INGOs in housing field to avoid their own loss by GoSL's failure of policy-making. Such coordination system should be permanent one, which can last even after recovery from a disaster, to prevent competitive participation of INGOs by penalty. Permanent coordination system can play the role as unified representative that can make a policy consultation in a short time. It can prevent the loss of power of negotiation as well. If permanent coordination system was adopted in the same condition of Sri Lanka, INGOs could induce GoSL to make more INGOs' motive compatible decision using the threat not to participate in uniform distance relocation. GoSL could select their best option as subdivided distance relocation from the remained options. It shows that introduction of permanent coordination system can prevent the failure of initial recovery policy by motive-compatible options for all players.

3.3 Analysis of Decision on Projects Withdrawal

Another key decision of INGO, 'temporary or permanent withdrawal of projects', will be analyzed with contexts of implementation phase in Sri Lanka. It was gradually occurred between the introduction of buffer zone in January 2005 and announcement of new housing policy in May 2006.

In the case of Sri Lanka, several problems were revealed during implementation of housing reconstruction. Main issue was slow progress in relocation. One of reasons was the scarcity of appropriate land for relocation, which was mainly caused by hurried decision for relocation using uniform distance criteria, the first key decision (The Government of Sri Lanka & Development Partners, 2005). Even though there are many government-owned sites, only limited number of site was appropriate to live in. Additionally, another reason for slow progress was that some INGOs, which pledged participation in housing reconstruction, withdrew their projects before completion of mission (Silva, 2009). In terms of pledge's number, only 8% had been completed until 1 year after disaster and 18% had been completed until 2 years (Harsha et al., 2007). Therefore, INGOs' withdrawal of projects can be considered as another key decision during implementation that led limited outcome of housing reconstruction. However, INGOs' withdrawal of projects was closely related to frequent change of relocation criteria. Because GoSL's relocation plan became prerequisite for relocation project, whether GoSL change the criteria or not was very important consideration factor for INGOs. These two interdependent decisions will be analyzed.

Slow progress of INGO-driven housing reconstruction resulted in delay of whole housing recovery in Sri Lanka. Because INGO-driven reconstruction was about 30% of overall housing projects, it hampered effective and timely allocation of resource for housing reconstruction. If INGO declared the stop of project clearly, it would be better to cope with such interruption in time. In Sri Lanka case, housing reconstruction in relocation site was completely depended on INGO's capability, it was hard to check the alternatives before INGOs declare its withdrawal.

In consideration of negative impact on overall recovery process by withdrawal of projects, another possible decision at the same condition can be considered as an alternative. If INGOs progress projects as initially planned, housing reconstruction could be finished much earlier. So it can be considered as the desirable decision for INGOs in terms of long-term objective. However, for that decision, GoSL had to keep the criteria for relocation.

Regarding consideration of keeping criteria as desirable decision of GoSL, there can be different views because initial relocation plan didn't reflect actual inundated distance or local communities' condition. GoSL didn't have enough suitable sites for relocation. Although the revision of relocation itself can be appropriate decision regarding relocation sites, there was a trade-off between positive effect and negative effect because of projects in progress. In this research, however, changing relocation criteria is evaluated as a negative decision. Although there were several positive aspects by revising criteria, negative impact by frequent change of criteria was much significant. When relocation criteria were reduced during implementation, GoSL could cope with the problems by lack of sites. On the other hand, it resulted in waste of budget for housing reconstruction that was already invested. Moreover, overall delay of investment by possibility to change the criteria left negative impact on the society at large. Therefore, this research considered keeping the relocation criteria as desirable decision at this phase.

3.3.1 Motives and Criteria of Decision in Changed Context

Although the composition of motives will not changed during recovery process, specific criteria of decision can be changed according to new information, relationship, or result of previous decision. Therefore, before the analysis of another decision, there is necessity to check what factors were changed between these two decisions. Before analysis of next decisions and motives, changes in context until about one and half year after disaster should be reviewed. It is because change of internal and external condition results in change of motives in recovery process. In here, internal change means change

in cooperative system itself, and external change means changes in outside of cooperative system.

First of all, internal change can be identified. Through initial planning phase, housing projects were allocated to specific agencies. It means that competitive situation among INGOs, which played important role in defining of initial phase, disappeared in the second phase. Before housing projects are allocated to each INGO, other motives such as vulnerability reduction or effective budget utilization were not clearly considered in decision. As INGO's participation is confirmed, there can be possibility to change the priority of motives. For GoSL, after confirmation of INGO participation, interdependence between GoSL and INGOs was deepened because GoSL's outcome in housing reconstruction depend heavily on INGO's performance in construction.

Regarding changes in external condition, firstly, lack of feasibility in initial relocation plan was revealed through implementation. Assessment of coastal hazards and tsunami impacts revealed inappropriateness in initial relocation criteria (Samaranayake, 2007). Lack of suitable land for relocation became direct reason of policy revision (IFRC, 2006). Moreover, another earthquake of magnitude 8.6 on 28 March 2005 without tsunami raised a question on objective of buffer zone (Hyndman, 2009).

Secondly, resumed civil war in December 2005 hampered progress of recovery projects. Even before the tsunami, there had been ethnic conflict. However, where tsunami impacts are concentrated in was the place with a preponderance of minority ethnic groups, Muslim and Tamil (Silva, 2009). Minority groups had complaints for longer relocation distance for their habitation. Different distance for relocation itself cannot be considered as the evidence of discrimination because the impact by tsunami was corresponding with relocation distance roughly. However, politically distorted allocation of recovery resources was revealed as not just rumor but actual events. Distorted relief resource distribution by political consideration worsened the socio-economic disparities and it led to severe ethnic conflict (Ingram et al. 2006). Civil war was direct cause for delay of recovery in the North and East area.

Thirdly, new president was elected in Nov. 2005 based on worsen disparities during recovery. According to Hyndman (2009), new president, Mahinda Rajapakse, quickly distanced himself from the previous presidency by changing his predecessor's government tsunami response body from the Task Force to Rebuild the Nation (TAFREN) to the Reconstruction and Development Agency (RADA). Regarding another earthquake without tsunami in 2005, the Former President Kumaratunga stated that it was a logical rationale for the buffer zone, on the other hand, a former minister of opposition party said that the buffer zone would be ineffectual (Hyndman, 2009). Then, through RADA, new president Rajapakse announced in Feb. 2006 that the buffer zone would be relaxed. (The Sunday Times, 2006, as cited in Hyndman, 2009)

3.3.1.1. GoSL's Motive

Change of internal and external conditions led to the change in criteria of decision in each motives. While GoSL was not decision maker of project withdrawal, GoSL's revision of relocation policy influenced INGOs' decision. GoSL's relocation policy revision can be considered by complex motives.

The most significant change in motive, 'Vulnerability Reduction', was that GoSL started to take various aspects of vulnerability into account based on scientific assessment and revealed limitation in relocation implementation. As the evidences that reveal lack of feasibility were accumulated, assessment of socio-economic impacts by forced relocation was reflected to reconsider the guideline for development in the coastal zone (Samaranayake, 2007). It became the basic reason for relocation policy revision. By policy revision, people who lived inside the 'old' but outside the 'new' buffer zone could rebuild their homes on their own land (UN-Habitat, 2011). Regarding the motive 'Vulnerability Reduction', GoSL's criteria of decision was changed from 'Risk exposure reduction' to 'Reduce socio-economic vulnerability' throughout the implementation.

On the other hand, change of relocation criteria was not consistent with another motive, 'Effective Resource Utilization'. GoSL suffered from budget constraint even to provide infrastructure at relocation site (Belgian Red Cross–French Speaking

Community, 2009). If on-going relocation projects were stopped by criteria change, it could induce the problem in keeping external aids. For GoSL, in order to support all people who need new houses, more budgets was required. Therefore, GoSL had the motive to secure as much as budget through external aids. In this motive, GoSL's criteria of decision became to 'Keep budget by aids', and keeping initial criteria for relocation becomes reasonable choice. Nevertheless, relocation policy was revised. It shows that GoSL put other two motives before 'Effective Resource Utilization'.

Finally, the motive for 'Match expectation of People' played a role as a trigger that led to practical policy change. An accumulated complaint was revealed as change of the regime through the presidential election in 2005. Therefore, new regime had the strong motive to solve accumulated problems in recovery. The Revised Tsunami Housing Policy was released in May 2006. Through this revision of housing policy, suspended projects by INGOs were changed to GoSL-driven reconstruction. At the same time, total number of housing support was expanded from 98,525 to 120,000. Such change can be understood as the intention to keep political influence by showing new regime's capability to progress reconstruction to people (RADA, 2006). For the motive to match expectation of people, GoSL thought 'Progress reconstruction quickly' as criteria of decision for decision-making.

GoSL's priority of motives can be inferred. First of all, regarding changing the initial criteria, GoSL put 'Vulnerability Reduction' and 'Matching Expectation of people' above 'Effective Resource Utilization'. Basically GoSL's actual decision to change relocation criteria was consistent with two motives, 'Vulnerability Reduction' and 'Match Expectation of People'. In details, GoSL started to take various aspects of vulnerability including shortage of suitable site, problems in livelihood by forced relocation, and so on into account, while GoSL had considered only risk exposure reduction at initial phase. It made GoSL reconsider uniform distance relocation. Political consideration was also one of direct causes to make GoSL decide to revise relocation criteria. On the other hand, keeping the initial policy was corresponded with only 'Effective Resource Utilization'. It was considered as less important motive than other two motives.

Regarding priority between 'Matching Expectation of people' and 'Vulnerability Reduction', 'Matching Expectation of people' can be considered as high priority because after the revision of relocation criteria, GoSL gave people the chance to decide whether relocate or not. In the aspect of vulnerability reduction, it was desirable for GoSL to suggest clear new criteria based on scientific information. However, GoSL gave the chance to people to select whether relocate or not. It showed that GoSL concerned resistance of people on changing criteria than vulnerability reduction. GoSL, moreover, had not taken the original sites of people who selected relocation even until 2012 (Vaes & Goddeeris, 2012). Such lack of enforcement induced problems in resource allocation. This also can be interpreted as GoSL's worry about people's resistance as well as lack of implementation capability. There was another example that matching people's expectation was considered significantly. Before change of the regime in Sri Lanka, an earthquake of similar magnitude and near the epicenter of the 2004 tsunami occurred without tsunami, and the occurrence of earthquake became a logical rationale for the buffer zone (Hyndman, 2009). However, the same fact was interpreted in totally different way, as a rationale for revising buffer zone after the regime change. In here, different interpretation was not based on new information such as impact distribution or assessment of risk. Merely same information was differently interpreted. Therefore, the fact that buffer zone was revised based on just different political standpoints, it showed GoSL put 'Match Expectation of People' before 'Vulnerable Reduction'. Strong political motive can be found at the description on situation of Hyndman below.

> *"The buffer zones proved to be a political hot potato for President Chandrika Kumaratunga, whose term ended in November 2005, at which time her then Prime Minister, Mahinda Rajapakse, was elected President of Sri Lanka. Rajapakse quickly distanced himself from the Kumaratunga presidency, first by changing his predecessor's government tsunami response body from the Task Force to Rebuild the Nation (TAFREN) to the Reconstruction and Development Agency (RADA). Then, through RADA, he announced in February 2006 that the buffer zone 'set back standards' would be relaxed and that the setback standards of the Coastal Zone Management Plan of 1997 would be revived (The Sunday Times 2006)." (Hyndman, 2009)*

To sum up, the priority among motives of GoSL can be defined in the order of 'Match expectation of people', 'Vulnerability reduction' and 'Effective resource utilization'. GoSL's motive, criteria of decision in decision-making and its priority are summarized in **Table 3.8.**

Table 3.8 GoSL's main motives and criteria of decision of keeping initial criteria of relocation

Motive	Criteria of decision	Priority of Motive
Match expectation of people	Progress reconstruction quickly	High priority
Vulnerability reduction	Reduce socio-economic vulnerability	↕
Effective resource utilization	Keep budget by aids	Low priority

3.3.1.2. INGO's Motive

Regarding INGOs' decision for temporary and permanent withdrawal of housing projects, three different motives were analyzed based on literature review. Unlike GoSL, conditions change induced INGO's change in not only criteria of decision but also priority of motive. INGOs' decision to withdraw projects can be considered by complex motives as well.

INGO's decision to withdraw the projects can be understood with the motive, 'Vulnerability Reduction'. As time went on, new vulnerable targets were appeared. Internally, for instance, resumed civil war has shift the attention of INGOs from housing reconstruction to emerging internally displaced people crisis (IFRC, 2008). For INGOs that originally worked in humanitarian aids field, long-term reconstruction can be pushed back on the priority list immediately after crisis. Externally, another disaster such as the

2005 Kashmir earthquake encouraged some INGOs to divert attention to the new flashpoint before they had completed their mission in Sri Lanka (Silva, 2009). In the viewpoint of INGOs, which target disaster-affected people all over the world, emergency response to new disaster can be considered the higher priority than reconstruction of houses at that moment. In Sri Lanka, RADA mentioned that of the total pledge of 3.1 billion USD, only 1.7 billion USD had been actually committed by December 2007 (Silva, 2009). INGO's criteria of decision was to 'Help the most vulnerable people' regarding the motive, 'Vulnerability Reduction'. Although criteria of decision itself were not changed, wider target groups started to be taken into consideration.

