モンゴルの自然災害への牧畜民のレジリエンス向上に関する分析 ～2009 年から 2010 年のドンドゴビ県で発生した“ゾド”の事例から～

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1. はじめに

途上国では低所得による低貯蓄、それに起因する低投資及び低生産の循環により所得が向上しない「貧困の罠（Poverty Traps）」が起こると指摘されている。本来マクロレベルの分析に用いられる理論だが、近年はミクロレベルで用い、外生ショックによる家計の経済階層移動の分析に適応されている（黒崎, 2009）。

Cater *et.al.*（2007）はエチオピアにおける調査から、干ばつにより資産が減少し、貧困の罠に陥る世帯があることを報告した。一方、途上国の家計は生活水準が揺れ動くと言われており、経済階層移動が構造的なのか、一時的なのかを区別することが必要とされている。経済階層移動を引き起こす要因として天候や市場の急変等の外生ショックのリスクがあり、外生ショックにより絶対的な生活水準の低下が起こる家計は脆弱な家計とされている。Little *et al.*（2006）はエチオピアで干ばつの前後における家畜頭数の変化を調査し、自然災害に脆弱な世帯が増加したことを報告している。

モンゴル国の遊牧民にとって最大の外生ショックの一つは自然災害“ゾド”（Dzud）である。モンゴルでは冬から春にかけて放牧地の不足、悪天候を中心とした複合的な要因（篠田・森永, 2005; 森永, 2009）により家畜が大量死する自然災害“ゾド”（寒雪害）が発生する（Natsagdorj and Dulamsuren, 2001）。ゾドは繰り返し発生しており（小宮山, 2005; Sternberg T., 2010）、モンゴル国で最大の労働人口が携わる牧畜業にとって最大の外生ショックである（World Bank, 2006）。これまで、ゾドに関するさまざまな研究が行われ、ゾドの要因の分類や頭数変化、社会背景などが明らかにされてきた（湊, 2004; 小宮山, 2005; 篠田・森永, 2005; 森永, 2009; Sternberg, 2010）。しかし、モンゴルでは最大の外生ショックであるゾドによる経済階層移動の分析は十分ではない。

2. 目的

アフリカの牧畜民に対して行われた手法を参考にモンゴルにおける外生ショックによる牧畜民の経済階層移動について家畜頭数を中心とした分析を行う（イメージは図 1）。それとともに今後の放牧地利用に対する政策を提言する。

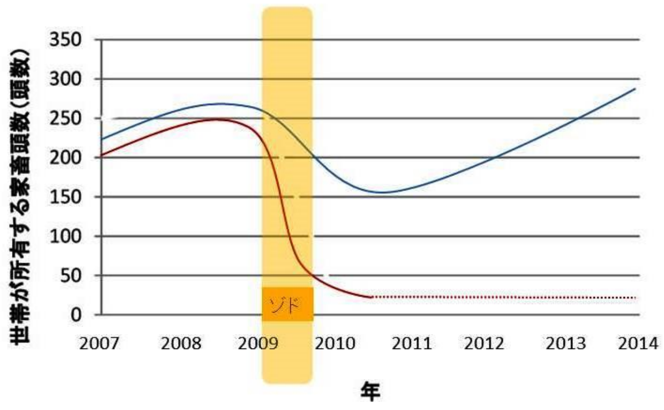

図1. ゾドによる遊牧民世帯の経済階層移動のイメージ

3. 調査概要

(1) 調査地域

調査は 2009 年の冬から 2010 年の春に発生したゾドにより家畜頭数が約 48%（約 104 万頭）減少し、モンゴル国最大の被害を蒙ったドンドゴビ県で行った。同県は面積 74、700km^2、人口 37、700 人である（人口密度 0.51 人／km^2）。牧畜業は県の GDP の 63%を占める主要産業で 135 万頭の家畜が飼われている（2011 年）。同県で牧畜民が集中し、利用できる放牧地に制限がかかり、従来の対処行動がとりづらくなった地域がある。調査は、その傾向が見られる同県の県庁所在地サインツァガーン郡で行った（人口密度約 4 人／km^2、年間降水量が平均 131mm、年平均気温 2.3℃）。

(2) 調査方法

同郡で牧畜民が中心である第 2・3・4 村を対象とし、620 世帯（2009 年時点）から所有家畜頭数に基づき層化抽出法により 148 世帯を選び、移動式住居“ゲル”を訪問し、構造化された調査票を用いた対面式の聞き取り調査を行った。調査は 2011・2012・2013 年の 1 月に同じ対象世帯に対してモンゴル国立農業大学と共同で実施した。調査票作成等のために牧畜民に聞き取り調査を行う等の予備調査を 2010 年 6 月、8 月に実施した。

4. 対象地域で発生したゾドの概要

対象地域でゾドによる家畜の死亡要因に関して行われた調査では、数日間続くことで家畜を放牧できなくなる嵐が頭数を減少させる主要因であった。また、オトル（通常使う放牧地以外への畜群の移動）をしない、乾草を給飼できない世帯はゾド時に家畜頭数をより減少させていた（中村, 2013）。

5. 調査結果

(1) ゾド後の経済階層の移動

Little et al. (2006)は牧畜民の資産を代表する指標として家畜頭数を用い、災害前の分類から災害 3 年後にどの所有頭数の分類に移動したかを分析した。モンゴルでは世帯あたり 100 頭以下の世帯を貧困とする基準がある（IMF, 2003）。

災害前の 2009 年末時点では非貧困層であった 100 頭～200 頭を有する世帯の 55%、同 200 頭～400 頭の 24%が災害の 3 年後にも継続的に貧困層に移動していた。

貧困ラインを超えた移動が起こっていた災害前に 100 頭～200 頭を

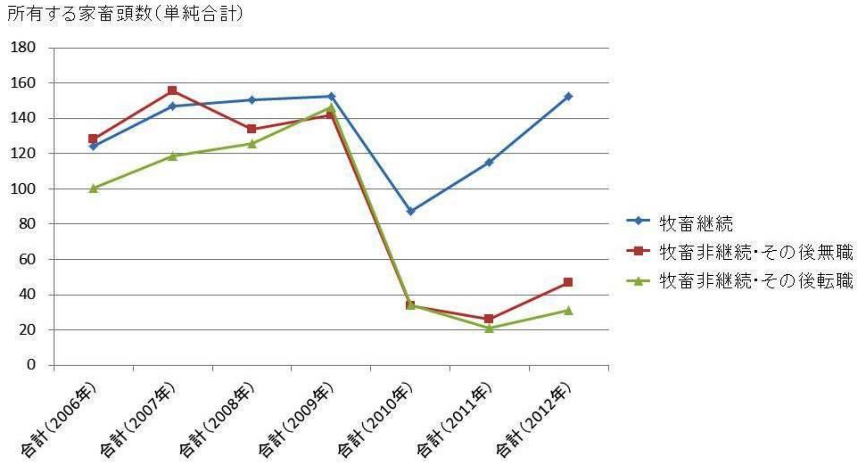

図2. 100頭～200頭を所有する世帯の所有家畜頭数の経年変化
継続 n=20、非継続・無職n=12、非継続・転職n=7

有していた世帯の中でも頭数を 50 頭程度以下まで減らした世帯は家畜を他の世帯に預け、都市部を中心とした生活に変化する傾向が見られた。それに対して 100 頭弱までの頭数減少におさえた世帯は牧畜を主に続け、頭数を回復させていた（図 2）。

(2) 家畜頭数の変化要因の分析

非災害時にも家畜頭数は繁殖・購入により増加し、遊牧民間で譲渡や市場での販売、自家消費、死亡などにより減少しており、常に変化している（図 3）。そのため、災害時の変化と日常的な変化を明確にするために、これらを考慮して分析する必要がある。

また、災害後の世帯の頭数の回復率を左右する要因として妊娠可能なメスの頭数が考えられる。現地調査では牧畜民から共通してオスよりもメスが災害の影響を受けやすく、さらに妊娠したメスは最も影響を受けやすいとの回答があった。そのため、災害時に妊娠可能なメスを妊娠させていた場合には、より災害時にメスの頭数を減らし、災害後に頭数が回復しにくくなったことが考えられる。

現在、モンゴル国の家畜統計に関する調査として行われるとともに課税や融資に用いられる公文書でもある世帯ごとの家畜台帳のデータを入手し、世代ごとの経年の頭数変化を用いた分析を行っている。学会報には予備的案分析結果を報告予定である。

