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COPING WITH THE IMPACTS OF SEVERE FLOOD EVENTS IN DHAKA'S SLUMS – THE ROLE OF SOCIAL CAPITAL

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With 4 figures and 3 tables

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Summary: Slum dwellers are often exposed to natural hazards. While their high vulnerability seems to leave them unprotected to face these hazards, current research points to the fact that slum dwellers in particular are able to deal with crises remarkably well due to their high social capital. Using the example of extreme floods in the megacity Dhaka, we study the structure of social capital in slum dwellings by focusing on the question how this form of capital enables the management of these events. Three characteristics seem to be crucial for this: first, trusting relationships between the people, which allows for a quick and unbureaucratic way to receive financial aid in form of small credits. In addition, the multifaceted and redundant structures of social capital, which allow numerous people to ask for help from people in varying positions. The final characteristic consists of the various possibilities to resume work immediately after a flood event. However, while the social capital in Dhaka allows slum dwellers to overcome the crisis, it does not enable a long-term development. For the slum dwellers it is not sufficient to utilize social capital alone in order to become resilient in a comprehensive way.

Zusammenfassung: Slum-Bewohner sind häufig Naturgefahren ausgesetzt. Einerseits sind sie solchen Ereignissen aufgrund ihrer hohen Vulnerabilität scheinbar schutzlos ausgeliefert, andererseits deuten aktuelle Forschungen darauf hin, dass gerade Slum-Bewohner über ein hohes Maß an Sozialkapital verfügen und mit Krisen erstaunlich gut umgehen können. Anhand des Beispiels von schweren Überschwemmungen in der Megastadt Dhaka untersucht dieser Beitrag, wie das Sozialkapital der Haushalte in Slums strukturiert ist. Im Vordergrund steht dabei die Frage, wie diese Kapitalform es ermöglicht, trotz der Vulnerabilität erhebliche Krisen zu bewältigen. Drei Eigenschaften scheinen dafür zentral zu sein: Erstens das allgemeine Vertrauen zwischen den Menschen, das es ermöglicht, rasch und unkompliziert an kleine Kredite zu kommen. Zweitens, die vielfältigen und redundanten Strukturen des Sozialkapitals, wodurch bei vielen Personen in unterschiedlichen Positionen Hilfe angefragt werden kann. Drittens, die verschiedenen Möglichkeiten gleich nach der Überschwemmung wieder rasch eine Arbeit aufnehmen zu können. Allerdings ermöglicht das Sozialkapital nur ein Überwinden der Krise, aber keine langfristige Entwicklung der Haushalte. In einem umfassenden Sinne resilient werden die Haushalte in den Slums von Dhaka durch die Nutzung von Sozialkapital kaum.

Keywords: Social capital, resilience, coping, adaptation, flood, slums, megacities, Dhaka

1 Introduction

The rapid growth of megacities in the Global South forces more and more slum dwellers to live in hazard-prone areas (MITCHELL 1999; SATTERTHWAITTE et al. 2009). According to recent studies, the major share of this growth will take place in developing countries in Asia (BORSORF and COY 2009; UITTO 1998). Many of these countries and megacities do not have adequate financial means to effectively mitigate natural disasters. However, CROSS (2001) suggests that megacities might be more resilient than rural areas or small towns. Despite that the urban poor suffer disproportionately from natural hazards, they are somehow able to survive. Current literature points out that poor people mutually help

each other to cope with and adapt to natural hazards (BOHLE 2005; MOZUMDER et al. 2008; RASHID 2000). The notion of social capital grasps these benefits of social networks, shared norms and trust (PUTNAM 2000). WOOLCOCK and SWEETSER (2002, 26) explicitly stress the importance of social capital in this respect: “Being poor means living and dying in an environment that forces a person to rely on neighbours, family, the extended kin, and networks. Social capital is their primary strategy for dealing with life’s challenges and opportunities.” Studies on marginal settlements in India (CHATTERJEE 2010; SUNDARI 2005), Kenya, Nicaragua (MOSER et al. 2010), and Brasil (VOLBEDA 1989), empirically confirm the high relevance of social capital for coping and adaptation routines.

The objective of this paper is to elaborate on the components of social capital and the structure of network ties. Moreover, we shall try to analyze how various aspects of social capital lead to social support during severe floods and how this enforces the resilience of slum dwellers in Dhaka. For this reason, we shall first give a general background on floods in Dhaka and a short introduction to the concept of social capital. We shall then show how our study sites were affected by severe floods. Subsequently, coping strategies as well as the nature and structure of social capital will be discussed. We conclude by focusing on the empirical relevance of social capital for resilience of households in slum settlements.

2 Natural disasters in Dhaka and adaptation strategies

A recent report of the WORLD WILDLIFE FUND (WWF) titled “Mega-Stress for Mega-Cities” points out that of the 11 cities examined, Dhaka in Bangladesh is most vulnerable to climate change impacts, especially with respect to flooding (WWF 2009). Situated in the center of the gigantic Ganges-Brahmaputra-Meghna river delta and experiencing continuous annual population growth of more than 2%, Dhaka is a prominent example of a rapidly growing disaster-prone Asian megacity. Moreover, due to a severe lack of adequate space for housing, many people are forced to settle in high-risk areas, e.g. in low-lying wetlands and/or close to open water bodies.