The motive that became direct cause for project withdrawal was 'Effective Resource Utilization'. According to project review report of IFRC (2007), the progress of project is evaluated with four areas of efficiency, effectiveness, relevance and sustainability. The first criterion of evaluation is efficiency, "*Have project resources been utilized to achieve the best possible performance?*" (IFRC, 2007). Because of characteristics of housing reconstruction requires long-term investment, housing project cannot redeem already invested budget when project is stopped in the middle. Especially for relocation, changing relocation criteria could result in shutting down on-going housing projects. It means that postponing investment can be the best strategy for INGOs when there is any possibility of project cancellation by the government. It also corresponds with the survey result on INGOs' characteristics which emphasizing short-term accountability. According to Ebrahim (2003), NGOs and funders have focused primarily on short-term 'functional' accountability responses at the expense of longer-term 'strategic' processes necessary for lasting social and political change. It shows the possibility that reconstruction project can be withdrawn to effective resource utilization although it is inconsistent with long-term objectives. Therefore, INGO's temporary and permanent withdrawal was decided in terms of 'Vulnerability Reduction' and 'Effective Resource Utilization'. For the motive, 'Effective Resource Utilization', INGO's criteria of decision was to 'Invest Budget Effectively'.

Finally, criteria of decision in motive, 'Match Expectation of Donors', were changed. After confirming the participation, INGOs' focus was moved from participation itself to

make project's outcomes naturally. IFRC, for instance, describe the changed situation during implementation as below.

> *"The RCM partners are under increasing pressure from the beneficiaries, the GOSL, donors and the media to expedite the projects and demonstrate that their usage of resources within the construction program is effective, efficient and creating adequate results for the Tsunami affected population." (IFRC, 2007).*

To make visible outcomes in housing, reconstruction project should be kept without change of beneficiary lists for new houses. In such context, INGO thought 'Making result of housing reconstruction' as criteria of decision for decision-making.

In terms of INGOs' motives, progress of projects without temporary withdrawal was desirable decision because it was possible to promote delayed reconstruction. However, in the actual decision-making, INGOs decided to temporary or permanent withdrawal of projects due to two motives, to help other vulnerable people and to keep the safety of investment against relocation criteria change by GoSL. INGOs' decision on withdrawal was closely related to GoSL's decision to revise the criteria of relocation. Desirable decision could be selected under the specific condition that INGO progressed its projects and GoSL kept the relocation criteria. In terms of the priority among three motives, INGOs' project withdrawal was the result of both motives to prevent waste of budget and to support new vulnerable people. On the other hand, it was conflicting decision with the motive to make project outcomes.

Regarding priority between 'Vulnerability Reduction' and 'Effective Resource Utilization', 'Vulnerability Reduction' can be considered as high priority. It is because that INGO tried to apply additional criteria to existing GoSL's policy, a house for a house policy, in order to select more vulnerable people during implementation as below.

> *"This house for a house policy was not an easy policy for humanitarian agencies to deal with, as they intend to help the most vulnerable. This meant that a house owner who owned two houses before the tsunami would get two houses and squatters would get nothing. As the government was not willing to change their policy, BRC-FL decided to try and select the beneficiaries who were most in need and entitled for a house, the most*

vulnerable among the house owners. BRC-FL gave priority to people who owned a house inside the buffer zone before the tsunami. Even if people owned two houses before the tsunami, for BRC-FL they were only entitled to one new house. In other words, we made sure that we did not give two houses to the same family. Beneficiary identification through consistent and continuous assessment, monitoring and evaluation of population size, damage levels and needs, should benefit the affected population by providing appropriate and equitable assistance" (Vaes & Goddeeris, 2012)

As the change of beneficiary can led to adjustment of plan and additional expense for assessment of new beneficiary list, it shows that INGO preferred 'Vulnerability Reduction' to 'Effective Resource Utilization'. Therefore, the priority among motives of INGOs can be defined in the order of 'Vulnerability Reduction', 'Effective Resource Utilization' and 'Match Expectation of Donors'. We can find the priority order was changed with previous decision. Although participation was importantly considered than vulnerability reduction or effective budget usage, after confirmation of participation, other motives had higher priority. INGO's motive, criteria of decision in decision-making and its priority are summarized in **Table 3.9.**

Table 3.9 INGO's main motives and criteria of decision of withdrawal housing project

Motive	**Criteria of decision**	**Priority of Motive**
Vulnerability reduction	Help the most vulnerable people	High priority
Effective resource utilization	Invest budget effectively	↕
Match expectation of donors	Make result of housing reconstruction	Low priority

3.3.2 Analysis of Interactive Decisions

For analysis of interactive decisions, possible option as a set of both players' decisions will be defined. Regarding ongoing relocation project, INGOs' possible decisions were to progress project or withdraw it. And GoSL could decide to keep or change the criteria of relocation. Changing criteria meant cancellation of some relocation projects by reducing buffer zone. Therefore, possible strategies can be defined as four combinations of both players' decisions as **Table 3.10** below.

Table 3.10 Possible decision sets at the housing implementation

Decision Set	GoSL's decision	INGO's decision
(a)	Keep criteria of Relocation	Progress Project
(b)	Keep criteria of Relocation	Withdraw Project
(c)	Revise criteria of Relocation	Progress Project
(d)	Revise criteria of Relocation	Withdraw Project

In this case, interactive decision was defined in the viewpoint of housing reconstruction project level between GoSL and INGOs. Long-term recovery such as housing and infrastructure reveals complex aspects including not only 'recovery' but also 'welfare' or 'development'. Therefore, the revision of criteria can be differently interpreted depending on focus. Such aspect was revealed at GoSL's decision to expand the beneficiary of housing program from disaster-affected people to more general vulnerable people in the middle of implementation. However, in this research, analysis objective was limited as cooperative reconstruction of permanent housing and GoSL was

also considered as a player of housing reconstruction. For that case, GoSL's revising criteria can be considered as shutting down target project.

3.3.2.1. GoSL's Preference

In terms of GoSL's preference, first of all, decision set (a) {*Keep criteria of relocation, Progress project*} was the most preferred option regardless types of motives. Project progress without changing criteria was the quickest way to reconstruct houses and possible to secure enough budgets to support disaster-affected people. Regarding 'Match Expectation of People' focusing on quick progress, decision set (d) {*Revise criteria of relocation, Withdraw project*} which both players make the same decision not to implement reconstruction is preferred. On the other hand, stop of necessary project (b) {*Keep criteria of relocation, Withdraw project*} was the worst case. In case of (c) {*Revise criteria of relocation, Progress project*}, while INGO might lost at already invested project, GoSL will prefer this to (b) {*Keep criteria of relocation, Withdraw project*} because GoSL can show the progress to people. Preference is decided as (a)>(d)>(c)>(b).

Based on vulnerability reduction focusing on socio-economic aspects, decision set (d) {*Revise criteria of relocation, Withdraw project*} which both players make the same decision not to implement reconstruction is preferred. Implementation of unnecessary relocation by decision set (c) {*Revise criteria of relocation, Progress project*} was considered as the worst because of lost chance to convert budgets. So, preference is decided as (a)>(d)>(b)>(c).

Finally, in term of effective resource utilization by keeping budgets by aids, Stop of necessary project (b) {*Keep criteria of relocation, Withdraw project*} was considered the worst case. In case of decision set (c) {*Revise criteria of relocation, Progress project*} and (d) {*Revise criteria of relocation, Withdraw project*}, when GoSL decides to revise criteria, both decision sets are considered as the same preference in budget aspect. Therefore, preference based on this motive is decided as (a)>(c)=(d)>(b).

When these results are taken together based on the priority of motives, GoSL's preference order of decision sets is decided as (a)>(d)>(c)>(b) like **Table 3.11**. The most preferred case and the second preferred case are the same as (a) and (d) regardless of motives. However, decision set (b) and (c) shows conflicting preference order according to motives. Between these two options, decision set (c) {*Revise criteria of relocation, Progress project*} can be considered as preferred case to (b) {*Keep criteria of relocation, Withdraw project*} because (c) is preferred to (b) in the high priority motive, to progress reconstruction quickly, as well as motive to keep budget.

Table 3.11 GoSL's preference ranking on possible decision sets at the housing implementation

Decision Set		**Motives** *(Criteria of decision)* *High Priority* > *Low Priority*			**Preference Ranking**
GoSL	INGOs	**Match Expectation of People** *(Progress reconstruction quickly)*	**Vulnerability Reduction** *(Reduce socio-economic vulnerability)*	**Effective Resource Utilization** *(Keep budget by aids)*	
Keep criteria	Progress Project	A	A	A	**A**
Keep criteria	Withdraw Project	D	C	D	**D**
Revise criteria	Progress Project	C	D	C	**C**
Revise criteria	Withdraw Project	B	B	C	**B**

3.3.2.2. INGO's Preference

In this case, it is assumed that investment was already started for housing project so far. Withdrawal case was considered as temporary withdrawal in the viewpoint of INGOs. For all motive, GoSL's cancellation of on-going project by the case (c) {*Revise criteria of relocation, Progress project*} was the worst option for INGOs. In this case, INGO lost the invested budget for relocation as well as the chance to participate in recovery. Unlike emergency relief work focusing relief item distribution, permanent housing reconstruction cannot obtain result in midstream. Therefore, decision set (c) became the worst choice regardless of motives.

In terms of vulnerability reduction, decision set (a) {*Keep criteria of relocation, Progress project*} and (b) {*Keep criteria of relocation, Withdraw project*} are preferred because these are confirmed the necessity of relocation. To cope with uncertainty of criteria change by GoSL, (b) {*Keep criteria of relocation, Withdraw project*} can be considered as the most preferred case for INGOs. The decision to postpone further investment to construction and wait until GoSL confirms that the project will be kept can be reasonable strategy for INGOs in spite of slow progress. It is exactly same with the motive 'Effective Resource Utilization'. Therefore, preference order is decided as (b)>(a)>(d)>(c) in terms of both motives, 'Vulnerability reduction' and 'Effective resource utilization'.

In terms of the motive to 'Match expectation of donors' by making result of housing, decision set (a) {*Keep criteria of relocation, Progress project*} is the most preferred. Among the INGO withdrew cases, (b) and (d), no necessity case (d) {*Revise criteria of relocation, Withdraw project*} was preferred to necessity to construction case (b) {*Keep criteria of relocation, Withdraw project*}. Donor will not expect that INGOs stop to support people in spite of disaster-affected county require continuous aids. Preference is decided as (a)>(d)>(b)>(c).

When these results are taken together based on the priority of motives, INGO's preference order of decision sets at housing implementation is decided as (b)>(a)>(d)>(c) in **Table 3.12** below.

Table 3.12 INGO's preference ranking on possible decision sets at the housing implementation

Decision Set		**Motives** *(Criteria of decision)* *High Priority* > *Low Priority*			**Preference Ranking**
GoSL	INGOs	**Vulnerability Reduction** *(Help the most vulnerable people)*	**Effective Resource Utilization** *(Invest budget effectively)*	**Match Expectation of Donors** *(Make result of housing recovery)*	
Keep criteria	Progress Project	B	B	A	**B**
Keep criteria	Withdraw Project	A	A	C	**A**
Revise criteria	Progress Project	D	D	D	**D**
Revise criteria	Withdraw Project	C	C	B	**C**

3.3.2.3. Interactive Decisions

In the implementation phase of housing reconstruction, GoSL and INGOs made decisions for housing relocation criteria change and progress projects. Both players had to make their decisions without complete information on other actor's decision. At cooperative relationship, one-sided suspension or changing criteria can damage counterpart's payoff. So, GoSL didn't release information on buffer zone criteria change before GoSL determined it. In the same manner, INGOs didn't share information on their

withdrawal. In the viewpoint of INGOs, temporary withdrawal of project could be the best strategy to cope with all possibility. For that reason, GoSL could not confirm that INGO's suspended projects are permanent withdrawal or just temporary delay. This interactive decision can be represented by strategic form game between two players like **Table 3.13.**

Table 3.13 Interdependent decision-making between GoSL and INGO on implementation in strategic-form game

Preference order: GoSL, INGO		**INGO**	
		Progress Project	Withdraw Project
GoSL	Keep Criteria	A, B	D, A
	Revise Criteria	C, D	B, C

Actual decision in Sri Lanka case was decision set (d), {*Revise criteria of relocation, Withdraw project*}, as equilibrium. However, decision set (a), {*Keep criteria of relocation, Progress project*}, which satisfies Pareto optimality, could give better preference ranking option for both players than actual decision set (d), {*Revise criteria of relocation, Withdraw project*}. If GoSL keeps the criteria and INGO progresses project at the same time, it can be considered as desirable decision for both players. However, in the viewpoint of INGOs, the decision to hold project on was the dominant strategy that gives higher payoff regardless of GoSL's decisions, to keep project and stop it. Even though it induces delay of recovery process, INGOs' temporary withdrawal of projects was reasonable decision to maximize its own payoff. For that reason, desirable result was not selected in the reality.

As low feasibility of initial plan was revealed through implementation phase, INGO couldn't be sure of GoSL's will to keep the criteria. According to Centre for Policy Alternatives (2006 as cited in Shaw & Ahmed, 2010), four ministries were issuing different buffer zone regulations in 2005. At the same time, GoSL had the doubts about INGO's fulfillment of expected projects because of delayed progress. It can be considered as a kind of dilemma situation because both players can move to better option (a), keeping progress reconstruction and minimizing revision. Dilemma situation by lack of information sharing among participants hampered cooperative decisions that can achieve win-win solution. It could be achieved by mutual trust based on information sharing regarding their strategies and decisions. Without trust among players, even though outcome is moved to desirable solution, it became unstable. Because at decision set (a) {*Keep criteria of relocation, Progress project*}, INGO can get better option by selecting withdrawal at decision set (b) {*Keep criteria of relocation, Withdraw project*}. Then GoSL can get better option by revise criteria. Therefore, actual decision set (d) {*Revise criteria of relocation, Withdraw project*} will be resulted.