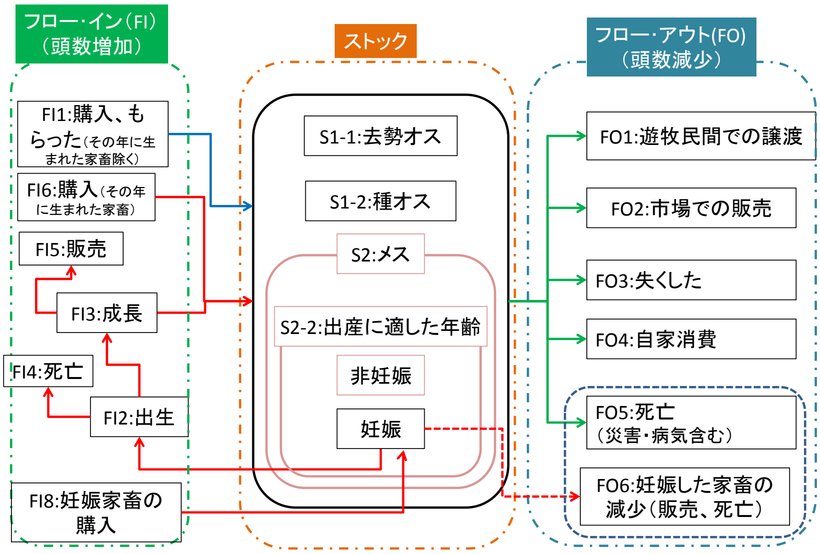

図3. 家畜頭数のストックと増減のフロー

(3) 都市部での職を得る機会による家計の変化

家畜頭数を大きく減少させた世帯間でも都市部での職を得る機会の有無により家計の現金消費支出の回復過程は異なる（図 4）。学歴、専門技術（電気技術者、調理食堂）、年齢（蛍石鉱山での肉体労働等）、年金がもらえるほどの高齢、親族が会社経営者などの要因により転職できた世帯は牧畜を続

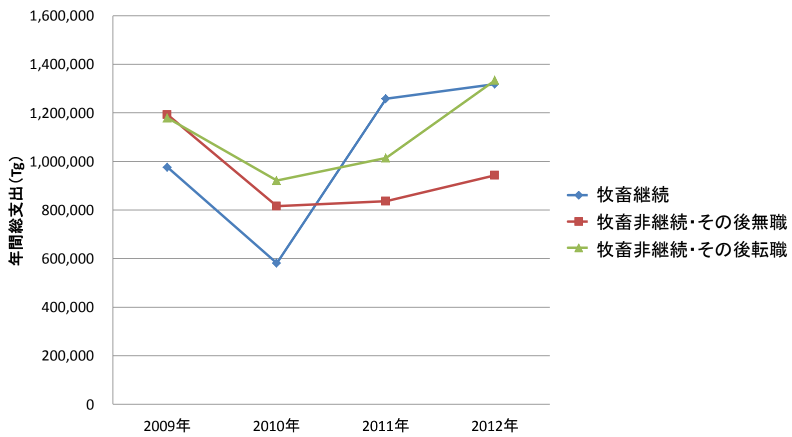

図4. 100頭～200頭を所有する世帯の所有家畜頭数の経年変化
継続 n=20、非継続･無職n=12、非継続･転職n=7

けた世帯と同レベルの現金消費支出にまで回復した。しかし、頭数が少ないために牧畜業を離れ、他の職も得られなかった世帯は現金支出の回復が比較的遅いことが分かった。

５．考察

頭数の少ない世帯は災害後に牧畜を継続できないリスクが高い傾向にある。このような世帯はモンゴルにおいて乾草草原を長きに渡って利用してきた伝統的技術であるオトル（通常使う放牧地以外への畜群の移動）をしない傾向にある。そのため、放牧地への圧力という自然環境面を考えると家畜頭数の少ない、移動性の低い世帯は特定の放牧地を使い続けることになり、結果として放牧地への負荷を増大させることが考えられる。

そのため、頭数の少ない世帯は災害に対しても脆弱性が高く、自然環境への圧力も高いことから、災害により家畜を多く失い、自ら牧畜をできなくなった世帯は他の所得機会を得やすくする政策をとり、牧畜から他の職への移動を促すことにより、災害の影響を受けにくい社会づくりと放牧地への圧力軽減の両立を行うことができると考えられる。

ただし、市場経済への移行期に都市部の産業が衰退した際には牧畜業が労働人口を吸収した経緯もある。経済的な外生ショックの発生時に牧畜業に戻れるような社会を維持することもモンゴル社会の安定につながると考えられる。ミルクや肉の消費といった文化的側面も併せて考えると牧畜業を離れても一定の頭数を維持できる支援も必要と考えられる。

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Toward reducing cyclone vulnerability and promoting resilience in Bangladesh

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Key Words: cyclone, flood, vulnerability, resilience, Bangladesh

1. Introduction

Reducing disaster vulnerability and promoting resilience have been a central issue on disaster research. There are several past studies examining factors relating to the vulnerability (Khan, 1974; Burton, Kates and White, 1993; Hewitt, 1997; Twigg and Bhatt, 1998; Weichselgartner, 2001, Wisner et al., 2004; IFRC, 2006) as well as vulnerability and disaster responses (Zaman, 1988; Haque and Zaman, 1994; Hutton and Haque, 2003, 2004; Edgeworth and Collins, 2006). The frequency and intensity of natural disasters have increased globally in recent years (see IPCC 2001a, b; Khan and Rahman 2007). Among others, tropical cyclones[1] and induced storm surges[2] are recognized as the foremost natural hazard (see Murty and El-Sabh 1992; Finkl 1994; Dube et al. 1997; Zerger et al. 2002; Benavente et al. 2006). Over the past two centuries, more than two million people worldwide have died during various tropical storms, including cyclones, hurricanes and typhoons, and tidal surge events (see Nicholls, 2003). On the face of the earth, the frequency of cyclones has shown an upward tendency (see Haque *et al.*, 2012). There has been great concern that the frequency and intensity of tropical cyclones will increase in the future due to global warming (see Emanuel 2005). The development and the intensity of tropical storms heavily depend on an ocean temperature. Hence, increasing sea temperature as well as rising sea levels, caused by global warming, will intensify the damage by cyclones and their associated storm surges (see Danard and Murty, 1987; Mohanti, 1990; Kausher et al., 1993; Ali, 1996; Islam, 2001; Brooks et al., 2005; Birkmann, 2006; IPCC, 2007; Emanuel et al., 2008; UNDP, 2007; Dasgupta et al., 2009; Dasgupta et al., 2010; Mallick, Rahaman, and Vogt, 2011a,b; Mamud and Barbier, 2011; Haque et al., 2012).[3] Cyclone and after cyclone situation analysis revealed that for any types of moderate cyclone, there are the following common occurrences: (i) destruction due to wind force and surge; (ii) loss of lives,

[1] The World Meteorological Organization defines a tropical cyclone as “a storm in the south-east Indian Ocean with the sustained wind speed of more than 33 nautical miles per hour (i.e. 62 km per hour)” (see Haque et al., 2012).
[2] A storm surge is the difference between the water level under the influence of a storm tide and the normal level that would have been reached in the absence of the meteorological disturbance (see Haque et al., 2012).
[3] Climate scientists still argue about global warming and its influence on increasing frequency and intensity of cyclones although they do not reach a compelling conclusion yet (see Ali 1996; Khan et al. 2000; IWTC 2006; Pielke et al. 2005; Emanuel 2005; Webster et al. 2005; Bengtsson, Hodges, and Roeckner 2006; Landsea et al. 2006; IPCC 2007; Woodworth and Blackman 2004; Woth, Weisse, and von Storch 2006; Emanuel et al. 2008).