Especially poor people, migrants, refugees, and people in search of work are driven to newly evolving informal and marginal settlements (termed ‘slums’ in South Asia). More than one third of Greater Dhaka’s population of about 15 million currently lives in slum settlements (CENTRE FOR URBAN STUDIES et al. 2006; UNITED NATIONS 2010). This number is expected to annually grow by appr. 10% in the future, increasing the stress on the population in these slums (NAWAZ 2006).

Households in slums are very sensitive to hazards, as slums provide only poor housing with extremely high population densities as well as poor water, sanitation and health services. The average population density of slums in Dhaka is about 220,000 people per square kilometer (CENTRE FOR URBAN STUDIES et al. 2006). About half of the housing structures are made of non-permanent building materials like mud, bamboo, or plastics. Many of the buildings are overcrowded and not

sufficiently ventilated. Consequently, living conditions are rather unhealthy. In the last decade, the proportion of slum dwellers living on private land increased from 49% to 70% (ANGELES et al. 2009), thereby improving the security of tenure considerably. However, the provision of water and electricity services declined because the government seldom provides those services for private slum areas. Many slum households have to buy water for a much higher price than households having a formal tap line of the Dhaka Water Authority. In addition, over 60% of Dhaka’s slums are completely or partially flooded almost every year, which indicates their high risk exposure and marginal location (all data from CENTRE FOR URBAN STUDIES et al. 2006).

BANKS et al. (2010) emphasize that despite a considerable number of projects for the urban poor have been implemented by the Dhaka City Corporation and the Bangladesh Government, their positive impact is far too small. Lack of political will and budget constraints often prevent more successful outcomes. Bangladesh is famous for its high prevalence of non-governmental organizations (NGOs) (AHMAD 2005), but in urban areas their involvement is lower than in the countryside (BANKS et al 2010). In most slum areas, the power of local owners and the involvement of public authorities are severe obstacles for any NGO activity. Of course there are exceptions such as the Bangladesh Rural Advancement Committee (BRAC), which implemented many slum schools and health centers. There are also a number of NGOs (e.g. Dushtha Shasthya Kendra (DSK), WATERAID) who successfully fight for access to legal water supplies and sanitary services. But these projects still need to be implemented on a much larger scale.

Extreme events such as the disastrous floods of 1987 and 1988, when up to two thirds of the country were inundated, prompted the World Bank to create the ambitious and expensive Flood Action Plan (FAP). This plan advocated for structural protection measures such as embankments, dikes, pump stations, and floodgates (BRAMMER 2000). However, many NGOs and environmental activists strongly opposed the implementation of the FAP. One of the few physical results of the plan is the embankment along the western border of Dhaka City. This embankment protects Western Dhaka from river floods, but other parts of Dhaka have been regularly flooded during monsoon. Each of the more recent country-wide floods in Bangladesh (1998, 2004, 2007, 2008) also had severe effects on Dhaka (ALAM and RABBANI 2007; ISLAM 2005; ISLAM 2006; STALENBERG and VRIJLING 2009). The Government responded

to these continuous threats with the 2005 National Adaptation Programme of Action (NAPA) and its successor, the 2009 Bangladesh Climate Change Strategy and Action Plan (BCCSAP). However, BANKS et al. (2010) strongly criticize that these plans neglect the urban poor and focus on infrastructural solutions like the improvement of urban drainage.

BRAMMER already recognized in 2004 that it is hardly possible to protect Bangladesh completely from floods with solely structural measures. The country relies, and will always rely, on non-structural measures in order to survive disastrous floods. Despite the high vulnerability of Dhaka's slum dwellers with regard to natural extreme events, the exceptional floods in 1998 and 2004 demonstrated that people were ultimately able to cope with these events. Although – or even because – households in slums have very limited access to financial and physical resources, their social resources in form of networks, mutual help and trust are relatively strong (JABEEN et al. 2010; RASHID 2000; WOOD 1998).

3 The concept of social capital

Social capital can be understood as “the ability of actors to secure benefits by virtue of membership in social networks or other social structures” (PORTES 1998, 6). The major benefit of social capital is social support that people can immediately access when needed. PORTES (1998, 5) points out that there is a clear distinction between “the resources themselves (i.e. social support) and the ability to obtain them by virtue of membership in different social structures” (parentheses by the authors). The ability to obtain social support is mainly determined by the basic components of social capital: *networks*, *norms* and *sanctions* (HALPERN 2005).

Networks provide the (infra)structure through which goods and support can be exchanged. Three different types of vertical and horizontal social ties exist within these networks. WOOLCOCK and SWEETSER (2002) distinguish bonding, bridging, and linking ties. Bonding ties refer to linkages within a group in which all partners occupy a similar hierarchical position (e.g. in terms of income, education, and occupation). Bonding ties are often characterized by emotional (friends, neighbours) or family relations (BOHLE 2005). Bridging ties also describe linkages among people from a similar socio-economic background, but refer to relationships between different social groups or local communities. Needs and aims of the network partners are similar, which is why they

cooperate under certain circumstances and specific arrangements. Typical examples of bridging ties are relationships among colleagues at work or within cooperatives. In contrast to this, linking ties indicate social relations between people of different social hierarchies, such as employer and employee or landlord and tenant. The distinction of these three basic types of ties (structure of social capital) is important, because they differ with regard to the available social support and to the resources the network partners possess and share. Bonding ties tend to be the strongest and most durable of the three types of ties, but mostly provide similar goods and information. Compared to bridging or linking ties, they are less likely to provide new impulses or lasting solutions. WOOLCOCK and SWEETSER (2002, 27) therefore point out that it is most favorable for poor people to possess all three kinds of ties in order to have access to “diversified economic exchange networks”.