As the reason why trust was not established, dominating position of GoSL in cooperation for housing reconstruction that was resulted by first key decision can be considered. Because of competition among INGOs, GoSL could hold dominating position, and INGO had only limited role in relocation planning. It prevented proper consultation with INGOs. GoSL decided to revise relocation criteria without consultation with INGOs. Lack of information of policy revision induced uncertainty to INGOs. INGOs decided to postpone the implementation to cope with uncertainty. Unlike internal players such as GoSL and affected people, it is important for INGO, an external player in disaster recovery, to keep the motive for continuous investment during long-term recovery process. However, in housing reconstruction of Sri Lanka, uncertainty in changing relocation criteria lowered expected payoff by further investment for housing projects. Moreover, in terms of INGO’s key motive to support the most vulnerable people, GoSL’s beneficiaries selection was inconsistent with INGOs’ criteria. On the other hand, another chance to help vulnerable people by resumed civil war or another international disaster became the reason why many INGOs decided to divert the housing

projects' budget to other works. It led to increase of postponed projects for INGOs. Then, it led to revision of criteria as a kind of vicious cycle.

Within that process, GoSL forced INGOs to take action by threat to deprive the land (Vaes & Goddeeris, 2012). GoSL believed it could motivate INGO to progress construction quickly. However, GoSL's action worried INGOs about possibility of shutting down projects. It resulted only increase of withdrawal as unintended outcomes because GoSL's response was not consistent with INGO's motive. It shows that forced measures to promote recovery without consideration of player's motives can result the opposite effect.

3.3.3 Conditions to Improve Decisions

When the huge impact by INGO's withdrawal on donor-driven recovery is considered, the key issue for sustainability of long-term recovery process can be how to motivate INGOs maintain investment for recovery. The decision to withdraw projects was made based on motives and conditions including accumulated limitations of uniform relocation plan, political regime change, emergence of new vulnerable people and so on. According to the analysis on interdependent relation, dilemma situation by lack of mutual trust among participants hampered cooperative decisions that could achieve win-win solution. Limited information sharing on each player's strategies became the cause of lack of mutual trust.

First of all, normative solution on direct cause of project withdrawal decision can be evaluated in terms of practicability. As the countermeasure to prevent to divert attention to other issues, INGO's long-term commitment focusing on local development especially in housing can be suggested as normative solution (Coles & Zhuang, 2011). However, in the long-term recovery such as housing and infrastructure, INGO's motive to keep investment is influenced by the government's recovery policy that can define INGO's expected payoff by projects. Without proper policy that can meet the motive of INGO to support vulnerable people, INGOs will consider to divert the budget to other fields or

disaster cases to maximize their payoff. In this context, it is hard for INGOs to expect to share their own information on possible strategies willingly as well.

As a motive-compatible solution, the condition that makes INGOs keep the participation voluntarily is needed. Possible solution is the alteration of INGOs' payoff by changing cooperative condition. In the previous case of Sri Lanka, GoSL allocated a whole construction project to one INGO. Except infrastructure construction and beneficiary selection, the motive to share information each other for project was quite low. It led to decrease of information sharing and weaken cooperative relationship as time went on. For this case, departmentalized participation in housing reconstruction based on each player's motive and strength can be the solution. When several players share the responsibility of a project, there is motive to share information voluntarily between partners because it is closely related to achievement their own goals. Moreover, in the viewpoint of INGOs, this option can be preferred because it can give much more project output with the same input. So, departmentalized participation can be motive-compatible approach especially for INGOs' motive to match donor's expectation. Shared responsibility can reduce the uncertainty in cooperation by preventing one-sided change or withdrawal.

This motive-compatible approach was adopted in the housing reconstruction after the Gujarat earthquake in India. For housing reconstruction of 222,035 destroyed houses after the 2001 Earthquake, 37,150 houses are constructed by the public private partnership program. Under the partnership, homeowners contributed their own labor and supplement state housing grant by their saving. NGOs focused on capacity building, and the private sector mobilized their resources and provided management support. Divided roles by each player's strength helped recovery progress. Moreover, Gujarat government could save the budget for long-term recovery by promoting for NGO's participation after finish of their relief work through support half of budget for further rehabilitation projects (Vatsa, 2001; Mishara, 2008). These motive-compatible cooperation approaches could be designed from the understanding of different motives.

From the recovery process aspect, the applicability of this practical solution can be checked whether it is motive-compatible or not in the actual context of Sri Lanka after the 2004 Tsunami. In the actual interrelation, GoSL had the doubts about INGO's fulfillment of expected trust, and INGOs couldn't be sure of GoSL's will to keep the criteria as low feasibility of initial plan was revealed. However, under the shared responsibility for housing project, GoSL could trust INGO because GoSL knew that if INGO didn't implement expected project on time, INGO would receive the penalty from coordination system among INGOs, which was suggested by previous analysis on the first decision. At the same time, because of shared responsibility with GoSL, GoSL can get delayed projects of INGOs underway to some extent. In the viewpoint of INGOs, there is only small possibility to adjust the relocation criteria during project implementation because GoSL will loss their budget as well as INGO's budget when on-going project is canceled by criteria change. These conditions will lead to the mutual trust between GoSL and INGOs. Both players will keep the decision set, {*Keep criteria of relocation, Progress project*}, which satisfies Pareto optimality and gives higher payoff than {*Revise criteria of relocation, Withdraw project*} as the Nash equilibrium.

When the specific condition of Sri Lanka is applied to proposed solutions, it is needed to consider the resumed civil war during the recovery implementation as the important external influential factor. It hampered the progress of housing reconstruction in the northern coasts because of security issue for practitioners. However, when the proposed solutions are considered, more sustainable process can be expected. First of all, by the coordination system among INGOs, postponed area's capability and fund of INGO can be reallocated to other areas. At the reallocated sites, cooperation between GoSL and INGO will be changed as cooperation between INGOs. By such adjustment, INGOs, which worked at the conflict area, can be kept to participate in. As the flexible management of budget, GoSL can save the expected investment in that site, and reinvest it to conflict area after the end of civil war. This win-win solution can be expected based on proposed motive-compatible solutions. Effectiveness review on suggested solutions in terms of actual conditions of Sri Lanka indicates that these two solutions can contribute to motive-compatible process at each phase.

3.4 Summary of Analysis

GoSL's relocation plan using uniform distance line was caused by GoSL's lack of recovery planning capability, political considerations and regulation failure experience. At the same time, in terms of interactive relation for cooperative reconstruction, it was because INGOs lost the chance to stop GoSL from starting inadequate plan in haste through the threat on participation. The reasons why INGOs couldn't threat GoSL were limited capability of coordination system for housing field and competitive participation of INGOs.

Normative solution such as changing the government's direct motive of decision by supplementation of planning experience can be impractical solution because of low frequency of large-scale disasters and limited capability of developing countries. Therefore, credible threat by INGOs can be practical solution to improve government's recovery policy making because INGOs in housing reconstruction field have a volume of experience in recovery planning. In Sri Lanka, the reason why INGOs could not make credible threat was competition among INGOs over the capacity of coordination. Therefore, focusing on motive and interactive decisions, permanent coordination system including INGOs in housing field is suggested to cope with the government's policy failure. As a unified player, more active approach to require policy improvement reflecting INGOs' recovery experience will be possible. Through the permanent system, it can resolve the problems such as competitive participation by one-off participation.

INGO's project withdrawal was caused by response to GoSL's change of relocation criteria to cope with limitations of initial plan. The number of withdrawal, however, was amplified by GoSL's dominant position in cooperation that discouraged the motive to share information on decision. INGO's withdrawal decision was made based on motives and conditions including accumulated limitations of uniform relocation plan, political regime change, and emergence of new vulnerable people.

As direct measure for motives of withdrawal, increasing commitment of INGO for local society can be considered (Coles & Zhuang, 2011). However, when it comes into conflict with other motives such as pursuing budget effectiveness, supporting vulnerable people, it cannot change the actual decision. Stability of long-term project can be secured by increasing expected payoff in long-term investment. In Sri Lanka, uncertainty in policy revision became the main cause of decreased expected payoff from investment. Therefore, to minimize withdrawal of project during implementation, departmentalized participation in housing reconstruction can be considered. Shared responsibility will lead to information sharing for project implementation. Because it can give more project outcomes than single participation case with the same amount of budget, it can prevent INGO's withdrawal by increasing expected payoff by project.

From the recovery process aspect, the applicability of these two practical solutions can be checked whether it is motive-compatible or not. Each solution should make the condition that when all players try to match their own motives at specific time, long-term recovery goals can be achieved as subgame perfect equilibrium.

First of all, INGOs have motive to establish the permanent coordination system among INGOs for housing field to avoid their own loss by GoSL's failure of policy-making. Such coordination system should be permanent one, which can last even after one recovery, to prevent competitive participation of INGOs and withdrawal of project by penalty. Permanent coordination system can play the role as unified representative that can make a policy consultation in a short time. It can prevent the loss of power of negotiation as well.

If permanent coordination system is adopted in the same condition of Sri Lanka, INGOs can induce GoSL to make more INGOs' motive compatible decision using the threat not to participate in uniform distance relocation. GoSL can select the best option, subdivided distance relocation, from the possible options as well. It shows that introduction of permanent coordination system can prevent the failure of initial recovery policy by motive-compatible options for all players.

Under such cooperative conditions, GoSL knows that INGOs will receive the penalty when INGOs withdraw their projects. At the same time, INGOs know the decreased possibility of relocation criteria change because GoSL already adopted subdivided relocation plan. Therefore, mutual trust on project implementation can be possible.

Based on the mutual trust on project implementation, as the second condition for sustainable recovery process, shared responsibility for housing project can be considered. In Sri Lanka, GoSL allocated each complete construction process to INGOs. However, as an alternative solution, role assignment within a project can be applied. GoSL could divide the role and responsibility of project into INGOs, housing specialized agencies and GoSL. The budget for reconstruction can be shared with GoSL. When it is considered the amount of allocated budget from INGOs is fixed, sharing responsibility of budget doesn't make difference in terms of total budget input for GoSL. In the viewpoint of INGOs, it will be motive compatible because it shows much more outcomes, which can match the donors' expectation, with the same amount of available budget. Therefore this option became the motive-compatible for both players.

In the previous interrelation, GoSL had the doubts about INGO's fulfillment of expected trust, and INGOs couldn't be sure of GoSL's will to keep the criteria as low feasibility of initial plan was revealed. However, under the shared responsibility for housing project, GoSL can trust INGO because GoSL knows that if INGO doesn't implement expected project on time, INGO will received the penalty from coordination system among INGOs. At the same time, because of shared responsibility with GoSL, GoSL can get delayed projects of INGOs underway to some extent. In the viewpoint of INGOs, there is only small possibility to adjust the relocation criteria during project implementation because GoSL already adopted subdivide plan by INGO's threat on participation. Moreover, GoSL will loss its budget as well as INGO's budget when on-going project is canceled by criteria change. These changed conditions show the mutual trust between GoSL and INGOs. Based on trust each other, both players will keep the decision set, {*Keep criteria of relocation, Progress project*}, which satisfies Pareto optimality and gives higher payoff than {*Revise criteria of relocation, Withdraw project*} as the Nash equilibrium.

When the specific condition of Sri Lanka is applied to proposed solutions, it is needed to consider the resumed civil war during the recovery implementation as the important external influential factor. It hampered the progress of housing reconstruction in the northern coasts because of security issue for practitioners. However, when the proposed solutions are considered, more sustainable process can be expected. First of all, by the coordination system among INGOs, postponed area's capability and fund of INGO can be reallocated to other areas. At the reallocated sites, cooperation between GoSL and INGOs will be changed as cooperation between INGOs. By such adjustment, INGOs, which worked at the conflict area, can be kept to participate in. As the flexible management of budget, GoSL can save the expected investment in the conflict site and reinvest it to conflict area after the end of civil war. This win-win solution can be expected based on proposed motive-compatible solutions. Effectiveness review on suggested solutions in terms of actual conditions of Sri Lanka indicates that these two conditions can contribute to motive-compatible process at each phase.

When these two key decisions are considered together as a process, the root cause of problems in second decision can be found at the first decision. Both decisions of GoSL's uniform distance relocation plan and non-housing field INGO's participation in housing reconstruction were made under temporary specific condition. However, GoSL and INGO did not consider such temporary condition for cooperative partner's decision at the first decision phase. It became another cause to weaken the sustainability of recovery process.

In terms of recovery process, the failure in initial planning phase had a lasting effect on players' motives. For instance, the government's exclusion of INGOs in initial planning demotivated continuous participation in long-term recovery. It led to decline in outcomes of housing reconstruction. Although GoSL had gradually widened understanding of vulnerability and expanded consultation with INGOs in decision-making, INGOs' withdrawal was not prevented successfully. It shows the importance of the early planning phase for achieving sustainable long-term recovery process.

In the disaster situation, information sharing is generally limited because of time limitation for decision-making and lack of prior information on each other. Moreover, the contents of shared information are limited to ‘Vulnerability reduction’ and ‘Effective resource utilization’, which are stated officially. Therefore, when the unstated motive, ‘Matching expectation of people or donor’, dominates decision, such decision’s motives are easy to be misunderstand by the counterpart. For example, during implementation, both of GoSL and INGO complained about each other's low commitment for reconstruction projects based on the official consent on cooperation at initial phase. Thus, regarding initial relocation planning, the effect of misunderstanding motives on recovery process and difference in considered elements should be analyzed.