livestock and crop by tidal wave; (iii) loss of soil fertility for spread of sea-spray, saline water intrusion and sedimentation; (iv) water source contamination; (v) extensive environmental pollution; (vi) spread of diseases; (vii) unemployment and starvation (see Rahman and Biswas, 2011). Among these damages, loss of lives is mainly concentrated in the tropics, where most of the deaths occurred in Asia alone (see CRED, 2008). The countries surrounding the Bay of Bengal, notably Bangladesh, is particularly prone to the disaster by tropical cyclones, experiencing about ten percent of the tropical cyclone formation and more than 40 percent of total annual deaths caused by the cyclone all over the world (Ahmad, 2012). Bangladesh is currently ranked as one of the most vulnerable countries to tropical cyclones (see IPCC, 2001a,b; IPCC 2007; UNDP, 2004; World Bank, 2005; Disaster Management Bureau, GoB, 2010). According to the mortality risk index[4], measured by United Nations International Strategy for Disaster Reduction (UNISDR), four populous countries in Asia – Bangladesh, China, India, and Indonesia – are classified as the extreme category for average number of annual fatalities. This index shows that people in Bangladesh are most at the extreme risk from tropical cyclones. The aim of this paper is to examine the extent to which factors contributed at the household level to human losses caused by 2007 flood and Cyclone Sidr in Bangladesh, which is prone to frequent disastrous cyclones and derive policy implications for future promotion of resilience against disaster, particularly cyclones and floods. This paper mainly exploits the panel data of Bangladesh Rural Household Survey conducted in 62 villages under 62 Upazilas from each district of the country in 2004 and 2008. The remainder sections of this paper are structured as follows: Section 2 describes the major disasters in Bangladesh. Section 3 summarizes several efforts taken in Bangladesh in order to reduce disaster vulnerability and promote resilience against tropical cyclones and associated storm surges. Section 3 briefly describes the Bangladesh Rural Household Survey used for the paper. Then, the paper investigates the extent to which several factors including both household and village characteristics, including disaster prevention infrastructure like cyclone shelters, would contribute to reduction in human loss. Methodology and estimation results will be explained in Section 5 and Section 6, respectively. The last section will conclude.

2. Disasters in Bangladesh

Bangladesh is prone to a wide variety of disasters such as sea level rise, cyclones and storm surge, flood, land erosion, water logging, drought, salinity intrusion, river bank erosion, arsenic contamination of ground water sources, environmental pollution, earthquakes, and tidal bore, which lead to large scale impact on crop production, employment situation, household livelihoods and national economy (Chowdhury, 1998; United Nations, 2008). These disaster vulnerabilities differ

[4] The Mortality Risk Index identifies where people are most likely be at risk of sudden onset hazard, particularly tropical cyclones, earthquakes, floods and landslides. This index is measured based on frequency and severity, human exposure and identification of their vulnerability (for the detailed ranking, see http://www.unisdr.org/files/9928_MRIA3.pdf: accessed on 11 April 2013).

across the areas within Bangladesh (Islam and Ahmed, 2004). At least 70 major cyclones hit the coastal belt of Bangladesh from the past 200 years. The Noakhali-Chittagong Coast received 40 percent of the cyclones, which is the most vulnerable area for the landfall of cyclones. The landfall areas of cyclones that hit the Bangladesh coast is not uniform. Out of fifteen major cyclones since 1960, nine mainly struck the south-east coast, four mainly struck the south-west coast, and two affected the central and eastern coastal areas (BBS, 2009). It is predicted that global warning will cause an annual temperature rise in Bangladesh and result in greater frequency and intensity of cyclonic storms. Chowdhury et al. (2012) estimated that during the period of 1985-2009, tropical cyclones had an increase in annual frequency by 0.0492 cyclones per year. This upward trend in cyclone frequencies is also obvious from the longer period of datasets (Chowdhury, 2008). Between 1891 and 2010, 180 cyclones with different magnitudes hit the coastal areas of Bangladesh. The cyclones of 1970 and 1991 alone caused approximately 500,000 and 140,000 human casualties, respectively. Around 900,000 people along the coast died in the last 35 years in the country. Among these areas, southeastern coast received around one-third of the total cyclones in the country. Bangladesh is regarded as one of the countries which are vulnerable to cyclone and storm surges (see Mahmud and Prowse, 2012; Penning-Rowsell, Sultana, and Thompson, 2012; Mamud and Barbier, 2011; Dasgupta et al., 2010). Nearly half of the world’s total deaths due to cyclones occurred in Bangladesh (see Ali 1996). Geographical features worsen the damage by cyclones in Bangladesh. The geographic location, unusual characteristics of tropical monsoon climate, a shallow continental shelf with the confluence of three mighty river systems and funnel shaped estuary exacerbate cyclone and surge impacts in Bangladesh (Dasgupta et al., 2010; Paul 2009; Paul and Routray, 2011). About ten percent of the territory of Bangladesh is only one meter above the mean sea level (Mohal et al. 2006). Under such circumstances, even incrementally small elevations in sea level would do severely and greater negative effects on coastal territory in the country. With respect to sea level rise, Bangladesh has been rated as the third most vulnerable country in the world in terms of number of people affected. Particularly, the coastal area of Bangladesh is well-known for severe cyclones and induced surges (Paul 2009). In this area, cyclones and induced surges are a recurrent phenomenon (Paul and Routray, 2011). At least one major tropical cyclone strikes the Bangladesh coast each year (Mooley, 1980) with powerful tidal surges that impact hundreds of thousands of lives and make it more unsafe than many other regions of the world (Murty and Neralla 1992). This coastal zone of Bangladesh is one of the top ten potentially deadly locales, where live 29 percent (i.e. 40 million) of the total population of the country (see Dasgupta et al. 2009). Among other cities, Chittagong and Khulna are found to be at higher risks for mortality and economic losses (Brecht et al., 2013). Between 1877 and 2009 Bangladesh was hit by 159 cyclones, including 48 severe cyclonic storms, 43 cyclonic storms, 68 tropical depressions (see Ali, 1999; Miyan, 2005; Karim and Mimura, 2008). Since record keeping commenced in 1877, more than one million people have died in the country as a result of cyclones. On average, a severe cyclone strikes Bangladesh every three years (GoB 2009). Usually, those cyclones are reported particularly in the pre-monsoon months of April and May and the post-monsoon months of October and November (Miyan, 2005). Most cyclones made landfall along the coast of Bangladesh and caused catastrophe and casualties. More recently 2007 Cyclone Sidr and 2009 Cyclone Aila in Bangladesh provided examples of devastating storm-surge impacts in coastal areas, which affect population, livelihoods, socio-economic systems, environments, and health (Mallick, Rahaman, and Vogt, 2011a; Chowdhury, 1998, Alam et al., 2003). In the last three decades, major floods have occurred in Bangladesh in 1987, 1988, 1998, 2004 and 2007.[5] During each flood, hundreds of people have been killed. Damage to crops, small enterprises and infrastructure was as high as several billion US dollars, severely disrupting the local economy. Normally, 20 to 25 percent of the country is inundated during every monsoon season. In the case of extreme flood events, 40 to 70 percent of the areas of the country can be inundated. The number and severity of cyclones in Bangladesh and the associated human losses have varied greatly during the past 50 years (see Haque et al., 2012). The two deadliest cyclones occurred in 1970 and 1991, with more than 500,000 and almost 140,000 deaths, respectively. However, during the past twenty years, Bangladesh has managed to reduce deaths and injuries from cyclones. For example, the recent severe cyclone of 2007 caused 4,234 deaths, a dramatic reduction in human losses compared with the devastating 1970 cyclone (see Haque et al. ,2012; Paul et al., 2010; Paul 2009). Mallick, Rahaman, and Vogt (2011a) mentioned that this is particularly because of developing cyclone shelters and an effective early warning system.

3. Disaster Management in Bangladesh

Disaster management in Bangladesh particularly for tropical cyclones is very reactive like other developing countries. Bangladesh gained independence in 1971, and before the independence, there was hardly any effort in terms of disaster planning and management. As mentioned in the previous section, in the 1970 cyclone, the death tolls were huge mainly because there was no dissemination of cyclone warning by the government in those days (Islam, 2006). After independence, in order to reduce disaster vulnerability and promote resilience against tropical cyclones and associated storm surges, several efforts and measures for disaster management have been taken in Bangladesh: 1) cyclone preparedness programme (CPP); 2) construction of cyclone shelters and killas; 3) early warning systems; 4) coastal embankment project; and 5) afforestation program.

[5] Floods in Bangladesh are categorized as follows: (i) monsoon floods, which increase slowly and decrease slowly, inundate vast areas and causes huge loss to the life and property; (ii) flash floods from sudden torrential flows, following a brief intense rainstorm; (iii) tidal floods, which are of short duration but are generally three to six meter high; (iv) rain floods caused by drainage congestion and heavy rain.