Norms encompass values, rules and expectations that exist within a social group or community (HALPERN 2005). For example, norms are vital to encourage people to donate goods and services. Norms can be internalized, stemming from personal conviction, which mostly evolved from the process of the individual's socialization, or they can be enforced through sanctions in the form of punishments or rewards by the community (COLEMAN 1988). In the context of social capital, ‘solidarity’ and ‘reciprocity’ are particularly important norms.

Sanctions explain what motivates people to provide social support. Sanctions can have negative (punishment) or positive (reward) effects on the donor (HALPERN 2005). Whereas negative sanctions are effective to maintain social norms, PORTES (1998) points out four aspects of positive sanctions that foster social support from the perspective of a donor:

- Internalized norms – A donor benefits from adhering to norms and values because these are part of societal culture. In providing support, he or she helps to reproduce and stabilize these norms and values within the community.
- Reciprocity – A donor of social support can be certain that he will also be supported when he is in need due to the norm of reciprocity. From this perspective, social support can be understood as a form of insurance.
- Enforceable trust – A donor can not only rely on the person he previously supported, but he can also place trust in receiving support from the wider community.
- Bounded solidarity – All group members (donors and receivers of support) share a certain group

consciousness and tend to support each other because they believe that all members within the group share a common fate.

Sanctions and norms are closely related as they act on each other. Especially the aspect of reciprocity can be assigned to both sanctions and norms. An important effect of norms and sanctions is the degree to which people within a system trust each other. Therefore, *trust* can be seen as a relevant indicator for the analysis of social capital (DIEKMANN 2007; FRANZEN and POINTNER 2007; HALPERN 2005).

BOURDIEU (1983) accentuated the point that social capital is not given or fixed, but a product of 'sociability efforts'. This means that people have to constantly invest in and use social capital in order to maintain and develop it. Thus, social capital is – just like other forms of capital – “accumulated labor” (BOURDIEU 1983, 183).

Social capital can have positive as well as negative aspects (e.g. KRIESI 2007; PORTES 1998; PUTNAM 2000). Negative examples include corruption and criminal structures such as the Mafia or the Camorra in Italy. However, it is widely accepted that in the development context the positive effects of social capital prove more relevant (BOHLE 2005). An important outcome of social capital is that it can help people survive during hard times and can provide them with opportunities for socio-economic improvement (PELLING et al. 2008; PELLING 2011). WOOLCOCK and NARAYAN (2000) term these two aspects as 'to get by' and 'to get ahead'. ADGER (2003) emphasizes that learning and the ability to self-organize are crucial for societies in developing countries to adapt to effects of natural hazards and climate change. Based on case studies in Southeast Asia and the Caribbean, ADGER (2003) concludes that social capital is a fundamental precondition for communities to learn and act collectively (see also WENGER 2000). A recent study on slums in India (CHATTERJEE 2010) points out that consolidated existing networks are not only important in various kinds of crises but are also crucial for long-term adaptation.

This paper primarily concentrates on the potential of social capital helping slum dwellers 'to get by' under unfavorable conditions such as floods. 'Getting ahead', however, also plays an important role in order to understand whether certain coping measures and strategies are sustainable in the long run. The concept of “resilience” combines these two aspects of “stability” and “opportunities for development” (FOLKE 2006). A resilient system is robust to disturbance and able to learn from crises (ADGER 2006). Social capital can provide the capacity to cope

and to learn. It is, therefore, a livelihood asset holding a high potential for resilience (PELLING 2011).

4 Methodology and data

In this study we apply quantitative as well as qualitative empirical techniques. The quantitative approach has been used to unravel social structures during past flood events and to detect underlying social structures that prevail in Dhaka's slum areas. The qualitative approach has been applied to verify and to enrich the quantitative results.

The quantitative approach is based on an extensive questionnaire survey among slum dwellers in five flood-affected slum settlements in Dhaka. The survey was conducted in November and December 2009 in cooperation with colleagues from the Universities of Rajshahi and Dhaka (Fig. 1). Seven student assistants conducted the interviews in Bengali. The reference units of the survey were households defined as economic entities, not individuals. The study sites were selected on the basis of a two-day workshop with local experts, extensive on-site inspections throughout Dhaka and a series of preparatory qualitative interviews with slum dwellers. The five study sites are distributed throughout Dhaka and represent different types of slums with respect to occupational structure, ownership patterns, and potential flood affectedness. Hazaribag 2 and Goda Tek are protected by the western embankment. Hazaribag 1 is located in the immediate floodplain of the Buriganga River just outside the western embankment. Maghbazar is situated in the centre of Dhaka and is protected by embankments and rather consolidated in its social and physical structure. Khilket and Dakshingaon are located in the rapidly expanding East Dhaka and are not protected by any structural measures. While Maghbazar is situated on government land, the other four study sites are on private land. This paper does not primarily intend to analyze differences among the five study sites. It rather concentrates on basic characteristics the slum settlements have in common.