Chapter 4
ANALYSIS OF DECISIONS BY SUBJECTIVE GAMES OF RECOVERY PLAYERS

4.1 Methodology

The analysis using classic game theory shows the difficulty of sustainable long-term disaster recovery process. The analysis also indicates the importance of the initial stage of the recovery process since failure in the initial phase had a lasting effect on players' motives in the following phases. For instance, the government's exclusion of INGOs in initial planning demotivated INGOs' continuous participation in long-term recovery and led to the decline in outcomes of housing reconstruction. However, decision-making at the initial stage of recovery process should be conducted under poor conditions such as time pressure to make decision, unformed cooperative relationship, and limited information on the situation. Therefore, the influence of uncertainties on irrational decision-making of each player should be considered in detail.

4.1.1 Subjective Perception

One of revealed features in interactive decision-making process during long-term recovery was misunderstanding of counterpart's motives. In Sri Lanka case, for instance, GoSL announced officially that the reason of hasty introduction of relocation plan using

uniform distance line is to reduce the tsunami risk exposure and prevent uncontrolled reconstruction by tsunami victims in the coasts (Jayasuriya et al., 2006). However, the political motive to show the capability to response quickly was not conveyed to INGOs. Belgian Red Cross, for instance, experienced that relationship with local authorities decreased at the later stages of projects, but practitioners of Belgian Red Cross perceived it simply as losing their initial enthusiasm for permanent housing reconstruction (Belgian Red Cross–French Speaking Community, 2009). Without understanding of such motive, INGO could not expect properly the possibility of changing relocation criteria by GoSL.

On the other hand, when INGOs expanded their field from emergency aids to permanent housing, INGOs mentioned only the motive to meet local needs for new houses (Steinberg, 2007). Another motive to secure temporary concentrated funds was not conveyed to GoSL. Therefore, GoSL couldn't expect the possible change of INGO's commitment for housing project according to temporary conditions. Because GoSL understood INGOs' commitment based on official information, GoSL couldn't prepare the countermeasures to keep the long-term commitment of INGOs.

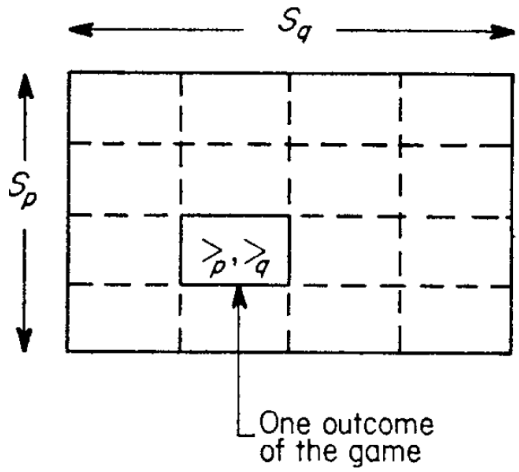
As the causes of such misunderstanding, first of all, limited information sharing condition in disaster situation can be considered. Especially immediately after the disaster, information sharing among players cannot be conducted well. Time pressure to make decision and understand damage prevents information sharing even between players who have cooperated each other before the disaster. Moreover, it is no wonder that the new external players and local players lack enough understanding of each other. When there is time pressure to make decision, some misunderstanding of counterpart's motive or payoff will be inevitable.

Another cause of misunderstanding can be found at the standpoint to keep continuation of organization. This aspect is not well shared by official communication between players in cooperative process, but it strongly influences on decision-making. Therefore, officially unstated motive related to continuation of organization can be considered as another cause of misunderstanding.

As Sri Lanka case shows, misunderstanding occurred in the early phase of long-term disaster recovery. It is important to understand the characteristics of motive misunderstanding between recovery players because of its influence on whole recovery process. However, the classical game theoretic frame cannot analyze subjective perception aspect clearly. For that reason, hypergame approach based on subjective perception of each player will be applied for analysis of decision of initial relocation planning focusing on misunderstanding aspect.

4.1.2 Hypergame Analysis

Hypergame built up from 'classical' game theory, but modified and expanded the game-theoretic framework to represent real-life (Bennett, 1980). It emphasized on problem formulation as the crucial element in decision-making process (Bennett & Dando, 1979). In terms of problem formulation, hypergame approach discarded the basic assumption of game theory that "all players see the same game" (Bennett & Dando, 1979). Based on the actual situation in which players are not correctly informed of each other's strategies and preferences, hypergame deals with different perception on the same strategies, and **Figure 4.1** and **4.2** show the difference in a two-player game and a simple two-player hypergame (Bennett, 1980). **Figure 4.1** shows the classic game in which preference of strategies is defined as one regardless of players. On the other hand, **Figure 4.2** shows that players' games are differently defined according to their own subjective perception in the structure of hypergame. For the same player's strategies set, subjective perception can differently define the other's strategies itself as well as preference of decision sets. The final outcome of games can be decided by the combination of each individual games.



p, q are the players

S_p represents p's strategy set

S_q represents q's strategy set

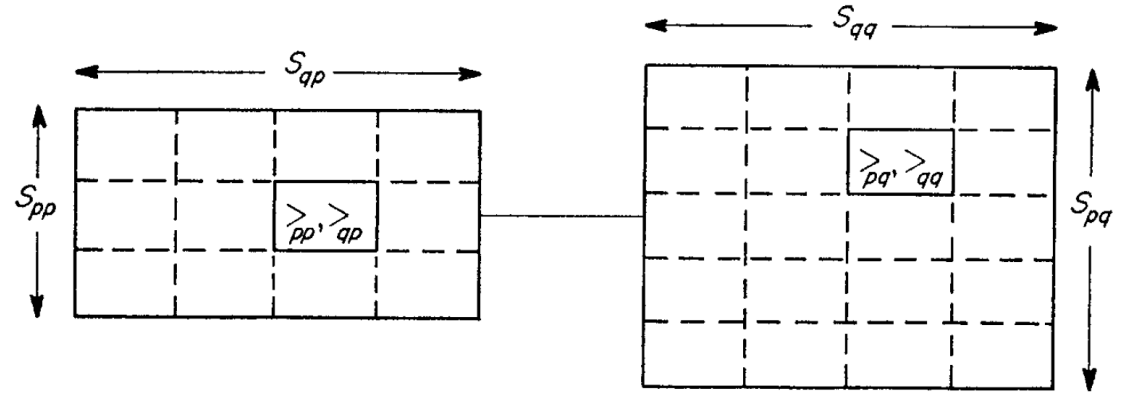
$>_p$ is the ordering of p's preference over the outcomes of the game;

we write $s >_p t$ to means 'p prefers s to t'

(One outcome 'cell' is shown)

$>_q$ similarly denotes q's preference

Figure 4.1 The structure of a two-player game (Bennett, 1980)



Player p's game:

S_{pp} (=S_p) is p's perception of his own strategy set

S_{qp} is p's perception of q's strategy set

Each outcome 'cell' contains an expression of p's preference for that outcome, $>_{pp}$ (=$>_p$) and his perception of q's preference, $>_{qp}$

Player q's game:

S_{pq} is q's perception of p's strategy set

S_{qq} (=S_q) is q's perception of his own strategy set

Each outcome 'cell' contains an expression of q's perception of p's preference for that outcome, $>_{pq}$ and his own perception, $>_{qq}$ (=$>_q$)

Figure 4.2 The structure of a simple two-player hypergame (Bennett, 1980)

In the previous research, hypergame studies dealt with decisions in the context of warfare, business competition, social issue, etc. (Bennett & Dando, 1979; Hamandawana et al., 2007; Bennett et al., 1980).

For instance, according to the research by Bennett et al. (1980), 'soccer hooliganism', one of the social conflicts, can be considered as an interaction between two parties, hooligan fans and authorities. Two involved players form each own individual game based on different perception of the "game" being played. In the viewpoint of the hooligan fans, fans make decision on preference of fans' possible strategies such as "orderly behavior", "play hooligan", and "real hooliganism" according to their expectation on authorities' possible response, "tough response" or "tolerant response". As the decision set, {Fan, Authority}, hooligan fans' the most preferred case is {*Play hooligan, Tolerant response*}, and the least preferred case is {*Orderly behavior, Tough response*}. For the authorities' preference, fans believe that the most preferred case is {*Orderly behavior, Tolerant response*}, and the least preferred case is {*Real hooliganism, Tolerant response*}. Therefore, based on the subjectively perceived interaction, fans will decide to "play hooligan" as their best strategy in expectation of authorities' "tolerant response".

In the same manner, the authorities decide to adopt a "wait and see" policy, observing the fans' behavior and being ready to act if necessary. However, the authorities can perceive fan's playing hooligan, not hooliganism, as "unacceptable behavior", which induce authorities' "intervention". Consequently, fans can do "real hooliganism" when fans think that authorities intervention is "tough response". This interaction process explains that different perception on the same response became the cause of occurrence of unwanted level of violence (Bennett et al., 1980).

Although previous researched focused on conflict situation, it can be applicable to disaster situation especially at the early phase. Subjective perception plays important role in decision of strategies because of conditions in disaster situation such as limited sharing of information among players. This approach can reveal the influence of subjective definition of key concept or criteria on recovery outcomes.

For the analysis using hypergame approach, first of all, strategies of players will be defined according to each player's perspective. Subjective perspective on counterpart's preference order will be identified according to shared information and the characteristics of each recovery player. Individual game based on interpretation of others will be analyzed in the context of each player. By mapping of both individual games, the influence of misunderstanding on recovery process will be discussed. Finally, the practical solution will be discussed.

4.2 Analysis of Individual Subjective Games

Basically, players' strategies are differently defined according to each actor's viewpoint. However, in the case of relocation planning in Sri Lanka, players' possible strategies are limited and relatively clear for both actors. Therefore, decision sets are identically defined for both GoSL and INGO as **Table 4.1** below. It is the same as Table 3.4.

Table 4.1 Possible decision sets at the housing relocation planning

Decision Set	GoSL's decision	INGO's decision
(a)	Uniform distance line Relocation plan	Participate in
(b)	Uniform distance line Relocation plan	Not Participate in
(c)	Subdivided distance line Relocation plan	Participate in
(d)	Subdivided distance line Relocation plan	Not Participate in

As the next step, each player can establish its own individual game based on its subjective perception. First of all, the player's own preference can be considered as same as previous analysis in Chapter 3. GoSL's perspective on INGO's preference, and INGO's perspective on GoSL's preference should be defined according to shared information.

4.2.1 GoSL's Subjective Game

For definition of subjective perception on counterpart's preference, it is needed to clarify the shared information and unshared information between players. First of all, only motive-related information is considered in this research. The criteria to decide shared or not are whether receiver recognizes that information or not. It is because main focus is to constitute the subjective perception. Official information that was published is also considered as shared information. Due to limited data on information sharing in recovery process, some information was inferred based on each player's misunderstanding of counterpart. For instance, INGOs consider minimizing donor's liability as one of important criteria of decision when INGO select the way of participation in housing (Vaes & Goddeeris, 2012). However, such information was not shared with GoSL. Such information was classified according to motives as **Table 4.2** below. It is noted with O / X whether information is shared to GoSL or not.

Table 4.2 INGO's information sharing for cooperation with GoSL

Motive	Criteria of Decision	Related Information	Sharing
Match expectation of donors	Take part in housing reconstruction	Dependency on donation	X
		Minimize donor's liability	X
		Appealing for fund-raising	X
Vulnerability reduction	Help the most vulnerable people	Main target for supporting	O
		Criteria for select target	X
Effective resource utilization	Invest Budget Effectively	Available amount of fund	O
		Available amount of manpower	O
		Capability in housing fields	X

When these factors are not shared with others, it is possible to assume that each player makes decision based on only subjectively perceived counterpart's payoff.

4.2.1.1. GoSL's perspective on INGO's preference

First of all, in the GoSL's perception on INGOs' motives, the motive to 'Match expectation of donors' is not clearly revealed because such information was only mentioned at the internal report of INGOs.

For 'Vulnerability reduction', detailed information of criteria to select target was not shared to GoSL. In the viewpoint of GoSL, this motive can be misunderstood as to help as many people as possible. In actual case, although INGOs tried to figure out more vulnerable people from the initial list of beneficiaries given by GoSL, INGOs didn't point out the fairness problem to GoSL at the early phase of participation because INGO pay more attention to participation itself (Vaes & Goddeeris, 2012). For participation in housing reconstruction, INGOs tried to show their capability to implement reconstruction to GoSL. Therefore, GoSL might perceive 'to help as many people as possible' as INGOs' main consideration factor. In this point of view, decision set (a) {*Uniform distance relocation, Participate in*} is preferred to decision (c) {*Subdivided distance relocation, Participate in*} because more people can be supported by decision (a). Therefore, INGO's preference order of decision sets is perceived as (a)>(c)>(b)=(d) by GoSL.

In terms of 'Effective Resource Utilization', GoSL managed the overall housing reconstruction and each INGO took only small part of responsibility for implementation. Despite INGO thought uniform distance plan as the least preferred case to subdivided distance plan, GoSL might consider that all participation cases are equally preferred by INGOs. Therefore, preference based on this motives will be decided as (a)=(c)>(b)=(d).

Within obviously revealed motives, vulnerability reduction was officially emphasized than effectiveness of resource utilization. For instance, in the project review

report of IFRC (2007), the progress of project is evaluated with four main areas: efficiency, effectiveness, relevance and sustainability as below.

Efficiency – "Have project resources been utilized to achieve the best possible performance?"