3.1 Cyclone Preparedness Programme

Prevention measures for cyclone disaster have improved following the launch of the Cyclone Preparedness Programme (CPP) established in 1972 under an agreement between the Bangladesh Ministry of Disaster Management and Relief and the Bangladesh Red Crescent Society (Khan and Rahman 2007; Paul and Dutt, 2010). The CPP includes the following activities: a) disseminating cyclone warning signals issued by the Storm Warning Center (SWC)[12] through an extensive telecommunication network; b) providing and assisting in first aid, rescue, relief and rehabilitation operations; c) coordinating and building community capacity, disaster management and development activities. The goal of the CPP is to minimize the loss of lives and property in cyclonic disasters by strengthening and developing disaster preparedness and response capacity in coastal communities, and by increasing the effectiveness of volunteers (Haque et al., 2012). The CPP covers eleven coastal districts, which are made up of 32 *Upazilas* consisting of 274 unions. Field-level work of the CPP is based on 2,845 local CPP unites, which are distributed throughout coastal villages. Each unit covers one or two villages with a population range between 2,000 and 3,000 people (Karim and Mimura 2008; Paul, 2012; Paul et al., 2010). CPP volunteers in these villages are eventually responsible for directly disseminating cyclone warnings to at-risk communities via megaphones and house-to-house visits and to assist in their evacuation. The warnings are also disseminated through radio and TV news as well as local administration. The CPP volunteers have an important role for cyclone warning dissemination to at-risk communities in Bangladesh. The volunteers are typically school teachers, social workers, clergymen, local government officials and community leaders (Haque, 1995: 722). At the time of the 1991 cyclone, there were around 20,000 CPP volunteers stationed in coastal districts (Chowdhury et al., 1993). The number increased more than double to 42,675 between 1991 and 2007 (see Penning-Rowsell, Sultana, and Thompson, 2012; Paul et al., 2010; Paul, 2009).

3.2 Construction of Cyclone Shelters and Killas

At present, cyclone shelters in the coastal regions of Bangladesh play a very important role in protecting human lives and livestock during cyclones. For example, during the Cyclone Sidr in 2007, fifteen percent of the affected population took refuge in cyclone shelters. After the devastating cyclone of 1970, the government and other agencies undertook construction of public cyclone shelters (Dasgupta et al., 2010). A program to construct the cyclone shelters in the coastal areas of Bangladesh was also initiated in 1972 to protect coastal residents from future cyclones and associated storm surges (Paul, 2012). During 1972-1979, a sum total of 238 shelters were constructed in coastal districts out of which eleven shelters appeared to have been washed away. Each shelter was capable of accommodating about 2,000 people during cyclones and tidal surges.

[12] This is a specialized unit of the Bangladesh Meteorological Department (see Paul et al., 2010: 91).

After 1985 cyclone, Bangladesh Red Crescent Society constructed 62 shelters and Caritas and other NGO’s constructed twenty shelters. These shelters are two-storied frame building with free ground floor and three meter height of RCC columns, which can accommodate 800 people during cyclones and associated storm surges. After the devastating cyclone of 1991, various organizations like Bangladesh Red Crescent Society, Ministry of Education with a Saudi grant, EEC, local Government Engineering Bureau as well as several NGOs have constructed considerable number of cyclone shelters with different types and designs (Mallick and Vogt, 2011; Mallick, Rahaman, and Vogt, 2011a). There is a need for development of multipurpose cyclone shelters along the coastal areas. During a normal period, these cyclone shelters are used as schools, community centers, and offices (Mallick, Rahaman, and Vogt, 2011a,b; Paul, 2012). Recent design of the shelters has the overhead water storage and the space to shelter livestock on the first floor, located on the floor under the space for the evacuees (Dasgupta et al., 2010). Animals can approach to the shelters through the slope. Many existing shelters are in dilapidated condition and have a host of problems, including insufficient lighting, broken windows and doors, lack of water and sanitation facilities, and lack of separate space for women. Worst of all, the shelters cannot accommodate all of the people who live in the cyclone-prone coastal districts (Paul and Dutt, 2010). According to the CEGIS survey in 2004, more than 65 percent of the shelters had no provision for the special needs of women; almost no facility was user friendly for people with disabilities; and 80 percent had no safe haven for livestock (Dasgupta et al., 2010). After Cyclone Sidr, the Bangladesh government initiated the construction of 2,000 new cyclone shelters in fifteen low-lying coastal districts, but the number and location of shelters remain inadequate for the population (Haque et al., 2012). In many instances, politicians and government officials selected shelter sites for political reasons rather than on the basis of safety requirements and local conditions (Talukder, Roy, and Ahmad 1992). Paul and Dutt (2010) pointed out that there are an insufficient number and an inadequate distribution of cyclone shelters. Many lives could have been saved if more shelters had been situated near villages likely to be struck by cyclones. Experts have already advised that a minimum of 3,000 additional cyclone shelters be built in order to provide adequate shelters for coastal residents in Bangladesh. However, because distance appears to be an important factor in determining the utilization or non-utilization of cyclone shelters, these facilities need to be located within 1.5 kilometers of each village in the coastal zone. This particular issue should receive the highest priority in the government’s CPP. A denser network of smaller public shelters would be preferable to less numerous and larger shelters because such a network would reduce the house-to-shelter distance, which would not only encourage greater utilization but also provide better protection of residents’ property. Even if with the sufficient number and the adequate distribution of the shelters, early warning messages need to be promptly delivered to the households in the villages likely to be struck by cyclones. In addition to the development of cyclone shelters, nearly 200 raised earthen platforms called *killas* have also been constructed in the cyclone-prone areas to safeguard livestock from cyclones and storm surges (GoB, 2008). A *killa* can shelter 300 to 400 livestock (Talukder, Roy, and Ahmad 1992). In some cases, the *killa* sites have been found to be inaccessible and undesirable. The maintenance of these facilities has been very poor; most of them are full of bushes and have become a habitat for snakes and harmful insects. Similar to the situation with cyclone shelters, the number of *killas* established in cyclone-prone coastal districts is insufficient to accommodate all livestock in these areas (Paul, 2012).

3.3 Early Warning System

Early warning systems were introduced in South Asian countries after the devastating cyclone of 1970. Although Bangladesh is extremely susceptible to catastrophic cyclones, the people's response to early warning systems has not been adequately and systematically investigated (Paul, 2012). There is some evidence that the coastal inhabitants depend on indigenous early warning indicators of cyclone hazard based on an observation of unusual weather, sea patterns and animal behavior (Hassan, 2000; Alam et al. 2003; Howell, 2003). In the past, the early warning and evacuation systems of Bangladesh have played an important role in saving lives during cyclones. In general, Bangladesh Meteorological Department issues forewarning for any impending cyclones and storm surges; newspapers, television channels and radio stations broadcast the warning; and the local government administration and the local Cyclone Preparedness Program (CPP) volunteers run by the Red Crescent Society lead the evacuation of the people (Dasgupta et al., 2010). The Red Crescent Society officials, CPP volunteers and residents of major cyclone affected areas pointed out the urgent need for broadcasting the warnings in the local dialects and the need to raise awareness for the importance of timely evacuation. Using local dialects is of importance as illiterate poor people often experience difficulties in understanding sophisticated Bengali (Dasgupta et al., 2010). Even among people with the timely receipt of news of 2009 Cyclone Aila, most of them did not pay careful attention on the early warning messages as there was very little faith about the warnings delivered from local radio (Mallick, Rahaman, and Vogt, 2011a). This was the primary cause of extreme human losses. Similarly, of the respondents who did not take refuge, 25 percent said that they did not receive any cyclone warnings prior to Cyclone Sidr's landfall. Nearly nineteen percent of non-evacuee respondents reported that they did not believe the cyclone warnings. One of the main reasons for this disbelief was a false tsunami warning issued in Bangladesh two months before Sidr's landfall. Nearly fourteen percent of non-evacuee respondents did not comply with evacuation orders either because the orders were issued long before the storm's landfall or because of the incompleteness of the warning messages (Paul, 2012).