A total of about 2000 households live in the five study sites of which 625 were interviewed in November and December 2009. Those households not interviewed were absent at the time of the survey or did not personally observe any flood that matched our definition (water level at least two feet in the house and/or at least one week in front of the house). Many of those households not interviewed

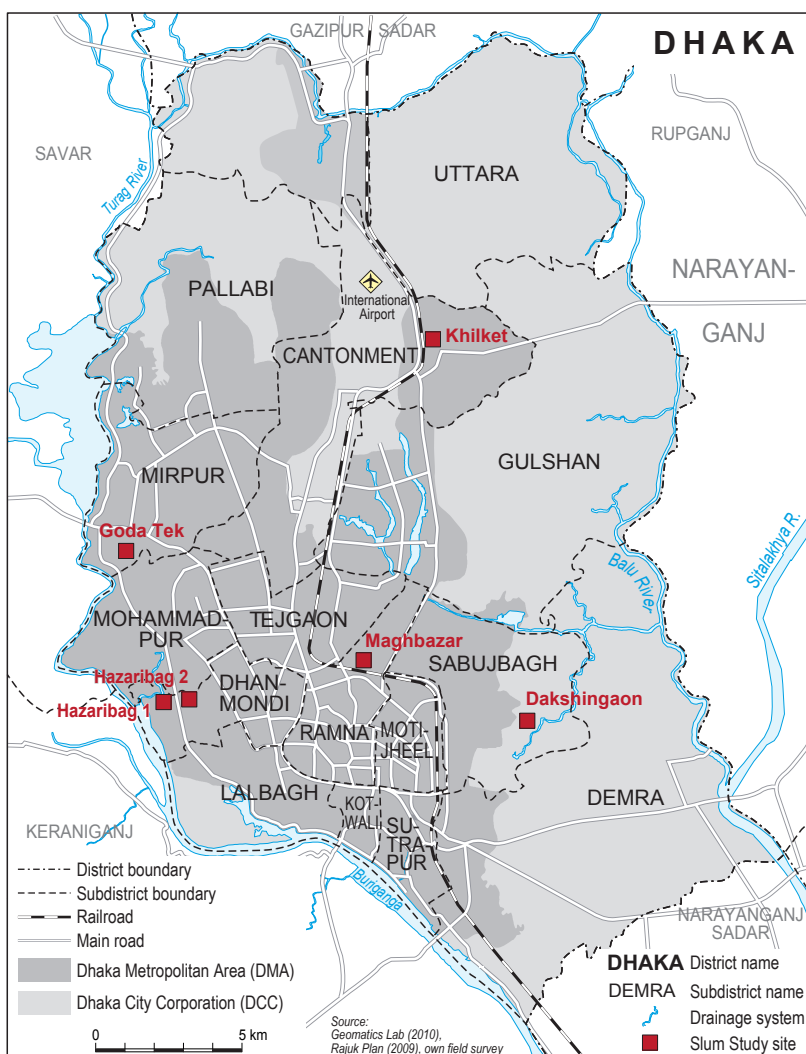


Fig 1: Location of the study sites of the questionnaire survey 2009

had simply not been living in the area long enough to have experienced a major flood event. Thus, our survey represents a complete sample of all households in one of the five study sites that experienced at least one severe flood in their immediate environment. According to KHAN et al. (2009) the majority of households in Dhaka's slums have already experienced at least one major flood in and around their dwelling according to our definition.

The questionnaire mainly covered three topics: socio-economic situation, impacts of floods on livelihoods, and coping strategies of the households. The basic analytical elements of the questionnaire were derived from the theory of livelihood assets (KRANTZ 2001). Accordingly, the questions for each topic focused on financial, physical, human,

and social capital. Natural capital does not play a major role for urban slum dwellers as its availability is extremely limited due to very high population densities. In order to capture the aspects of social capital the "Social Capital Assessment Tool" from the WORLD BANK (2011) provided a useful framework. After a preliminary analysis of the quantitative data, a guideline for the second field phase with qualitative interviews was drawn up. The emphasis in this guideline was on prospective future effects of floods. The qualitative interviews were conducted during August and September 2010. Eight group interviews as well as seventeen in-depth interviews were facilitated by two Bangladeshi master students. The respondents were 25 women and 25 men living in either of the five study sites (Fig. 1).

5 Impacts of floods on slum households – empirical results

5.1 Problems caused by floods

The usual burdens of everyday life are severely aggravated by rising flood water. Floods drastically limit access to basic needs such as food, drinking water, and shelter. They affect all livelihood assets to a major extent (see Tab. 1).

First of all, 90% of the respondents reported that they had to eat significantly less during the flood. Flood water takes away dry fire materials and space to cook. This caused 85% of the respondents to face severe troubles to prepare food. Together with drinking water being contaminated by flood water this leads to a sharp increase in diarrhea and skin

diseases (compare also RASHID 2000). More than half of the responding households stated that at least one family member became severely ill during the flood. On average, more than 1,000 Taka (BDT; about EUR 10) had to be spent for medical treatments of each ill household member. In crowded areas, the personal hygiene especially of women and girls was reported by the interviewees to deteriorate during flood events, which in turn leads to further increases in infectious diseases. The education of children suffers as well as school is mostly suspended during floods, because school buildings are used as public shelters.