Effectiveness – "Have the projects achieved the set objectives?"

Relevance – "Does the project make sense in meeting the long term shelter needs of tsunami affected people, and why?

Sustainability – "Does the project offer the beneficiary an opportunity to reap lasting benefits?" (IFRC, 2007).

Except only efficiency, other three criteria are closely related to vulnerability reduction issue. When these results are taken together based on the priority of motives, GoSL's perspective on INGO's preference order of decision sets is decided as (a)>(c)>(b)=(d) as shown in **Table 4.3.**

Table 4.3 GoSL's perspective on INGO's preference ranking on possible decision sets at the housing relocation planning

Decision Set		**Motives** *(Criteria of Decision)* *High Priority* > *Low Priority*		**Preference Ranking**
GoSL	INGOs	**Vulnerability Reduction** *(Help as many people as possible)*	**Effective Resource Utilization** *(Invest budget effectively)*	
Uniform distance	Participate	A	A	**A**
Uniform distance	Not Participate	D	D	**D**
Subdivided distance	Participate	B	A	**B**
Subdivided distance	Not Participate	D	D	**D**

4.2.1.2. Analysis of GoSL's Subjective Game

GoSL can define GoSL's individual game with GoSL its own preference and INGOs preference perceived by GoSL. Individual game of GoSL is shown in **Figure 4.3**.

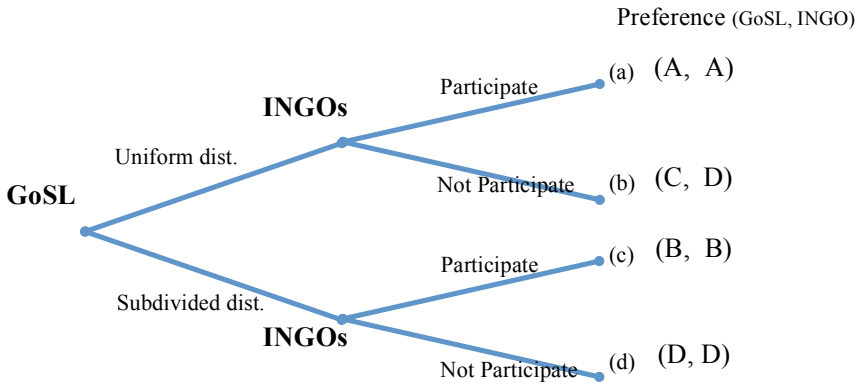


Figure 4.3 GoSL's Individual game with decision-making on relocation planning

In this case, preference of INGO is differently defined, but the outcome itself is revealed as the same with previous analysis using classical game approach, decision set (a) {*Uniform distance relocation, Participate in*}. However, INGO's preference order is differently perceived by GoSL as below.

INGO's preference for that outcome, **(c)** $>_{ii}$ **(a)** $>_{ii}$ (d) $=_{ii}$ (b)

GoSL perception of *INGO*'s preference, **(a)** $>_{ig}$ **(c)** $>_{ig}$ (d) $=_{ig}$ (b)

It indicates that INGO's preference on GoSL's relocation criteria when INGO participate in is differently perceived. It means GoSL might think that INGOs prefer {*Uniform distance relocation, Participate in*} to {*Subdivided distance relocation, Participate in*}. Even though INGO declares the threat as INGO will not participate in

uniform distance plan, it will be incredible threat for GoSL who believes that INGOs prefer {*Uniform distance relocation, Participate in*} to {*Subdivided distance relocation, Participate in*}. This misunderstanding can explain why some INGOs' threat was not successful for GoSL.

4.2.2 INGO's Subjective Game

For identifying INGO's perspective on GoSL's preference, it is needed to clarify the shared information and unshared information from GoSL to INGO. In terms of GoSL's information that was shared or unshared can be listed up as **Table 4.4** below (Vaes & Goddeeris, 2012; I-FREED, 2005). It is noted with O / X whether information is shared to INGO or not.

Table 4.4 GoSL's information sharing for cooperation with INGOs

Motive	Criteria of Decision	Related Information	Sharing
Match expectation of people	Show disaster situation control	Political conflict among parties	X
		Political influence on policy (Possibility of interference)	X
Vulnerability reduction	Reduce risk exposure	Disaster damage situation	O
		Necessity of coastal regulation	O
		Beneficiaries information	X
Effective resource utilization	Secure budget by aids	Required budget for recovery	O
		Site information for relocation	O
		Construction information (Floor plan, etc.)	O

For example, information on beneficiaries was not transferred to INGO at the early phase of reconstruction. Such situation can be found at the description on the project of the Norwegian/Swedish INGO, FORUT, in the Eastern Province.

> *"Various organizations that obtained access to land from the Addalaichennai authorities to build a specific number of houses in Oluvil found that they did not know who they were building for as the Sri Lankan government only made beneficiary lists available after new houses were completed." (Brun & Lund, 2008)*

In the other reconstruction case for 100 houses by collaboration between I-FREED and SUCCESS, GoSL gave the basic information of construction site and floor plan through the official document as **Figure 4.4** (I-FREED, 2005).

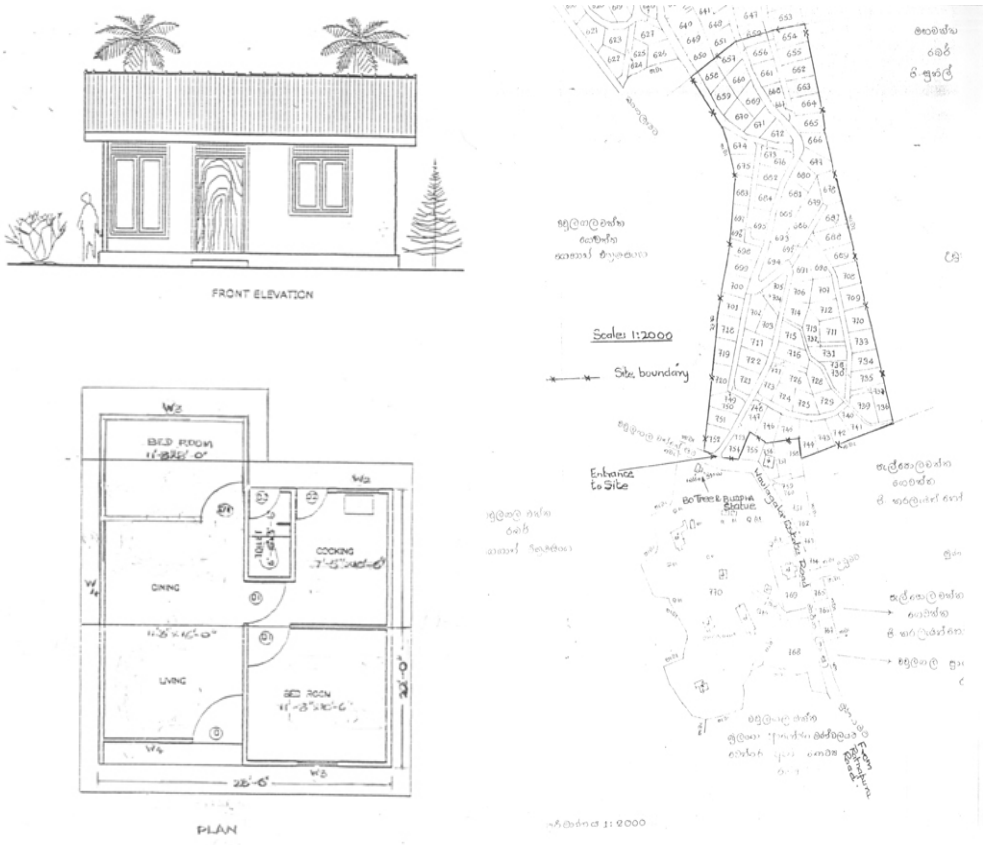


Figure 4.4 Information on the floor plan and sites from GoSL (I-FREED, 2005)

4.2.2.1. INGO's perspective on GoSL's preference

In the INGO's subjective perception, GoSL's political motives are not considered. According to Khasalamwa's research (2009) focusing on post-tsunami interventions in Sri Lanka, the role of political patronage shapes access to resource. In that research, the overprovision of housing in the south was suggested an evidence of inequitable allocation of resources from a national perspective. However, INGOs were hard to be aware of such regional imbalance in resource allocation especially in the early stage of reconstruction because ethnic segregation was not revealed at individual project level.

Regarding 'Vulnerability Reduction', GoSL officially announced that the reason of uniform distance relocation is to prevent repeated failure of coastal regulation (Birkman et al., 2010). Therefore, consideration factor in 'Vulnerability Reduction' is mainly considered as 'enforcing coastal regulation'. In the disaster situation, it is impossible for INGO grasp the necessary information especially on disaster-affected people. The government can deliver information between people and INGOs in general recovery cases. However, because of centralized political structure of Sri Lanka, there was no regional institution to do so (Uyangoda, 2005). Moreover, GoSL didn't share enough information on expected beneficiary with INGOs (Vaes & Goddeeris, 2012). In terms of coastal regulation, preference order is determined according to relocation criteria as (a)=(b)>(c)=(d).

For 'Effective Resource Utilization', information on disaster damage and needs was relatively clearly shared to INGO. Through the official note to all diplomatic missions and international organizations, GoSL officially announce the necessity of external support to construct houses for tsunami-affected people (The Ministry of Foreign Affairs of Sri Lanka, 2005). Through such documents, INGOs could recognize the GoSL's motive to secure reconstruction budget by aids. In the budget aspect, preference of decision sets will be evaluated based on participation as (a)=(c)>(b)=(d).

Within obviously revealed two motives, vulnerability reduction was officially emphasized than effectiveness of resource utilization. At the report of GoSL on reconstruction progress, vulnerability reduction is mainly mentioned as target of disaster

recovery (The Government of Sri Lanka and Development partners, 2005). Guiding principles, which are consented by all players at the beginning of reconstruction, can be another evidence on INGO's perspective on GoSL's preference. Among eight guiding principles, vulnerability reduction is much more emphasized than effectiveness of resource utilization (The Government of Sri Lanka and Development partners, 2005). For instance, vulnerability issue is mentioned directly or indirectly at these principles such as 'Future vulnerability ought to be reduced' and 'Consultation with local affected communities and stakeholders'. On the other hand, only one principle, 'Coordination is essential to maximize benefits and prevent duplication' is related to effectiveness aspect focusing on maximizing impact.

When these results are taken together based on the priority of motives, INGO's perspective on GoSL's preference order of decision sets can be decided as (a)>(b)>(c)>(d) as **Table 4.5.**

Table 4.5 INGO's perspective on GoSL's preference ranking on possible decision sets at the housing relocation planning

Decision Set		**Motives** *(Consideration factors)* *High Priority* > *Low Priority*		**Preference Ranking**
GoSL	INGOs	**Vulnerability Reduction** *(Enforcing coastal regulation)*	**Effective Resource Utilization** *(Secure budget by aids)*	
Uniform distance	Participate	A	A	**A**
Uniform distance	Not Participate	A	D	**B**
Subdivided distance	Participate	D	A	**C**
Subdivided distance	Not Participate	D	D	**D**

4.2.2.2. Analysis of INGO's Subjective Game

INGO can define INGO's individual game with INGO its own preference and GoSL's preference subjectively perceived by INGO. Individual game of INGO is shown in **Figure 4.5**.

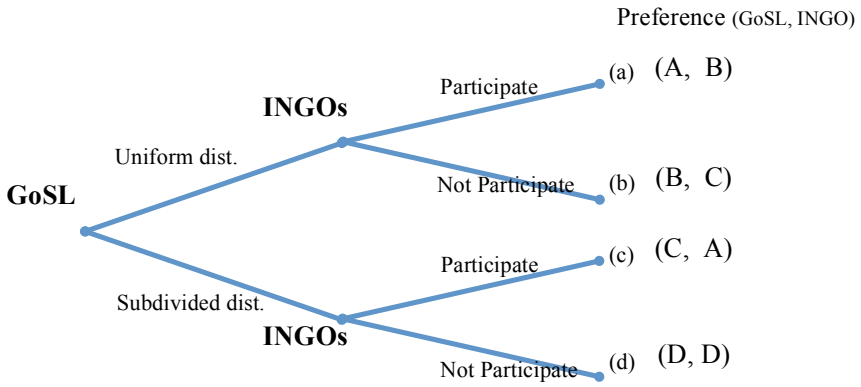


Figure 4.5 INGO's individual game with decision-making on relocation planning

Like GoSL's individual game, the preference order of GoSL, which is perceived by INGOs, is differently defined but outcome itself was revealed as the same with analysis using classical game approach in Chapter 3. However, change of priority shows meaningful implication when INGO tries to force GoSL to desirable decision. In the case INGO declare not participate in with uniform distance relocation, only three option will be compared for GoSL like below.

GoSL's preference for that outcome, **(c)** $>_{gg}$ **(b)** $>_{gg}$ (d)

INGO perception of *GoSL*'s preference, **(b)** $>_{gi}$ **(c)** $>_{gi}$ (d)

If INGOs perceived GoSL's preference that (b) {*Uniform distance relocation, Not participate in*} is preferred to (c) {*Subdivided distance relocation, Participate in*}, INGO would not make the threat to change GoSL's decision. Even though INGO declares that INGO will not participate in uniform distance relocation, GoSL's best strategy will be the same as uniform distance relocation, decision set (b) as **Figure 4.6**. In this context, the reason why INGOs didn't make credible threat can be clearly explained. Under limited information sharing situation, officially emphasized motive to reduce risk exposure was misleading as the motive to keep uniform distance plan regardless INGO's strategies.