3.4 Coastal Embankment Project

In addition to these measures, a coastal embankment project was initiated in Bangladesh in the 1960s to increase crop production by preventing the intrusion of saline ocean water into crop fields located near the coast (Choudhury, Paul, and Paul 2004). Since then, a series of embankments have been constructed to protect coastal regions, including around 4,000 km of coastal embankments surrounding the Bay of Bengal and offshore islands (BWDB, 2000). In the 1960s, 123 polders and supporting infrastructure were constructed to protect low-lying coastal areas against tidal flood and salinity intrusion in Bangladesh (Mallick, Rahaman, and Vogt, 2011a). Later, after the ability of embankments to reduce or prevent damage from cyclone and storm surges was demonstrated, the embankment project was extended to cover all coastal regions of the country (Khalil 1992). Unfortunately, because of poor maintenance and inadequate management, most of the sea-facing embankments are in very dilapidated condition, with numerous cuts or portions partially or completely eroded (Paul, 2012).

3.5 Afforestation Program

Moreover, after the 1966 cyclone, the government initiated a massive afforestation program along the coastal zone, including in Sunderbans (Karim and Mimura 2008). Coastal forests not only provide protection for residents and the environment against tidal and storm surges but also act as a natural barrier that slows surge waves and stabilizes coastal land (GoB, 2008). Coastal vegetation was found to be protective during Cyclone Sidr when mangrove forests saved the south-western part of Bangladesh. During a different storm, it reduced the death toll from a cyclone in India in 1999 (Das and Vincent, 2009). Reforestation of approximately 1200 km^2 of mangrove forests in Bangladesh has been carried out to mitigate cyclone risk (Saenger and Siddiqi, 1993). Continued technological advances will increase preparedness and help mitigate the effects of cyclones and associated storm surges in Bangladesh (Haque et al., 2012). Although there is currently little scientific evidence regarding the impact of disaster management measures such as cyclone shelters, coastal embankments and/or awareness programmes on cyclone-related mortality, they appear to have saved millions of lives. This study attempts to fill in this gap.

4 Data

In order to examine factors contributing to human losses caused by 2007 flood and Cyclone Sidr, this paper uses the panel data of Bangladesh Rural Household Survey conducted by Socioconsult Ltd. in 62 villages under 62 Upazilas from each district of the country in 2004 and 2008. The surveys were sponsored by IRRI, IFPRI and BRAC. In order to facilitate dialogues on strategies and policies related to poverty reduction, the survey collected the following information: demography, migration, agriculture and other livelihood sources, income and expenditure, consumption, housing, perception about changes in economic conditions. In addition, it also has collected information on village profile such as population, total land, irrigated land, and flooded area. Furthermore, the 2008 survey had the special module regarding the loss by 2007 flood and Cyclone Sidr, including the loss of property such as houses, crops and livestock as well as sources of funding for recovery. Based on the 2008 survey, it was revealed that 2007 flood and Cyclone Sidr damaged most households in Barisal division, while it did little for those in Sylhet division. The damage by these natural disasters spread all over the other districts, particularly coastal districts as well as districts along the Ganges (or Padma), Brahmaputra (or Jamuna), and Meghna Rivers.

5 Methodology

The methodological framework of this paper is based on the conventional risk hazard models (see UNDP, 2004; Dao and Peduzzi, 2004; Turner et al. 2003; UN/ISDR, 2009). Risk is defined as the probability of harmful consequences or expected losses of lives, resulting from interactions between hazards, exposure, and vulnerable conditions (see UNDP, 2004; Turner et al., 2003). In practice, depending on availability of data, this can be measured by human loss due to hazard. This paper uses household-level mortality as a measure of cyclone and storm surge impact. Thus, the model can be written as follows:

(1) $Loss = f(Hazard,\ Exposure,\ Vulnerability)$

where *Loss* denotes the household-level losses due to cyclone and associated storm surges, which are human losses from the 2007 flood and Cyclone Sidr. *Hazard* refers to intensity of flood and cyclone occurred in Bangladesh in 2007. *Exposure* is defined based on UN/ISDR (2009), stating that "people, property, systems or other elements present in hazard zones that are thereby subject to potential losses". This can be measured by numbers of people or types of assets in a village. This study utilizes the household data on family size and family composition before experiencing the disaster, particularly shares of family members potentially at high risk of exposure such as those of female, children, and old people. Similarly, as of vulnerability, UN/ISDR (2009) mentions that there are many aspects, resulting from economic, social, and physical features which vary significantly within the village and over time. *Vulnerability* is defined as the characteristics and circumstances of households and villages that make it susceptible to the damaging effects of a hazard. Here, the paper measures the vulnerability using the following variables: household welfare; housing material; access to information on disaster warnings and cyclone shelters; and village population density. In order to examine factors influencing human loss caused by the 2007 flood and Cyclone Sidr, we use the empirical model which can be express as follows:

(2)
$$\begin{aligned} hloss_{ij} &= \alpha + \beta_1 \cdot cyclone_j + \beta_2 \cdot flood_j + \beta_3 \cdot fsize_i + \beta_4 \cdot female_i + \beta_5 \cdot age0\_5_i + \beta_6 \cdot age65over_i \\ &+ \beta_7 \cdot welfare_i + \beta_8 \cdot wall\_d_i + \beta_9 \cdot tv\_d_i + \beta_{10} \cdot shelter_j + \beta_{11} \cdot popden_j + \beta_{12} \cdot interact_i + \varepsilon \end{aligned}$$

where $hloss_{ij}$ denotes either human or economic losses within the *i* th household in the *j* th village.

This is approximately measured by reduction in family size during the said period as the 2008 survey did not directly ask the respondents about the number of the dead caused by flood and cyclone occurred in 2007. The number of babies born during this period was excluded from this estimation. In order to estimate the extent to which family size decreased, number of migrants was also taken into account as some family members might stay away from a household head. With regard to human loss, the dummy variable of $hloss\_d_{ij}$ was also generated for logistic regression estimates. In addition, a decrease (or an increase) in family size due to its split (or extension) due to marriage, divorce, and separation was also considered when the level of human loss was estimated. $cyclone_j$ refers to a tropical cyclone intensity, which is measured based on a wind speed at village level. This is a measure of how affected a village household is by Cyclone Sidr in 2007. Following Yang (2008), this affectedness is estimated by the square of the wind speed above the tropical storm wind speed threshold (i.e. 38 mph), normalized by the maximum of this variable (i.e. w_{MAX} = 200 mph) as the pressure exerted by winds on structures is in general modeled as rising in a squared term rather than a linear relation (see Emanuel, 2005). This is given by:

(3) $$cyclone_j = \frac{(w_j - 38)^2}{(w_{MAX} - 38)^2}$$

where w_j is the wind speed (in mph) to which village households were exposed in their location j, which is estimated based on CEGIS (2008). This cyclone intensity measure has the range of zero to one. If households were exposed to the maximum wind speed, this measure is one, while it becomes zero if the wind speed is below the tropical storm wind speed threshold (i.e. 38mph). $flood_j$ refers to the intensity of the flood occurred in 2007. This captures the extent to which a village was affected by flood in 2007, which is defined as a proportion of the land flooded by 50 cm and more deep water. This flood information was derived from the 2008 Rural Household Survey. $fsize_i$ is the natural logarithm of number of total family members in 2004. For the shares of female family members, family members aged zero to five, and family members aged 65 and over as of 2004, we used the variables of $female_i$, $age0\_5_i$, and $age65over_i$, respectively. $welfare_i$ shows the welfare level of the i th household, defined by per capita annual expenditure on essential commodities in 2004. It has the characteristics of a skewed to the right distribution. In order to make this variable normally distributed, we take the logarithm of the variable. $popden_j$ is a population density in the j th village. In addition to the above variables in the estimation equations, the several dummy variables are also added to capture the effects of each factor influencing the human losses. The variable $wall\_d_i$ identifies housing vulnerability. Access to disaster-related warnings also matters when households face the disaster like flood and cyclone. Ownership of a TV set was included as a dummy variable of tv_d_i, to consider its effect on human suffering. The interaction terms of tv_d_i, and each hazard variable was also included in the model. For examining whether existing cyclone shelters could contribute to reduction in the losses, the dummy variable, $shelter_i$, was included in one of the explanatory variables in the estimation models. This variable denotes whether there is a cyclone shelter within a village or not. Table 1 and Table 2 show the definition of variables used in the analysis and their summary statistics. When it comes to the dependent variable, nearly two-thirds of households did not experience any human loss after the 2007 flood and Cyclone Sidr (see Table 2). In equation (2), the dependent variable $hloss_{ij}$ is the household-level human death figures and is a non-negative count variable, and thus the estimation equation is expected to take a Poisson or some other count model approximations such as a negative binomial model and a hurdle model (or two-part model). Figure 1 shows the actual distribution of $hloss_{ij}$. In order to examine whether death occurred or not in a household, we also use a dichotomous variable, i.e. $hloss\_d_{ij}$ for a logit approximation, instead of $hloss_{ij}$ in equation (2). In the next section, we first separately estimate the probability of human loss using a logit regression and its level using both Poisson and negative binomial models. Then, we consider the hurdle model (or two-part model) which takes into account the models of the probability and the level of human deaths and relaxes the assumption that the zeros and the positives come from the same data-generating process. The two parts of the model are functionally independent. The first part (i.e. a probability equation) uses the full sample, but the second part (i.e. a level equation) uses only the positive count observations. We use the logit model for the first part, while the zero-truncated Poisson or the zero-truncated negative binomial model for the second part.