Secondly, flood water has a myriad of impacts on the financial resources of households. Major problems arise when the head of household and other family members cannot continue to work and therefore no longer receive a daily income. According to

Tab. 1: Impacts of severe floods on households in Dhaka's slums

Characteristics during or immediately after the flood	Quantitative and qualitative results of the survey
Human Capital	
Cutback in nutrition	90% of the households were less or far less able to eat the normal amount of food
Diseases	At least one family member became severely ill in 57% of the households and in 32% of the households at least two family members became severely ill. Out of 559 people who became severely ill, the average amount of money spent for treatment was BDT 1,135. 70% of those people who became ill were not able to work or attend school
Hygienic conditions	Deteriorated, especially for girls and women
Preparation of food	85% had difficulties to prepare food
Education	Many schools stopped teaching during floods
Financial Capital	
Family income	70% of the households faced a significant decrease in income
Ability to continue work	75% of the head of households were not able to continue working (out of these, 70% were unable to work for 14 days or longer)
Loss of savings	74% had to spent all of their savings during the flood
Loss of valuables	70% of the households lost valuable assets. 95% of those lost assets were damaged by water or washed away. Theft only occurred in 4% of the cases
Physical Capital	
House/dwelling has been damaged	70% of the households; half of the households reported that at least one member had to leave the house
Streets and culverts have been damaged	Mud pathways have been washed away, stuck culverts exacerbated the flood and prevented water from flowing off
Social Capital	
Disappointment about social networks/help from others	Social resources did not disappoint households substantially. Households were disappointed by the government and NGOs in 67%, landlords and patrons at work disappointed in 18%, but relatives and neighbors in only 12% of the cases

Source: Own survey 2009, N=625 households

our data, 70% of the households faced a significant decrease in income during major floods and three quarters of the heads of households were not able to continue work. Noteworthy savings hardly exist and cannot support families over a longer period of time. People are unable to work not only because their work place or streets are flooded, but also because of the necessity to care more intensively for sick or dependent family members. This is tellingly expressed by the following statement:

“If the family has little children they must not leave them alone [as the children may drown in the water]. But both – man and woman – have to work. The man alone cannot maintain the family. If the woman has to take care of the children, the family cannot be maintained” (Interview with a shop owner in Hazaribag 1).

Thirdly, physical capital is also severely affected by flood water. 70% of the dwellings were damaged after the flood, 15% of the households even reported that their houses were completely destroyed. Moreover, half of the households stated that at least one of their members had to leave the house. Broken streets and culverts further deteriorate living conditions and enhance waterlogging.

It should be emphasized, however, that severe flood events do not disturb the relationships to other households or other people. As our data show, trust in others and especially in the community does not suffer during floods. Only 12% of our respondents stated that they were disappointed by their relatives or neighbours. Disappointment with governmental support and NGOs is much more widespread.

5.2 Coping with floods

In order to cope with floods, slum dwellers have to rely on a whole series of coping and – to some extent – adaptive measures. Adaptive measures are conducted *before* an event takes place in order to minimize its negative impacts. Coping measures can be defined as practices which people apply *after* the event has happened in order to combat the negative effects that accompany the event (NELSON et al. 2007; SMIT and WANDEL 2006). Coping measures in this understanding are reactions to the immediate as well as to the long-term impacts of floods. Several coping measures detected during our survey will be described in the following.

Slum dwellers mostly put emphasis on first replacing the reduced income by taking loans and – to a lesser extent – by begging for food or money from shop owners, middle class people or employers. Our findings reveal that about two thirds of the slum households received loans during or after a major flood event. The different providers of these loans are presented in table 2.

It is obvious from our data that formal loan providers such as banks play a negligible role. Almost every respondent borrowed money from long-term personal relationships. Local moneylenders, who demand higher interest rates, proved to be of minor importance. The majority of the respondents used their social capital to access loans, which were mostly provided through bonding and linking ties. This fact is important, because those loans allow relatively short

Tab. 2: Details on loan providers during or directly after the last severe flood event

Authorization	Type of tie	Loan provider	Percent of responses (N=436, multiple responses)	Average amount borrowed in BDT (N=393)	Average interest rate per month (N=351)	Average repayment time (N=277)
Formal	--	Bank	1%	15,000	10.0%	15.0 months
	Mediated by bonding, bridging or linking ties	Local money-lenders	16%	8,584	10.0%	13.2 months
Based on long-term personal relationships	Bonding ties	Relatives	22%	8,820	5.2%	12.8 months
		Neighbors	23%	6,669	7.8%	8.0 months
	Bridging ties	Friends	3%	4,812	7.5%	6.2 months
	Linking ties	NGOs	25%	10,588	12.9% *	14.7 months
		Landlord	2%	3,063	3. %	5.3 months
Not known	Not known	Employer	5%	7,467	4.6%	11.5 months
		Other	3%	5,200	4.0%	4.6 months