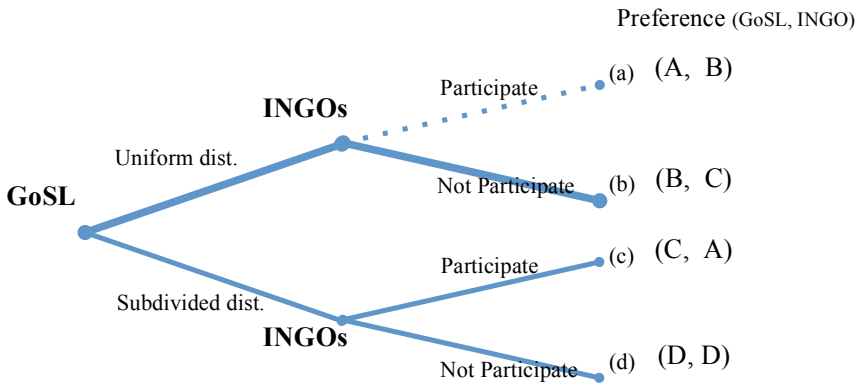


Figure 4.6 INGO's Individual game on relocation planning when INGO declares not to participate in uniform distance plan

4.3 Analysis of Hypergame

As the result of hypergame analysis, the outcomes of interactive decision itself are the same with previous analysis in both subjectively perceived individual games. This results support the robustness of actual decision, {*Uniform distance relocation, Participate in*}, as equilibrium at initial planning phase. At the same time, misunderstanding, which represented as differently perceived counterpart's preference order with actual preference, became one of causes that prevented desirable decision in terms of long-term recovery objectives.

For GoSL's subjective game, GoSL perspective on INGO's preference is needed. Because INGOs' information related to budget investment effectiveness is mainly shared with GoSL, GoSL might infer that INGO will focusing on helping a many people as possible. In this context, although INGO declares {*Participate if GoSL takes subdivided distance policy, Not participate if GoSL takes uniform distance policy*} as a threat, GoSL might not trust the threat because, according to GoSL's subjective perception, INGOs had to abandon their best option by threat.

On the other hand, in INGOs' subjective game, GoSL's motives to uniform distance relocation are perceived as GoSL officially announced. According to INGO's subjectively perceived preference of GoSL, even though INGOs declare not to participate if GoSL takes uniform distance policy, GoSL will keep the uniform distance line policy for reducing risk exposure. This misunderstanding might discourage INGOs' motive to make the threat for GoSL. Therefore, it indicates that misunderstanding of counterpart's strategies in the early stage of recovery resulted in missing the opportunity to improve decision on relocation.

In terms of recovery process, misunderstanding in earlier phase is important to keep the cooperative relationship for long time. To sustain cooperative projects with INGOs, GoSL should pay attention to understand INGOs actual motives. In Sri Lanka case, to start housing reconstruction by support of INGOs, each INGOs' capability or motives

were not enough considered to allocate projects. Because the dominant position of GoSL in cooperative relation prevented to solve misunderstanding, lasting misunderstanding accelerated withdrawal by INGOs.

This analysis using hypergame indicates the importance of information sharing between cooperative partners for recovery. Increasing cooperation with various players is inevitable because cooperation with external players is substituted for the limited capability of the government in disaster recovery. Although, in Sri Lanka case, the outcomes as decision set are not differently evaluated whether misunderstanding is considered or not, misunderstanding of other player's strategy can change the key decision in more sensitive conditions by changing perceived preference order. For sustainable cooperation between various players, information sharing especially on each other's motive in recovery should be carefully conducted.

As one of practical solutions to reduce misunderstanding, the list of information for NGO registration system for government can be considered. World Bank suggested that the government should assessment the capacity of all NGOs to allocate the role and coordinate NGOs (Jha et al., 2010). Especially for INGOs entering disaster-affected country for the first time, the formal registration system is recommended to identify organizations' constituency, capacity, technical skills, etc. as **Table. 4.6**. Suggested data except basic information such as 'Name' and 'Contact information' can be categorized according to related motives of INGOs. First of all, most information is related to motive of 'Effective resource utilization'. For instance, 'Experience', 'Expertise' and 'Financial capacity' are those information. Secondly, regarding to the motive of 'Vulnerability reduction', 'Beneficiary screening criteria' is recommended. However, the motive to 'Match expectation of donors' can be inferred only partially from 'Financial capacity (source of fund)'. This list shows the reason why misunderstanding is occurred between the government and INGOs. Most of information is focused on project itself for effective cooperation, which is mainly related to the motive of 'Effective resource utilization'. Relatively other two motives are not considered in detail. Therefore, to prevent misunderstanding counterpart's strategies, more detailed information regarding other two motives, such as 'Stability of funding part' or 'Reporting method to donors', should be

considered. Using the improved list of registration system, which covers INGOs' multifaceted motives properly, the government can easily predict INGOs' strategies during the recovery process. This approach can reduce unnecessary misunderstanding especially at the early phase of long-term recovery.

Table 4.6 Data for NGO Registration System (Jha et al., 2010)

Data	Purpose
Name	Legal name and doing-business-as name, internationally and locally.
Legal status	National or international organization. Type of incorporation or other legal status. Legal basis for receiving funds from international and/or national sources. Permission to operate in the country.
Experience	Experience in the affected country and/or region and in similar post-disaster reconstruction activities. Supervisory structure, and experience of senior officials.
Expertise	Principal services: financial, technical assistance, human resources. Language skills of staff. Systems for project management.
Beneficiary screening criteria	Screening criteria for beneficiaries, especially philosophical or religious preconditions, if any.
Financial capacity	Financial management capacity. Availability and source of own funds. Experience with managing government and other outside funds. Ability to present accurate and timely financial information.
Institutional contacts	Headquarters and institutional information, including names of senior management and board members.
Contact information	Location of office, telephone, fax, Web site, e-mail address.

Finally, suggested practical solution in Chapter 3, permanent coordination system among INGOs in housing field, can be evaluated in the context of uncertainty. First of all, with the permanent coordination system among INGOs, GoSL could recognize that the INGOs' threat had high possibility of realization because coordination system can

regulate the overall participation of INGOs as a unified player who pursue maximizing INGOs' payoff. Moreover, INGOs can be easy to understand the political motive of the government through the internal information sharing from INGOs, which had worked in that country for a long time. These aspects support that suggested practical solution can be helpful to overcome the uncertainty in the early phase of recovery.

Chapter 5
CONCLUSION

5.1 Conclusions

5.1.1 Summary

Long-term disaster recovery such as infrastructure and housing reconstruction, especially in developing countries, is a crucial phase in terms of sustainable development as well as disaster resilience. Increasing roles of various players including International Non-Governmental Organization (INGO) and the private sector make it hard to manage implementation process and achieve the expected goals. Even though there is common consent on the idealistic aim, it is hard to achieve long-term recovery goals effectively. It is because each recovery player has multifaceted motives, which vary with the context, and makes interactive decisions with other players for cooperation. In reality, there are many unexpected situation after disaster impacts. In such urgent situations to take action for recovery, it is almost impossible to make perfectly rational decision. Therefore, identifying the mechanism of actual decision-making in disaster recovery can contribute to achieve long-term objectives through sustainable recovery process.

Previous researches on long-term recovery have mainly focused on identifying desirable decision and efficient strategies. However, consideration on the cause of irrational decision under disaster conditions was limited. Consequently, accumulated lessons learned by recovery experiences have not been linked to the efficient achievement of recovery goals, and similar mistakes in long-term recovery have been repeated. Although there were recent researches on recovery players' motives and

interactive decision-making respectively, the analysis framework unifying both characteristics in decisions of long-term recovery was not suggested.

This research, therefore, aims to identify the cause of divergence of recovery process from the desirable direction in terms of unreasonable decisions. For that purpose, the analysis on decisions in long-term recovery that focuses on multifaceted motives varying with the context and interactive decision-making between associated players is applied. It is shown the limitation of existing normative approach focusing on single decision-maker's will. It also discusses the decisive conditions for change key decisions, which seriously hindered achievement recovery goals, as well. In this research, it is ultimately aimed to contribute to the improvement of long-term recovery process.

As a case of long-term recovery, the permanent housing reconstruction by INGOs in Sri Lanka after the 2004 Indian Ocean Tsunami is analyzed. With abundant financial support and participation of INGOs as implementers, Government of Sri Lanka (GoSL) had planned to relocate 30,602 houses, one third of total 98,525 houses for reconstruction, by INGOs-driven reconstruction. However, as a result of long process, only 16,578 houses are completed by INGOs-driven program. Besides, it resulted slow progress and low occupation rate of new houses, which reached to 37% in Hambantota. Although many researches on Sri Lanka case had found several factors that caused limited outcomes, these factors were enumerated without unifying framework of actual decision. Moreover, some suggested solutions, such as consideration of future vulnerability, were already included the 'Guiding Principles', which were shared to all involved players before the start of reconstruction. This case clearly showed the gap between lessons learned in normative approach and actual decision-making in the field, and the necessity of the analysis framework on decisions in terms of interactive decision-making among players with multifaceted motives.

This research analyzes the decisions in long-term recovery focusing on multifaceted motives varying with the context and interactive decision-making between associated players in Sri Lanka. Analysis procedure consists of four steps: (1) identification of key decision and associated players, (2) motive analysis based on the context of decision, (3)

interactive decision analysis, and (4) identification of key condition to improve decision. As the analysis method for interactive decision-making between recovery players, the game theoretic approaches are applied. Two different methods are suggested according to the focal points: (a) Classic game theory-based analysis is applied to sequential decisions in terms of process aspect in long-term recovery, and (b) Hypergame-based analysis is applied to the decision at the early stage of cooperation in regard to uncertainty and misunderstanding during the disaster situation.

In Sri Lanka case, two key decisions were identified. One is GoSL's failure of relocation policy using uniform distance line from the coastline at initial planning. Another is INGOs' temporary or permanent withdrawal during reconstruction implementation. As key players, GoSL and INGOs are considered. Based on the literature review, each player's payoff table regarding possible decisions is evaluated.

In terms of decision of coastal buffer zone, no reconstruction zone for the safety from tsunami, hasty introduction of uniform distance relocation policy by GoSL was the result of complex conditions and motives including GoSL's political conflict, lack of relocation experience, and INGO's competition for recovery participation. For GoSL's failure of relocation policy, it was shown that if the INGOs had declared their appropriate strategy, which served as the thread, GoSL's right choice could be the relocation policy using subdivided criteria. However, it did not happen because of competition among INGOs. Therefore, permanent coordination system among INGOs in housing field can be a practical solution.

INGOs' projects withdrawal was made based on motives and conditions including accumulated limitation of uniform relocation plan, political regime change, and emergence of new vulnerable people. For INGO's withdrawal, the situation was analyzed by the game theoretic framework and it was shown that even though INGOs and GoSL might have recognized that there was an Pareto optimal solution, they had to take another solution, Nash-equilibrium of the game, without mutual trust. It indicates that GoSL could have prevented INGOs' withdrawal during the recovery, as a motive-

compatible solution, by shared responsibility for housing reconstruction, which will increase INGO's expected payoff in long-term participation.

Because of various uncertainties immediately after the disaster, the influence of uncertainties on irrational decision-making of each player should be considered. Hypergame analysis is applied to GoSL's hasty decision of uniform distance relocation. Strategies of players will be defined according to each player's subjective perspective. Subjective perspective on counterpart's preference order is identified according to shared information between players and the characteristics of each recovery player. Individual games based on interpretation of others are analyzed in the context of each player. Finally, the influence of misunderstanding on recovery process and practical solution are discussed.

As the result of hypergame analysis, the outcome of interactive decision itself is the same with previous analysis. At the same time, misunderstanding, which represented as differently perceived counterpart's preference order, became one of causes that prevented desirable decision in terms of long-term recovery objectives. As a practical solution to reduce misunderstanding, the complemented list of information for NGO registration system is suggested.

5.1.2 Suggestion

Results of case analysis on housing reconstruction in Sri Lanka highly depend on unique characteristics of Sri Lanka context. When it is considered that the exactly same disaster cannot occur again, implication of analysis result to general disaster cases should be considered.

First of all, the characteristics of disaster recovery aids can be considered. Although the number of player who needs aids is one, the government, the players who try to provide aids are quite many agencies. Therefore, it is inevitable that regional and sectoral gaps in aids occur during the recovery process (IASC, 2010; GFDRR, 2011). Such gap can be found at the survey result on Aceh and Nias, Indonesia case after the 2004

Tsunami as **Figure 5.1**. While some sectors such as health and education are overfunded, mainly long-term recovery sectors including transport, housing, flood control, etc. failed to secure the necessary fund (GFDRR, 2010). According to another survey by GFDRR (2011), recovery participants considered lack of effective and efficient coordination as the biggest constraint to successful response. Therefore, how to cope with such sectoral gap can be key issue for successful recovery.