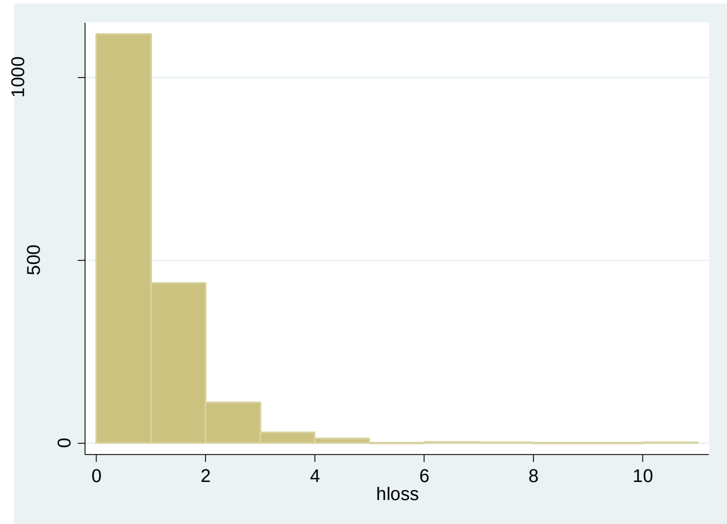
Table 1. Definition of variables used

Variable Name	Variable Description
Loss	
hloss_d	=1 if human loss within a household between 2004-2008; =0 otherwise
hloss	Number of human deaths within a household between 2004-2008
Hazard	
cyclone	Tropical cyclone intensity (based on wind speed, mph)
flood	Flood affected area
Exposure	
fsize	The natural logarithm of number of total family members in 2004
female	Share of female family members in 2004
age0_5	Share of family members aged 0-aged 5 in 2004
age65over	Share of family members aged 65 and over in 2004
Vulnerability	
welfare	The natural logarithm of per capita annual expenditure on essential commodities in 2004
wall_d	=1 if wall is made of concrete; =0 otherwise
tv_d	=1 if a household owns a TV set; =0 otherwise
shelter	=1 if there is a cyclone shelter within a village; =0 otherwise
popden	Village population density

Table 2. Summary Statistics

Variable Name	Obs	Mean	Std. Dev.	Min	Max
Loss					
hloss_d	1722	0.350	0.477	0	1
hloss	1722	0.510	0.937	0	11
hloss (if hloss > 0)	603	1.458	1.063	1	11
Hazard					
cyclone	1742	0.138	0.216	0	1
flood	1742	0.408	0.341	0	1
Exposure					
fsize	1739	1.512	0.450	0	3.045
female	1739	0.494	0.181	0	1
age0_5	1739	0.117	0.147	0	0.667
age65over	1739	0.054	0.147	0	1
Vulnerability					
welfare	1739	8.059	0.682	5.407	11.55
wall_d	1742	0.175	0.380	0	1
tv_d	1742	0.300	0.458	0	1
shelter	1742	0.017	0.128	0	1
popden	1742	6.983	5.121	0.735	28

Figure 1. Distribution of human loss, at household level



6 Factors influencing human deaths by cyclone

The five sets of models examined factors influencing the human loss caused by the 2007 flood and Cyclone Sidr (see Table 3). As mentioned in the methodology section, the first three columns show the estimation results of the models which separately examine the probability and the level of the human loss, using the logit model and the Poisson or negative binomial models respectively. On the other hand, the columns of Model 4 and Model 5 are the results derived from the hurdle models (or two-part model) which are the mixture of the logit estimation for the probability equation and the Poisson or the negative binomial models for the level equations. In order to find the estimation model which best fits the data, the commonly used model-comparison statistics of log likelihood and Akeike information criteria (AIC) are computed (see Table 4). These criteria suggest that Model 5 provides the best fitting specification as higher log likelihood and smaller AIC are preferred. Thus, in this section, we mainly discuss the result of Model 5 in Table 3.

Table 3. Marginal effect and standard error estimates of the human deaths (or cyclone impact) function: Dependent variable = hloss_d (for Logit) /hloss (for either Poisson or NB2)

	Model 1	Model 2	Model 3	Model 4		Model 5	
				Poisson hurdle		NB2 hurdle	
	Logit	Poisson	NB2	Logit	Poisson	Logit	NB2
	(Probability)	(Level)	(Level)	(Probability)	(Level)	(Probability)	(Level)
Hazard							
cyclone	0.0936**	0.1758**	0.1796**	0.1033**	0.2284	0.1033**	0.1273
	(0.0371)	(0.0870)	(0.0898)	(0.0408)	(0.1900)	(0.0408)	(0.1235)
flood	0.0018	0.0236	0.0269	0.0016	0.1305	0.0016	0.0663
	(0.0368)	(0.0638)	(0.0645)	(0.0410)	(0.1044)	(0.0410)	(0.0731)
Exposure							
fsize	0.3171***	0.7689***	0.7555***	0.3483***	1.0730***	0.3483***	0.6012***
	(0.0283)	(0.0648)	(0.0594)	(0.0350)	(0.0953)	(0.0350)	(0.1992)
female	0.4213***	0.6818***	0.6830***	0.4628***	0.0239	0.4628***	0.0404
	(0.0648)	(0.1324)	(0.1300)	(0.0739)	(0.2649)	(0.0739)	(0.1460)
age0_5	0.0472	-0.1174	-0.0974	0.0519	-0.7969**	0.0519	-0.4876**
	(0.0970)	(0.1743)	(0.1720)	(0.1066)	(0.3170)	(0.1066)	(0.2389)
age65over	0.1280	0.4039**	0.3987**	0.1406	0.8225***	0.1406	0.3962**
	(0.0958)	(0.1946)	(0.1901)	(0.1055)	(0.2830)	(0.1055)	(0.1806)
Vulnerability							
welfare	-0.0457***	-0.0601*	-0.0535*	-0.0502***	0.0140	-0.0502***	0.0185
	(0.0175)	(0.0325)	(0.0299)	(0.0192)	(0.0916)	(0.0192)	(0.0449)
wall_d	-0.0303	-0.1173*	-0.1191*	-0.0332	-0.2494	-0.0332	-0.1483
	(0.0305)	(0.0697)	(0.0656)	(0.0335)	(0.1551)	(0.0335)	(0.1263)
tv_d	-0.0658***	-0.0636	-0.0683	-0.0718***	0.0723	-0.0718***	0.0374
	(0.0248)	(0.0466)	(0.0462)	(0.0265)	(0.0969)	(0.0265)	(0.0633)
shelter	-0.1114***	-0.2390***	-0.2284***	-0.1223***	-0.1765	-0.1223***	-0.1121
	(0.0227)	(0.0468)	(0.0475)	(0.0251)	(0.1249)	(0.0251)	(0.0735)
popden	-0.0012	-0.0009	-0.0009	-0.0013	0.0065	-0.0013	0.0045
	(0.0024)	(0.0030)	(0.0029)	(0.0027)	(0.0057)	(0.0027)	(0.0031)
Number of obs	1722	1722	1722	1722	603	1722	603

Note: a) * p<0.10, ** p<0.05, *** p<0.01. b) NB2 denotes a negative binomial model. c) The interactions of *tv_d* and hazard variables (i.e. *cyclone* and *flood*) are used for the coefficient estimations.