Source: Own survey 2009. * Interest rates for NGOs in % per year

repayment times. The higher amounts and repayment times of loans taken through linking ties can be explained by the purpose of these loans. They were predominately used for repairing damaged houses. The table also shows that lower amounts of loans were repaid faster. A T-test for the equality of means reveals significant differences: The mean amount of loans with repayment times of less than six months is BDT 3,852, whereas the average sum of loans repaid over a longer period of time is BDT 10,470 ($p=0,000$). Cross-tabulation shows that lower amounts of loans were predominately used for clothes, food and medicine. Higher amounts of loans were predominantly used to repair houses. Despite difficult circumstances during a flood, borrowing does not necessarily lead to a vicious circle of indebtedness (BRAUN and ABHEUER 2011). This also holds true because many people are able to resume their employment shortly after the flood recedes. Thus they can repay their loans relatively quickly. Many interviewed households stated that especially in the aftermath of flood events they do not face troubles in finding work.

Personal networks play a vital role during floods because they also provide non-financial support (see Fig. 2 and Fig. 3). Relief distributions from NGOs (e.g. Dushtha Shasthya Kendra – DSK, Nagar Daridra Basteebashir Unnayan Sangstha – NDBUS, BRAC) and the Government of Bangladesh also help to ease the distress of slum dwellers. Half of the respondents stated that they received relief goods (mostly food, clothes and medicine) during the last major flood, and 57% of these respondents stated that this was of great help for them. However, this also means that almost three quarters of the respondents either did not receive relief at all or the amount received was not seen as sufficient.

In contrast to reactive coping strategies, adaptive measures only play a minor role during flood events (also compare CHATTERJEE 2010 for India). Structural measures like raised plinths, door thresholds or bamboo constructions are common, but only effective while the water level does not exceed average levels. Individual preventive measures like personal savings, preserving food, storing medicine, or organizing building materials in advance are common phenomena as well. They ease the lives of people during normal floods, but are hardly sufficient during severe flood events. The reason for this is the low volume of the preventive measures and the very limited economic opportunities of slum dwellers. Slum households simply do not have sufficient financial income to accumulate adequate resources. On the one hand, about two fifth of the respondents (43%) had accumulated savings before the flood, while one third (32%) applied structural measures to protect them from flood water. On the other hand, 77% of the respondents lost all their savings during the flood event, and most of the protective measures did not function well under extreme flood circumstances.

Being part of the urban poor and living in slums means that every resource – however small it might be – is critical to overcome the challenges of flood events. The good news is that most urban slum dwellers are able to utilize at least some resources and coping strategies. Only 12% of the responding households neither received any social support nor private loans. The other 88% used at least one of those strategies. Comparison of means and correlation analyses reveal that households which did not use any explicit coping strategy were, in most cases, not unable to do so, but were simply less affected by the flood:

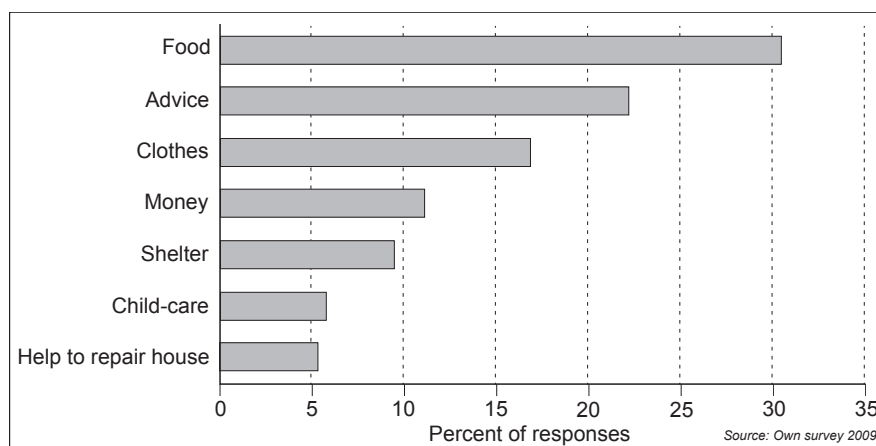


Fig. 2: Social support received during the last severe flood event in Dhaka's slums (N=966, multiple responses)

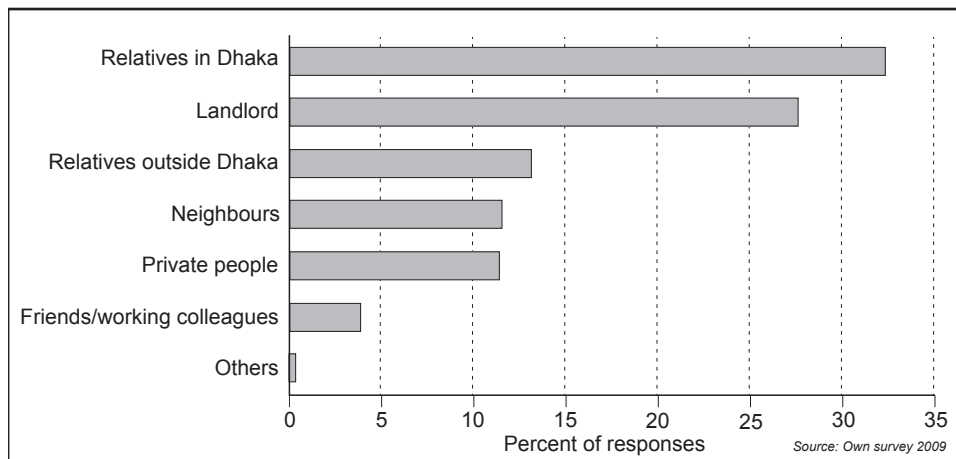


Fig. 3: Providers of social support received during the last severe flood event in Dhaka's slums (N=966, multiple responses)