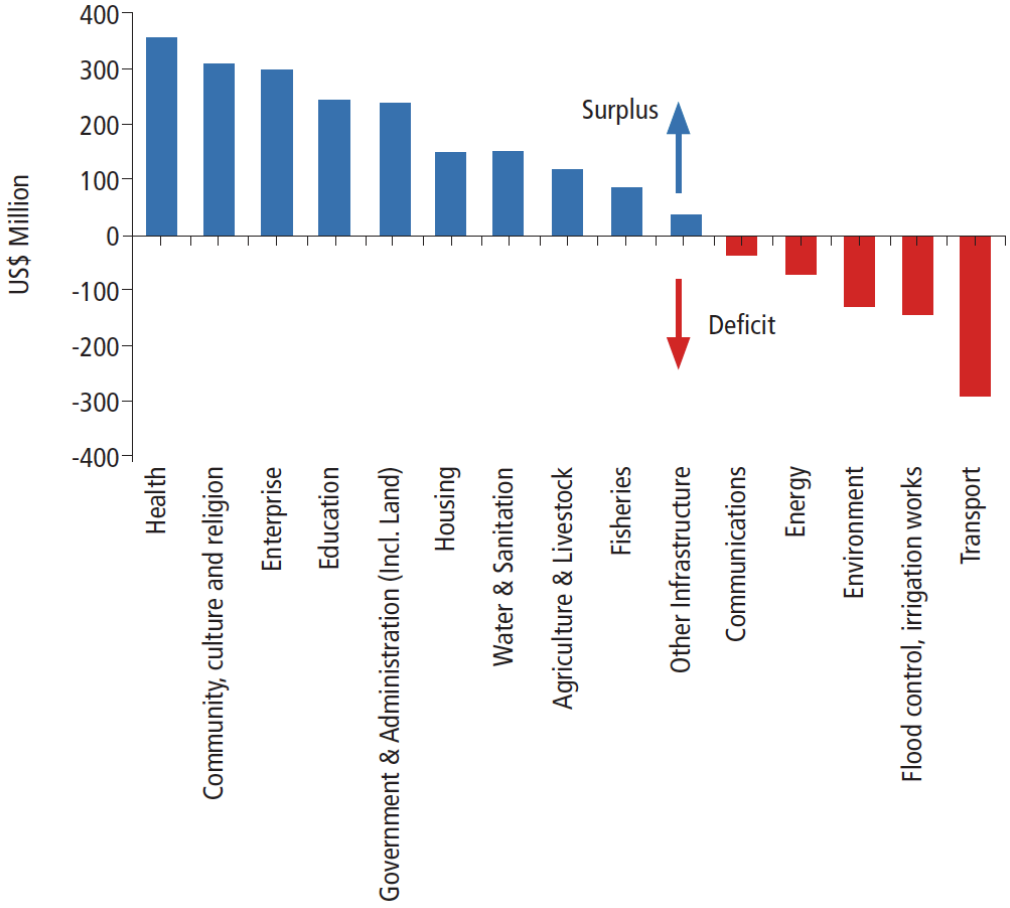


Figure 5.1 Sectoral Gaps in aid for Aceh, Indonesia after the 2004 Tsunami (GFDRR, 2010)

Sri Lanka case reflected problems by sectoral gaps. To cope with huge demand for housing reconstruction, extra fund in short-term relief work naturally flowed in housing field with INGOs. When previous analysis on Sri Lanka case is considered, the

characteristics of INGOs in housing field as a player showed the exactly same characteristics of INGOs working at the short-term relief. It is because the majority of INGOs in housing reconstruction of Sri Lanka was INGOs that work mainly at the humanitarian relief fields.

External agencies for disaster recovery can be divided into two groups according to main motive and characteristics in interrelation with the government. Those are agencies focusing on short-term support and agencies focusing on long-term cooperation. Firstly, short-term support-focused agencies include INGOs, which highly depends on the private donors. Regarding motives, consideration of donors' expectation and prompt outcomes play important role in decision-making. Because these agencies support within the government's frame for recovery, these agencies will not active in negotiate with the government to change the policy. Secondly, long-term cooperation-focused agencies include UN agencies, bilateral and multilateral donors. In terms of motives, these agencies take account of long-term impact than donors because of relatively stable influx of budget. Because cooperation can extend into long-term development project, these agencies try active negotiation with the government on the policy. Each type of agencies has advantages and disadvantages, and these characteristics are developed in accordance with each main work field. However, when such features are mixed with different work field, sustainability of recovery process can be hampered.

Sri Lanka's problems in the housing reconstruction process can be said as the representative problem when agencies focusing on short-term support extended their commitment to long-term recovery for bridging the sectoral gaps of aids. Both competition for donors and participation in inappropriate relocation plan without threat for improvement were the results from the common characteristics of short-term supporting agencies. Withdrawal of project also can be understood by the characteristics of short-term supporting agencies that had to meet the donor's variable needs. Before finding the general solution, the present state of coordination system for housing field and some more cases should be considered.

Unlike emergency response fields, the coordination among the agencies was not emphasized in housing field. For instance, when the Inter-Agency Standing Committee (IASC) established 9 clusters in 2005, only emergency shelter was established. Even in the emergency shelter cluster, the role of Global Cluster Lead, IFRC, was relatively weak and doesn't act as the 'provider of last resort', as do other Cluster Leads (Jha et al., 2010). Therefore, its coordination capacity even in the permanent housing field was very limited. In spite of several global coordination mechanisms such as IASC in 1992 and the Joint Declaration on Post-Crisis Assessments and Recovery Planning in 2008, these mechanisms didn't include INGOs. Even though the Global Humanitarian Platform (GHP) was created in 2006 including NGOs, UN agencies and International organizations, normative "Principles of Partnership" was shared without concrete mechanisms for coordination.

When it comes to actual recovery cases, there was partially successful case of coordination of long-term reconstruction in Indonesia after the 2004 Tsunami (GFDRR, 2010). The Multi Donor Fund for Aceh and Nias (MDF) was established in April 2005 in response to the government's request to coordinate donor support for reconstruction (GFDRR, 2011). The MDF pooled 655 million USD from 15 donors and provided to projects implemented by the government, international organizations, NGOs and communities. However, participants were mainly foreign governments and only 10% of budget for reconstruction was coordinated by MDF (MDF, 2012). However, even in the same place, Aceh and Nias, there were the same problems with Sri Lanka case by INGOs' implementation. Many of INGOs had expended their commitment from emergencies relief to housing reconstruction to meet an unprecedented grant flow (Steinberg, 2007). Uncoordinated participation of INGOs, however, resulted in low quality houses, abandoned unfinished houses.

To solve this coordination issue, existing researches and reports have emphasized the government's strong will and its leadership. For instance, the IASC report on Haiti reconstruction at the early recovery phase, it is strongly recommended that the government of Haiti's adopt the same approach with Indonesian government for MDF as a successful case (IASC, 2010). World Bank report on reconstruction emphasizes that

government should coordinate the work of NGOs and monitor their performance as a leading agency (Jha et al., 2010) On the other hand, INGOs' role is recommended as partners under the government's leadership (GFDRR, 2011).

When the implementation of coordination among INGOs in long-term recovery depends heavily on only government's leadership, it is easy to repeat the failure because of relatively limited capability of developing countries after large-scale disaster. In the case that the government lost their capability by disaster such as Aceh, Indonesia, government-driven approach cannot be implemented. Therefore, in the same manner as previous Sri Lanka case analysis, practical solution can be considered for the problems when agencies focusing on short-term support extend their commitment to long-term recovery based on the different motive of players and their interactive relationship.

First of all, in the viewpoint of not government but external agencies, it can be another solution that establishment of the coordination system covering short-term support-focused INGOs for housing field and designation of lead agency, which can act as the 'provider of last resort' in key decision. Through this coordination system, available aids can be aligned with needs in fields in global viewpoint instead of each INGO perspective. This system will be effective to reduce the time for policy-making by unifying the related stakeholders as well. Even though the government lost the capability to lead the coordination, this coordination system can prevent competitive participation or withdrawal of project by internal binding power.

Secondly, based on the coordination system, shared responsibility in housing reconstruction based on each player's motive and payoff can be introduced. In the actual success cases of recovery from Gujarat earthquake and Hurricane Katrina, unlike Sri Lanka case, INGOs took part in only consistent part with their motives by the partnership with local people, the government and private sectors (ADB & WB, 2008; Jha et al., 2010). If such aspect is considered, exceed fund of INGOs can be applied to housing field successfully. As the departmentalized participation of INGOs that focus on short-term support role, it can be considered as possible option that cooperation with housing field specialized agencies such as UN-Habitat and responsibility sharing with local

government. For instance, in the responsibility sharing with the government for funding, INGOs can achieve much more outcomes with the same amount of fund comparing to single responsibility case. It becomes the motive-compatible solution for INGOs trying to match the donor's expectation. On the other hand, the government can expect stable long-term commitment of INGO by increased expected payoff on projects.

5.1.3 Conclusion

The analysis using classic game theory shows the difficulty of sustainable long-term disaster recovery process. Even when players had the long-term goal, or they shared the long-term goal, due to the decisions made in the interactive decisions-making process, such long-term goals may not be implemented. Even though players made 'rational' choice depending on their own motives and contexts, the decision as result of interactive decision-making can hamper the achievement of recovery objective.

For achieving long-term recovery goals, it was important that recovery policy and institutions are corresponding to each player's motive at specific time. Motive compatible policy and institutions can achieve the long-term recovery goals as subgame perfect equilibrium by making the condition for all players to match their own motives at each phase. Suggested practical solutions are reviewed in terms of motive-compatibility and applicability to actual complex conditions of Sri Lanka after the 2004 Tsunami.

The analysis also indicates the importance of the initial stage of the process since the failure in the initial phase had a lasting effect on players' motives as path dependency. For instance, government's exclusion of INGOs in initial planning demotivated INGOs' continuous participation in long-term recovery, leading to the decline in outcomes of housing reconstruction.

The problems discussed in this research have a game theoretic structure. It indicates the importance of coordination and information sharing among associated organizations would be helpful to overcome those problems. It is not an easy task, but would deserve the efforts.

In this research, it indicates that adjustment of recovery policy and institutions considering players' motive is important to achieve the long-term recovery goals. To develop such findings to concrete recovery policy, accumulation of research results on other cases in different context is needed as further research.

5.2 Future Work

5.2.1 Research Limitations

Regarding limitation of this research, as the first step to analyze long-term recovery process in terms of motive, player's characteristics and motives are simplified as one player to consider entire recovery process. For instance, various INGOs can have different motive according to purpose of establishment. However, such differences are not fully considered in the definition of player's motive focusing on majority's characteristics. Only limited players are considered in the analysis of interactive process. However, the affected people or the private sectors should be considered to understand realistic process in detail. Finally, though long-term recovery includes many sequential decisions, only two key decisions are considered.

Lack of data on disaster recovery is commonly mentioned as limitation in disaster research because of difficulties to make documents under emergency situation. To define the motive of organizations, detailed information on their decision-making process from the internal viewpoint is needed, but it is quite rare. In this research, internal viewpoint on their possible option strongly depends on a few organizations such as IFRC, Belgian Red Cross, UN-Habitat, etc. Fortunately, these organizations' role in housing reconstruction was large in Sri Lanka case. So, overall trend could be identified. In terms of methodology for motive analysis, common methodology such as experimental-based approach is difficult to apply to long-term disaster condition because control of other factors is almost impossible in the disaster recovery. Another methodology such as survey-based approach has also difficulty to conduct because memory of practitioner becomes vague when the long-term process is finished. Therefore, for more detailed analysis, there is need to trace one long-term recovery from beginning to the end of reconstruction.

5.2.2 Future Work

As the further research, first of all, regarding derived key factors in recovery process, discussion should be improved by receiving feedback and comments from practitioners actually working in the housing recovery process in Sri Lanka. In this research, inference based on literatures from various viewpoints was used to define motives in decisions because each player's report and interview can have biases or self-justification. However, interview with practitioners will be needed to verify the revealed factors based on literature review. Further improvement to analysis can be expected from feedback on additional constraints in the process that didn't appear at written literature.

Secondly, in terms of an extended application of analysis outcomes, a further analysis dealing with other long-term recovery cases should be conducted. Although the causes for divergence of recovery process are found at Sri Lanka case, it could be exceptional causes depending on the particular situation of Sri Lanka. This research shows that lack of mutual trust resulted in unreasonable decision because of increasing uncertainty. However, it can be still early to conclude that trust between players can reduce uncertainty in decision-making. For that reason, verification of these factors can be done by several other recovery cases including successful cases.

Thirdly, subjective perception's influence should be verified in detail as further study. Sensitivity analysis about the difference of subjective recognition of payoff table can be conducted. It is important to identify the factors that directly influence on decision-making out of various influential factors. Sensitivity analysis on the difference of subjective recognition of payoff table will be helpful for that. To verify influence by subjective perception on decision-making in recovery process, interview or survey with practitioners will be needed.

Finally, various INGOs can have different motives and its priority according to purpose of establishment, such as charity based INGOs etc. At the same time, interactive relations can be differently defined according to types of relation, and relation between Gov. and INGOs is just one of them. Based on these aspects, long-term recovery phases

can be understood as shift of phase of organization relationship. With this framework of phase shift, the sustainability of long-term recovery process can be evaluated.

REFERENCES

1. ADB. (2005). Curbing corruption in Tsunami relief operations. *Proc. of the Jakarta expert meeting*.

2. ADB. (2008). Completion Report: India: Gujarat Earthquake Rehabilitation and Reconstruction Project. ADB.

3. ADB, JBIC & World Bank. (2005). Sri Lanka 2005 Post-Tsunami Recovery Program: Preliminary Damage and Needs Assessment. ADB, JBIC and World Bank.

4. Amaratunga, D., & Haigh, R. (2011). Post-disaster Reconstruction of the Built Environment: Rebuilding for resilience. Wiley-Blackwell.

5. Angst, L. & Borowiecki, K.J. (2014). Delegation and motivation. *Theory and Decision*, *76*, 363-393.

6. Aoki, M. (2001). Towards a comparative institutional analysis. The MIT Press.

7. Bankoff, G. & Hilhorst, D. (2009). The politics of risk in the Philippines: comparing state and NGO perceptions of disaster management. *Disasters*, *33*, 686-704.