Table 4. Model selection for a level equation

Model	Log Likelihood	AIC
Model 2: Poisson	-1545.67	3117.34
Model 3: Negative Binomial (NB2)	-1523.19	3074.39
Model 4: Poisson hurdle	-1515.20	3082.40
Model 5: Negative Binomial hurdle (NB2 hurdle)	-1499.48	3052.96

Note: Akeike information criteria (AIC)

6.1 Hazard and human deaths

Our estimation result found the positive correlation between the wind speed of Cyclone Sidr and the probability of the human loss. But the flood affectedness by the cyclone was not found to significantly increase its probability though the effect was positive. Contrary to expectations, this study did not find a significant influence of the intensities of the wind speed and the sizes of flood affected area on the level of the human loss among the household with dead family members, which is significantly determined by household exposure to the cyclone.

6.2 Exposure and human deaths

The factors related to the exposure, particularly family size, significantly affect both the probability and the level of the human deaths by Cyclone Sidr. The greater the number of family members is, the household has a higher risk of losing their lives. This is a predictable result. With regard to the influences of family composition, this study confirms that the households with higher shares of female have a greater probability of having a loss of their family members. This is explained by the fact that female is more vulnerable in Bangladesh mainly because of its social and cultural aspects. In the past studies, women’s willingness to stay their homes even during cyclones, a mother’s protective instinct to save her children, and women’s clothes (i.e. sarees) and their long hair hinder movement while trying to swim in tidal waves have all been cited as reasons for the higher risk of death (see Alam and Collins, 2010). In addition, Sharmin and Islam (2013) also mentioned that female’s limited decision-making processes increases their vulnerability to natural disasters. For example, in the face of the cyclone and flood of 1991 in Bangladesh, warning information was transmitted by men to men in public spaces, but male members rarely communicated to the rest of the family. Even women were not allowed to leave the house without male, and as a consequence they perished waiting for their male members to return home and take them to a safe place. Moreover, as in many other Asian countries, most Bengali women have never learned to swim which significantly reduces their survival chances in case of flooding. Furthermore, women often do not go to the cyclone shelters due to an insecure environment there and hence, they prefer to stay back home during a cyclone. Such deliberate actions were results of social insecurity. The study also found that the share of the elderly persons has the positive effect on the number of human deaths while the share of small children shows the opposite role if they lost the life of at least one family member. The elderly have a tendency to dismiss warnings in a cognitive process framed by situational factors, such as compromised mobility and media access (Gruntfest, 1987; Paul, 2012). In general, past studies have stated that children are also vulnerable to cyclones. However, Alam and Collins (2010) mentioned that mothers have protective instincts and are prepared to die trying to save her children.

6.3 Vulnerability and human deaths

The household vulnerability factors were found to only influence the probability of the human loss caused by Cyclone Sidr. The important findings to derive from our estimation models are that the households with access to cyclone shelter and disaster-related warnings significantly have the lower probability of experiencing the loss of their family members. An improvement in the access to them could contribute to a significant reduction in the cyclone victims. Moreover, strong evidence of the greater death risk was found for poorer households. This can be explained by the fact that poor households are less likely to have access to multiple media or certain technologies, thus inhibiting reception of cyclone warnings, and also to live in the areas with more vulnerable to the disaster, for example those near from the river or along the coast and those without land elevation.

7 Conclusion

This paper has given an account of the reasons for disaster vulnerability in Bangladesh, which is particularly prone to the disaster by tropical cyclones and associated storm surges. In order to reduce disaster vulnerability and promote resilience against tropical cyclones and associated storm surges, several efforts have been taken in Bangladesh: cyclone preparedness programme (CPP); construction of cyclone shelters and killas; early warning systems; coastal embankment project; and afforestation program. The purpose of this paper was to investigate the extent to which factors contributed at the household level to human loss caused by 2007 flood and Cyclone Sidr in Bangladesh. In doing so, the paper mainly exploits the panel data of Bangladesh Rural Household Survey conducted in 62 villages under 62 Upazilas from each district of the country in 2004 and 2008. First, the results of this investigation show that there is evidence that the existence of cyclone shelters significantly contributed to saving lives during the 2007 flood and Cyclone Sidr. Second, the finding of the study revealed that the access to disaster-related warnings matters. The ownership of a TV set has an indispensable role to save local people in that regard. Lastly, family composition, particularly the shares of female and the elderly in a household, was found to significantly influence the human loss. In order to reduce the number of deaths, further attempts with the community-based supports and a change in the cultural mindsets are needed to save greater numbers of the elderly or female cyclone sufferers.

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複雑化する国際環境とわが国の国際人道支援の変遷

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1. はじめに

「人道支援」は、一般的に、「災害や紛争によって影響を受けた人々の生命を救い、苦しみを軽減し、人間の尊厳を守るための支援」と定義されている。また開発援助との対比においては、開発援助が、途上国が実施する投資事業への資金的支援や人材育成、政策支援など、相手国の能力の活用を基本としているのに対し、人道支援は「一時的に能力を発揮できなくなっている人々に対する人的・物的な直接支援である」と言うこともできる。

わが国の本格的な国際的人道支援活動は、1970 年代末のタイ・カンボジア国境の難民支援に始まり、その後 30 余年の間に、体制、機能などにおいて大きな進展を遂げてきた。本稿では、政府が実施する国際緊急人道支援を中心にその歴史を振り返り、現在までに達成された成果を抽出するともに、」現在の国際環境の中での課題について検討する。

２．わが国の国際緊急人道支援の歴史

1979 年 1 月のポル・ポト政権の崩壊により、カンボジアからタイに流出した 150 万人（ピーク時）に達する難民に対し、国連及び米欧の国際 NGO は医療支援を中心に大規模な救援活動を展開した。しかし、当時の日本にはこのような人道危機に対応できる体制が整備されておらず、6,000 万ドルに及ぶ資金提供を表明したものの、「世界第 2 位の経済大国でありながらアジアの人道問題を座視している」として国内外の批判を受けることとなった。

こうした批判に応えるために急遽結成されたのが、「カンボジア難民救援医療チーム」（Japan Medical Team: JMT）である。JMT の名の下、1980 年～82 年の間に計 13 チーム、407 名の医療従事者が派遣された。この時の要員は、日本政府が国公立の病院や国立大学等に働きかけることにより確保されたが、通常業務を中断しての 3 か月単位での派遣であったため、その過程には多大な苦労を伴った。更に「出口戦略」が明確でなかったことから、他のドナーが撤退したあとも支援継続を余儀なくされた。

この反省に基づき、緊急時に政府が即座に召集・派遣できる体制を予め整備しておくことを目的として、1982 年、「国際救急医療チーム」（Japan Medical Team for Disaster Relief: JMTDR）の設立が閣議で了承された。JMTDR は登録制により広く人材を確保し、外務省・JICA が事務局機能を務める、いわば「官制ボランティア組織」として成立した。JMTDR の派遣は、1984 年のエチオピアの干ばつ被害による国内避難民への支援が最初であり、救援物資の供与も同時期に開始された。その後、先進各国の緊急人道支援を学ぶ中で、医療支援だけでなく、総合的な支援体制を整備する必要性が認識され、1987 年に「国際緊急援助隊の派遣に関する法律」が成立した。この法（通称 JDR 法、JDR: Japan Disaster Relief）整備により、医療チームに加え、救命救助を目的とする救助チーム及び災害後の様々な対応

への助言を行う専門家チームが国際緊急援助隊の構成要素となった。

その後、大きな転換点となったのは 1992 年の「国際平和協力法」(通称 PKO 法、PKO：Peace Keeping Operations)の成立である。PKO 法はわが国の国連平和維持活動（PKO）への参加を可能にするために制定された法である。この審議の過程で、国際緊急援助隊との関係について外務省は、「JDR 法は自然災害及び紛争に起因しない人為災害に適用される」と国会で説明した。その結果、1991 年のクルド難民支援を最後に、紛争により発生した難民や国内避難民への支援は国際緊急援助隊による支援の対象外であるというのが、一般的な了解事項となった。また PKO 法と同時に JDR 法も改正され、自衛隊が国際緊急援助活動を行うことが可能となった。この時に確立した体制は、現在に至るまで基本的に変わっていない。