- The mean of the duration the water stayed in front of the house was 25.1 days for those 12% who did not use any explicit coping strategy and 38.2 days for the others (T-Test, $p=0.000$).
 - The mean of the height the water reached within in the house was 1.8 feet for the 12% who did not use any explicit coping strategy and 2.7 feet for the others (T-Test, $p=0.022$).
 - Correlation analysis shows that households applying explicit copings strategies were slightly less able to cook during the flood (correlation coefficient = 0.22, $p=0.000$) and became severely ill more often (0.16, 0.000). Moreover, the head of household was less able to continue his or her work (0.18, 0.000).
- The question remains, however, how households in slums are able to retain the ability to help each other despite generally high levels of poverty and vulnerability. For this reason it is necessary to better understand the underlying structure of social capital in Dhaka's slums.

6 Components of social capital in Dhaka's slums

As we already pointed out in section 3, networks, norms and sanctions can be regarded as the basic components of social capital. The statistical data, but also the qualitative interviews show that almost all slum dwellers are indeed embedded in dense social networks (see Tab. 3). On a level of inter-household relationships (*micro-level*) it can be clearly seen that almost everybody intensively shares luck, troubles and gossips with neighbours, friends, and relatives. 85% out of the 625 respondents stated that they have

'good' or even 'very good' relations with their neighbours. Over 60% of these neighbours are relatives or migrants from the same native village. Apart from these strong bonding ties, linking ties to landowners, shop-owners or employers also exist. 35% of the responding households, for example, stated that their landlord would intervene in case of an argument among neighbours. After flood events it can be observed that almost half of the damaged houses were rebuilt by the landlords.

The mostly positive relationships between slum dwellers and landlords were also expressed during the qualitative in-depth interviews:

"There is a good relation with the landlord. Father, uncles had been here. We are staying here like our own house" (Interview with a man from Voirob, Central Bangladesh, who sells peanuts in Khilket).

Interestingly, bridging ties, for example to colleagues at work or to people in other slum clusters, play only a minor role at the micro-level. Table 2 also reveals the dominance of bonding ties. These results confirm to some extent the work of WOOLCOCK and SWEETSER (2002), who also show that poor people predominately rely on bonding ties, having less access to bridging or linking ties.

Apart from micro-level networks, slum dwellers are also part of *meso-level* networks. A slum settlement consists of several compounds separated by streets, markets, or walls (here defined as 'slum clusters'). Our qualitative interviews show that everyday interaction among different slum clusters is limited. Nevertheless, when, for example, a tube well is broken, slum dwellers from one cluster can turn to other slum clusters and ask for water. In such cases, households benefit through their bridging ties to people in

Tab. 3: Components of social capital and their relevance in Dhaka's slums

Type of network ties	Indicator and percentages
<i>Bonding ties</i>	85% of interviewees have 'good' or 'very good' relations with their neighbors 60% of interviewees have relatives and/or families from same native village living in the slum area
<i>Linking ties</i>	35% of interviewees stated that their landlord would intervene in case of an argument among neighbors
Type of norms	
<i>Community/solidarity</i>	77% of interviewees believe they would receive help from the community in times of crisis
<i>Reciprocity</i>	83% of interviewees expect to receive direct help from somebody they helped themselves at an earlier occasion
Indicators of trust	
<i>Perceived safety</i>	87% of interviewees feel safe in their neighborhood
<i>Borrowing money</i>	96% of interviewees would lend money to neighbors

Source: Own survey 2009, N=625 households

other slums. Another form of a meso-level network is the interaction of NGOs or government party members within slums. In all five study areas, NGOs implement projects and the respective slums benefit through microcredits and improved sanitation, but also through education programs. On a *macro-level*, slum settlements are supported by the international community and the Government of Bangladesh during severe crisis in the form of relief distributions, however to a smaller extent than rural communities (BANKS et al. 2010).

Shared norms also play a decisive role. Our data show that people have faith in solidarity. 77% of the respondents believe that they would receive help from the community if they were in trouble. Personal reciprocity is self-evident for them as 83% of the interviewees expect to be supported in times of crisis by somebody they helped at an earlier occasion. Social support is deeply rooted within Islamic traditions. To give donations (in the *Quran* called *Sadaqah*) is directly linked to purification (*Zakat*), one of the utmost principles in Islamic religion. To give a defined percentage of one's wealth to poor people as charity (*Zakaat*) is also a widely respected duty. Solidarity, therefore, is a deeply rooted part of people's culture. It can be observed that slum dwellers who beg receive donations from adjacent better-off areas and that their hope for support by the wider community materializes during major flood events.