8. Barenstein, J.D. & Wickramagamage, P. (2009). Coastal livelihoods and post-tsunami resettlement in Sri Lanka. *Swiss Universities of Applied Sciences and Universities of Teacher Education*.

9. Belgian Red Cross–French Speaking Community. (2009). Post-tsunami housing reconstruction Kalutara district, Sri Lanka. Belgian Red Cross.

10. Bennett, P.G. (1980). Hypergames: Developing a model of conflict. *Futures*, *12*(6), 489-507.

11. Bennett, P.G. & Dando, M.R. (1979). Complex strategic analysis: a hypergame study of the fall of France. *Journal of the Operational Research Society*, *30*, 23-32.

12. Bennett, P.G., Dando, M.R. & Sharp, R.G. (1980) Using hypergames to model difficult social issues: An approach to the case of soccer hooliganism. *Journal of the Operational Research Society*, *31*, 621-635.

13. Birkmann, J., Buckle, P., Jaeger, J., Pelling, M., Setiadi, N., Garschagen, M., Fernando, N. & Kropp, J. (2010). Extreme events and disasters: a window of opportunity for change? Analysis of organizational, institutional and political changes, formal and informal responses after mega-disasters. *Natural Hazards, 55*, 637–655.

14. Boano, C. (2009). Housing anxiety and multiple geographies in post-tsunami Sri Lanka. *Disasters, 33*, 762-785.

15. Bosher, L. (2011). Household and governmental perceptions of risk: Implications for the appropriateness of housing provision in South India. *Housing Studies, 26*(2), 241-257.

16. Brun, C., & Lund, R. (2008). Making a home during crisis: Post-tsunami recovery in a context of war, Sri Lanka. *Singapore Journal of Tropical Geography, 29*.

17. Centre for Policy Alternatives. (2006). Reflection on the Tsunami One Year: Lessons to be learnt. Centre for Policy Alternatives.

18. Chamlee-Wright, E., & Storr, V. H. (2009). Expectations of government's response to disaster. *Public Choice, 144*(1-2), 253–274.

19. Chandra, A. & Acosta, J. (2009). The role of nongovernmental organizations in long-term human recovery after disaster. RAND.

20. Coles, J., & Zhuang, J. (2011). Decisions in disaster recovery operations: A game theoretic perspective on organization cooperation. *Journal of Homeland Security and Emergency Management, 8*(1).

21. Croson, R. & Konow, J. (2009). Social preferences and moral biases. *Journal of economic behavior & organization, 69*, 201-212.

22. Dikmen, N. (2005). A provision model and design guidelines for permanent post-

disaster housing in rural areas of turkey based on an analysis of reconstruction projects in çankiri. Middle East Technical University.

23. Ebrahim, A. (2003). Accountability in practice- mechanisms for NGOs. *World Development, 31*(5), 813–829.

24. Fadardi, J.S., Azad, H. & Nemati, A. (2010). The relationship between resilience, motivational structure, and substance use. *Procedia social and behavioral sciences, 5,* 1956-1960.

25. Gaillard, J.C., Clavé, E. & Kelman, I. (2008). Wave of peace? Tsunami disaster diplomacy in Aceh, Indonesia. *Geoforum, 39*, 511-526.

26. GFDRR. (2010). Haiti Earthquake Reconstruction: Knowledge notes from DRM Global Expert Team for the Government of Haiti. GFDRR.

27. GFDRR. (2011). Knowledge Notes: Earthquake Reconstruction, GFDRR.

28. Ghesquiere, F. & Reid, P. R. (2012). The Sendai Report: Managing disaster risks for a resilient future. World Bank. Retrieved from Online http://documents.worldbank.org/curated/en/2012/05/18142289/sendai-report-managing-disaster-risks-resilient-future

29. Gilbert, R. (2001). Doing more for those made homeless by natural disasters. *Disaster risk management series, 1*.

30. GSDMA. (2005). Grit and Grace - the story of reconstruction. GSDMA.

31. Hamandawana, H., Chanda, R. & Eckardt, F. (2007). Hypergame analysis and hydroconflicts in the Okavango drainage basin. *Water International, 32*(4), 538-557.

32. Harsha, A. R. R., Samarawickrama S. P. & Imamura, F. (2007). Post tsunami recovery process in Sri Lanka. *Journal of Natural Disaster Science, 29*(1), 21-28.

33. Hyndman, J. (2009). Siting conflict and peace in post-tsunami Sri Lanka and Aceh, Indonesia. *Norwegian Journal of Geography*, *63*(1), 89-96.

34. I-FREED (2005). Relocation of a tsunami affected village away from the coast.

Report of I-FREED (International Foundation for Revitalization, Empowerment, Education and Development).

35. IASC. (2010). Response to the humanitarian crisis in Haiti. IASC.

36. IFRC. (2006). Legal issues from the international response to the tsunami in Sri Lanka. IFRC.

37. IFRC. (2007). Mid term review-Red Cross and Red Crescent movement tsunami recovery program - housing projects, Matara district. IFRC.

38. IFRC. (2008). Progress report Sri Lanka. IFRC.

39. Ingram, J. C., Franco, G., Rio, C. R. & Khazai, B. (2006). Post-disaster recovery dilemmas: challenges in balancing short-term and long-term needs for vulnerability reduction. *Environmental Science & Policy, 9*, 607-613.

40. Jayasuriya, S., Steele, P. & Weerakoon, D. (2006). Post-Tsunami Recovery: Issues and Challenges in Sri Lanka. *ADB Institute Research Paper series, 71*.

41. Jayawardane, A. (2006). Disaster mitigation initiatives in Sri Lanka. *Proceedings of International Symposium on Management Systems for Disaster Prevention*.

42. Jha A.K., Barenstein, J.D., Phelps, P.M., Pittet, D. & Sena, S. (2010). Safer Homes, Stronger Communities: A Handbook for Reconstructing after Natural Disasters. World Bank.

43. Karagonlar, G. & Kuhlman, D.M. (2013). The role of social value orientation in response to an unfair offer in the ultimatum game. *Organizational Behavior and Human Decision Processes, 120,* 228-239.

44. Keraminiyage, K. (2011). Can the game theory concept be applied affectively in post disaster reconstruction decision making? *Proceedings of International Conference on Building Resilience*.

45. Khasalamwa S. (2009). Is 'build back better' a response to vulnerability: Analysis of the post-tsunami humanitarian interventions in Sri Lanka. *Norwegian Journal of Geography, 63*(1).

46. Kim, Y.-J., Dyne, L.V., Kamdar, D. & Johnson, R.E. (2013). Why and when do motives matter? An integrative model of motives, role cognitions, and social support as predictors of OCB. *Organizational Behavior and Human Decision Processes, 121*(2), 231–245.

47. Lawther, P.M. (2009). Community involvement in post disaster re-construction: case study of the British red cross Maldives recovery program. *International Journal of Strategic Property Management, 13*(2), 153-169.

48. Leon, E., Kelman, I., Kennedy, J. & Ashmore, J. (2009). Capacity building lessons from a decade of transitional settlement and shelter. *International Journal of Strategic Property Management, 13*(2), 247-265.

49. Ligon, E. & Schechter, L. (2012). Motives for sharing in social networks. *Journal of development economics, 99*, 13-26.

50. Linnerooth-Bayer, J., Mechler, R. & Pflug, G. (2005). Refocusing disaster aid. *Science, 309*, 1044-1046.

51. Lyons, M. (2009). Building Back Better: The Large-Scale Impact of Small-Scale Approaches to Reconstruction. *World Development, 37*(2), 385–398.

52. Mannakkara, S. & Wilkinson, S. (2013). Build Back Better: Lessons from Sri Lanka's Recovery from the 2004 Indian Ocean Tsunami. *International Journal of Architectural Research*, *7*(3), 108-121.

53. McCarty, N. & Meirowitz, A. (2007). Political game theory: an introduction. Cambridge University Press.

54. MDF (2012). Multi Donor Fund 2012 Final Report: Sustainable Futures: A Legacy of Reconstruction. MDF.

55. Miles, S.B. & Chang S.E. (2006). Modeling community recovery from earthquakes. *Earthquake Spectra, 22*(2), 439-458.

56. Mishara, P. K. (2008). The Gujarat Earthquake recovery and reconstruction experience: 2001-04. *International Workshop on Post-Earthquake Reconstruction*

Experiences, Presentation.

57. Mulligan, M. & Shaw, J. (2007). What the world can learn from Sri Lanka's post-tsunami experiences. *IJAPS*, *3*(2).

58. Munich Re (2013). The 10 deadliest natural disasters and costliest natural disaster. *NatCatSERVICE*. Retrieved from Online http://www.munichre.com/en/reinsurance/business/non-life/natcatservice/significant-natural-catastrophes/index.html

59. Myerson, R.B. (1991). Game Theory: Analysis of Conflict. Harvard University Press.

60. Okeke, E.N. & Godlonton, S. (2014). Doing wrong to do right? Social preferences and dishonest behavior. *Journal of Economic Behavior and Organization, 106*, 124-139.

61. Pelling M. & Dill K. (2010). Disaster politics: tipping points for change in the adaptation of sociopolitical regimes. *Progress in Human Geography*.

62. Perera, A. (2007). Sri Lanka: Not all tsunami reconstruction is equal. Inter Press Service. Retrieved from Online http://www.ipsnews.net/2007/07/sri-lanka-not-all-tsunami-reconstruction-is-equal/

63. Pyles, L. & Harding, S. (2012). Discourses of post-Katrina reconstruction: a frame analysis. *Journal of Community Development, 47*(3), 335–352.

64. RADA. (2006). Mid-year review: Post tsunami recovery and reconstruction. RADA.

65. Reniers, G. & Soudan, K. (2010). A game-theoretical approach for reciprocal security-related prevention investment decisions. *Reliability engineering and system safety, 95*, 1-9.

66. Sadiqi, W., Coffey, V. & Trigunarsyah, B. (2012). Rebuilding housing after a disaster: Factors for failure. *Proceedings of 8th Annual International Conference of the International Institute for Infrastructure*, 292-300.

67. Samaranayake, R. (2006). Pre-and post-tsunami coastal planning and land-use policies and issues in Sri Lanka. FAO.

68. Schei, V., Rognes, J.K. & Shapiro, D.L. (2011). Can individualists and cooperators play together? The effect of mixed social motives in negotiations. *Journal of experimental social psychology, 47*, 371-377.

69. Schilderman, T. (2010). Putting people at the centre of reconstruction. In Lyons, M, Schiderman, T. & Boano, C. (Ed.) *Build Back Better: Delivering people-centred housing reconstruction at scale*.

70. Shaw, J. & Ahmed, I. (2010). Design an delivery of post-disaster housing resettlement programs: Case studies from Sri Lanka and India, Report 6. Monash University.

71. Shin, S. (2002). Game Theory Guide (in Korean). Pakyoungsa.

72. Silva, K. T. (2009). 'Tsunami third wave' and the politics of disaster management in Sri Lanka. *Norwegian Journal of Geography, 63*(1), 61-72.

73. Smith, G.P. & Wenger, D. (2009). Sustainable Disaster Recovery: Operationalizing An Existing Agenda. In Rodriguez, H., Quarantelli, E.L., & Dynes, R.R. (Ed.) *Handbook of Disaster Research*.

74. Steinberg, F. (2007). Housing reconstruction and rehabilitation in Aceh and Nias, Indonesia—Rebuilding lives. *Habitat International, 31*, 150–166.

75. Telford, J., Cosgrave, J. & Houghton, R. (2006). Joint Evaluation of the international response to the Indian Ocean tsunami: Synthesis Report. *Tsunami Evaluation Coalition*.

76. The Government of Sri Lanka. (2005). Government rejects 'Daily Telegraph' article on tsunami assistance as not factual. Daily Telegraph.

77. The Government of Sri Lanka & Development Partners. (2005). Sri Lanka post tsunami recovery and reconstruction. *Joint Report of the Government of Sri Lanka and Development Partners*.

78. The Ministry of Foreign Affairs of Sri Lanka. (2005). The official note for asking for construction of houses for persons affected by the Tsunami, No.EA/GEN/645.

Received by the Government of Republic of Korea.

79. UN-Habitat. (2011). Turning around the tsunami: UN-Habitat working in partnership with Sri Lanka. UN-Habitat.

80. Uyangoda, J. (2005). Ethnic conflict, the state and the tsunami disaster in Sri Lanka. *Inter-Asia Cultural Studies*, *6*.

81. Vaes, B. & Goddeeris, M. (2012). Sri Lanka tsunami 2004 lessons learned. Belgian Red Cross Flanders.

82. Vatsa, K.S. (2001). The Bhuj Earthquake District of Kutch, State of Gujarat (INDIA): A Reconnaissance Report Identification of Priority Issues. World Institute for Disaster Risk Management.

83. Werker, E. (2010). Disaster Politics. Harvard International Review. Retrieved from Online http://hir.harvard.edu/disaster-politics?page=0,0

84. Wolfgang, F., Ihsan, A. & Kaiser, K. (2008). Managing Reconstruction Finance: International Experiences with Public Financial Management and Accountability, *Policy Research Working Paper 4475*. World Bank, DC.

85. World Bank (2005). Tsunami Recovery in Sri Lanka: An Enormous Task but Signs of Progress. World Bank.

86. Zhao, R., Neighbour, G., McGuire, M. & Deutz, P. (2013). A software based simulation for cleaner production: A game between manufacturers and government. *Journal of Loss Prevention in the Process Industries, 26*, 59-67.