2000 年以降、世界各地で発生する災害は激甚化し、わが国もその都度人員の派遣、物資の供与、資金（緊急無償資金）の供与を組み合わせて対応してきた。中でも 2004 年 12 月末に発生したスマトラ沖地震・津波災害に対しては、医療、救助、専門家、自衛隊部隊を合わせ、最大規模のオペレーションを展開した。

３．国際緊急人道支援の質の向上

（１）高い意欲と統一した理念を持つ医療チーム

カンボジア難民支援の経験を元に設立された医療チーム（JMTDR）は、いくつかの基本原則に沿って運営されている。その第一は、所属、職業、居住地、国籍を問わず、個人の自発的意思に基づく登録制により待機態勢を維持すること、第二は、全員が同じ理念と方式に基づいて行動することである。この原則に基づき、現在、災害医療の第一人者をチームのコア・グループとしつつも、全国各地の様々な専門性を持つ 1,000 名を超える人材（非医療従事者を含む）が登録している。また新規登録者に対する導入研修や、既登録者に対する専門別の中級研修（年 3 回）により、統一した行動様式や診療方式の浸透を図っている。医療チームが派遣されるごとに教訓が抽出され、次の研修に反映されている他、手術機能の付加などの強化策にも取り組んでいる。

更に、薬剤の使用や廃棄において国際標準を順守すること、現地の医療水準との調和を目指すことなども重要な基本原則であり、現地の医療が復旧した段階で撤退するという出口戦略も明確にされている。

（２）国際標準に沿って整備された救助チーム

JDR 法成立後、救助チームの最初の派遣は、1990 年のイラン地震災害であった。この時の隊員はわずか 15 名の小規模チームだった。現在、救助チームは 70 名弱の編成となり、レスキュー隊員だけでなく、医療班や建築物の構造評価専門家も含む構成となっている。

このような体制に整備されてきた背景には、国際捜索救助諮問グループ（International Search and Rescue Advisory Group：INSARAG）の存在がある。INSARAG は、1988 年のアルメニア地震に対する国際支援の混乱を背景に、問題意識を共有する国が集まって作ったインフォーマルなネットワークであり、創立メンバーには JICA の若手職員も名を連ねていた。国連人道問題調整事務所（Office for Coordination of Humanitarian Affairs：OHCA）が、事務局となっている。INSARAG は、各国のチームが最低限備えるべき技術レベル、組織・体制、派遣から撤収に至るまでの手順、調整の枠組みへの参加方法などをガイドラインとしてまとめるとともに、各国の能力を分類するための検定（ピア・レビュー）を実施して

いる。日本の救助チームは2010年に最高レベルであるヘビー・チームに認定されたが、その過程で、ガイドラインに基づく体制整備が行われた。

また、日本は、国連が主導する調整の枠組みである国連災害評価調整チームへの要員の登録・派遣や、運営委員会での議論にも、積極的に貢献している。

（３）NGOによる緊急人道支援の拡大

国際的に緊急人道支援を行うわが国のNGOは、カンボジア難民支援を機に設立されたとされているが、その後海外で人道支援を行うNGOは徐々に増えていった。しかし単独のNGOでは十分な財源の確保ができないという制約があり、その克服のため、2000年にNGO、政府、企業のパートナーシップにより国際人道支援を展開するためのジャパン・プラットフォーム（JPF）が設立された。

国際的には、国際赤十字・赤新月社連盟、国際赤十字委員会及び国際NGOが人道支援の倫理上の原則を列記した「行動規範」を1994年に策定したが、同規範に調印済みの日本のNGOも25を超えている（世界全体では515団体）。更に、国際NGOは1997年にスフィア・プロジェクトを立ち上げ、「人道憲章と人道的対応における最低基準」（スフィア・スタンダード）を策定し、2003年には人道支援の説明責任を強化するための[人道説明責任パートナーシップ]を開始した。2005年の「人道改革」では、人道支援に関わる国連機関、政府機関及び国際NGOが分野ごとにクラスターに属し、情報共有や調整を行うしくみが導入された。これらの一連の動きに関し、日本国内では政府機関よりもNGO内で理解が浸透している。

４．わが国の国際緊急人道支援の課題

（１）自然災害による避難民に対する長期間の包括的な支援の強化

自然災害に対する国際支援では、災害発生後の救援だけでなく、防災・減災、災害発生時の対応、復旧・復興を一つのサイクルととらえ、その全ての過程においてリスク軽減に努力することが求められている。わが国は、1980年代より防災・減災に対する資金協力・技術協力を実施してきており、スマトラ沖地震・津波やハイチ地震（2010年）等の復旧・復興支援も積極的に行っている。特に救援から復旧・復興までの期間を短くする「継ぎ目のない協力」を重視し、災害発生直後から復旧・復興のためのニーズ調査を実施するなどの工夫を行っている。

しかしながら、被災者の立場から救援の過程をつぶさに見ると、復旧・復興に至るまでの継続的な支援が行われているとは言い難い。途上国での大規模な災害発生時には、被災者が正常な生活に戻るまで、長期間にわたる避難生活を送ることを余儀なくされることが多々ある。そうした場合、感染症、妊産婦の健康、高齢者への配慮、栄養、児童の教育、水と衛生、人権や尊厳の観点からの「保護」など、様々な領域に関する支援が必要である。こうした点に関しては、外務省が国連機関等を経由して実施する緊急無償資金協力や、NGOの活動によって部分的にカバーされているものの、支援ニーズの包括的な評価や対応計画を策定したうえでの支援とはなっていない。

その原因としていくつかの点が考えられる。第一は、わが国の政治家、政府関係者、国民に共通する「迅速な対応への強い関心」である。「緊急」人道支援という名称が示すように、発生した災害に対して即座に対応することに価値を見出す考え方が一般的である一方、

急性期が過ぎた後の状況については忘れられがちである。第二の点は、まさにわが国の緊急人道支援の歴史に由来するが、政府が直接動員・派遣できる人員の待機態勢が、国内で主要業務を持つ集団によって成り立っているということである。この集団は海外で人道支援を行うことに特化した恒常的組織ではないが故に、活動期間も短くならざるを得ない。これらのことから、緊急人道支援は「一過性のイベント」になりがちである。海外での人道支援を本業とする NGO であれば息が長い支援が可能であるので、今後は NGO も主要なプレーヤーの一員として政府の対応計画の中に組み入れていくといった包括的なアプローチが必要であろう。

（2）紛争起因の人道危機への対応の強化

前述の PKO 法の成立を機に、紛争起因の人道危機（Complex Humanitarian Emergency）に対しては、JDR 法の下での人的支援は行われていない。他方、PKO 法が定める国際平和協力業務の中には、国連 PKO への参加に加え、選挙監視活動や国際的な人道支援活動も含まれている。しかし、これまでの実績を見ると、人道支援活動は、2003 年のイラク被災民救援を最後に以降は行われていない。その他の人道危機への支援は、内閣府が所管する国際平和協力業務の物資供与、外務省が国連機関等経由で行う緊急無償資金協力と、NGO が自発的に展開する活動によって担われている。ここでも支援ニーズの評価と支援の全体計画策定という包括的なアプローチが欠如している。

人道という観点から見れば、自然災害による被災者と、紛争により影響を受けた人々を区別して扱うことは不自然であり、また支援の内容も両者で大きく変わるものではない。実際他の援助機関の多くは両者を区別せず、「人道支援」として等しく対応しているケースがほとんどである。シリア問題を含め、自然災害よりもむしろ紛争により深刻な影響を受ける人々が増えている現在、20 年続いた体制を見直す必要があるのではないかと思われる。

５．今後の展望

本稿で提起した「被災者の立場に立った支援」については、図らずも東日本大震災により、国内関係者に認識されることになった。過去に経験したことがない長期の避難生活の中では、生命に関わる緊急時の支援だけでは満たされない様々なニーズがあること、また、被災者の人権や尊厳を守るための最低限の基準が必ずしも確保されなかったことなどが認識された。このような経験を元に、日本国内の災害対応に従事する人々と、海外で人道支援を行っている人々の双方に共通の問題意識が生まれ、改善に向けて様々な研究がなされている。

こうした研究の成果が、将来の国内災害のみならず、海外での支援にも活用されるならば、「人間の安全保障」の追求に主導的役割を果たそうとするわが国の国際人道支援の更なる向上につながるものと期待される。

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