HALPERN (2005) emphasized the high importance of negative sanctions for individuals who do not follow norms or do not fulfill social expectations. In the case of Dhaka, however, this only applies to a

minor extent. People who do not follow the norms of reciprocity and solidarity may be excluded from the community by not receiving any more social support and not being paid attention to, but in order to understand what motivates people to provide social support, positive sanctions are more interesting to look at. There are a number of motivational reasons for slum dwellers in Dhaka to support others. The first originates from group consciousness. Slum dwellers are convinced that they and their neighbours share a common fate and have rather similar problems. This is a clear example of *bounded solidarity*. This class and neighborhood consciousness was expressed explicitly by two interviewees:

Woman 1: "*We poor people always feel for each other. The rich people do not feel for us.*"

Woman 2: "*These poor people are our own people*" (Interviews with two housewives from Bhola, South Bangladesh, in Goda Tek).

To help other people from the same 'group' (people who live in similar conditions, with similar socio-economic backgrounds and a similar employment status) wherever and whenever it is necessary is a responsibility almost everybody follows up to his or her ability. Due to the poor living conditions of most slum dwellers, almost every household knows that a time will come when they will rely on external help as well. Therefore, the aspect of *reciprocity exchange* is an important motivation to help other people.

"*We help each other with little bit of money. When I have something, the other person needs, I help him. We help each other because we are neighbours*" (Interview with a carpenter who was raised in Dakshingaoan).

The aspect of *enforceable trust* can also be observed in the slums of Dhaka. People know that they can trust the solidarity within their neighborhood and their efforts to help others will not be in vain. Also, *internalized norms* are motivating people to provide social support. The sense of community within the slum clusters is strong and therefore all people benefit from following the same internalized norms.

To sum up, the four motivational reasons as mentioned by PORTES (1998) can also be found in Dhaka: *internalized norms, reciprocity, enforceable trust and bounded solidarity*. The motivational reasons specify the rewarding sanctions according to HALPERN (2005). Providing social support is not only beneficial for the receiver, but also rewards the donor.

The basic components of social capital are well implemented in the social fabric. A good indicator for this is the feeling of trust and safety within the slums. Our findings show that almost everybody feels safe in his or her neighborhood (87%) and almost everybody would lend money to neighbours (96%). As a matter of fact, this safety is a major reason to stay in the slum for many interviewees:

"If we stay in a higher [wealthier] area or place then the dacoits [thieves] enter the house and do their duty. Here there is no problem like that. We have no money, no tension. We have no money remain after eating. This is why the dacoits don't stand in front of us. Suppose who are rich, and who has 5 lacs [500,000 Taka], 10 lacs [1,000,000 Taka], the dacoits attack them. We have no problem" (Interview with a group of housewives in Hazaribag 1).

However, some slum dwellers are certainly wealthy enough to make an interesting target for criminals. It seems to be more likely that due to the specific social fabric and the high population density within slums, criminals hesitate to operate in slum areas. Slums are very crowded and it is almost impossible to remain unnoticed. This also explains why most of the people do not want to leave for flood shelters after the onset of a flood and try to survive in the rising water as long as possible.

BOURDIEU's (1983) aspect of accumulated labor is – apart from trust – another factor that indicates the strong social fabric that unites Dhaka's slum dwellers. Households in slums rely on social support of others in many cases (diseases, necessary repair work on the house etc.). At the same time, households are often asked for support by their neighbours or relatives (also during non-flood times). Thus, they rely and provide social support many times a year and their networks are used and tested frequently. As pointed out by BOURDIEU (1983), people put a lot of effort into their networks and through this accumulate social la-

bor. PUTNAM (1993) therefore rightly stresses that social capital is one of the rare forms of capital which increases with use.

7 Origin and nature of social support in Dhaka's slums

Both quantitative data and in-depth interviews support the assumption that the highly developed components of social capital lead to a high level of mutual support in Dhaka's slums. This is true in everyday life and especially during severe flood events. Figure 2 and figure 3 provide data on social support provided and received during flood events.

53% of the respondents in our quantitative survey stated that neighbours help each other in critical situations and 52% claimed that they received help from other people during major flood events. Help in this context is understood as an exchange of material objects of everyday use, such as clothes, money, and food, but also comprises of assistance to repair damaged houses or to provide shelter for people who lost their home. The definition of help further included that the recipients did not have to give anything in return and that it was not organized relief.

Figure 2 shows details on the exchanged goods. Figure 3 denotes from whom the interviewed households received social support. The donors are mostly relatives – both from Dhaka and from outside of Dhaka. This again hints at strong bonding ties. The second largest group of donors consists of landlords. About 10% of the interviewed households received help from neighbours or other private individuals (mostly residents from adjacent middle class areas). Under normal circumstances, socially homogeneous neighborhoods provide important networks with dense bonding ties. During severe floods, however, neighbours provide only about 10% of the social support received by affected households. This hints at the fact that immediate neighbours are themselves too affected by severe flood events to help. During times of severe crisis, neighbours have enough problems on their own. This does not mean that people do not help each other at all, but very often the support is rather minor:

"During the flood everybody was busy. Everybody was under pressure. I got help from my employer. But the other neighbours tried to get help from others. Some got something, some did not" (Interview with a carpenter who was raised in Dakshingao).

Social introduction between members of different networks is a crucial precondition that people formerly unknown to each other can begin to cooper-

ate. A third person introduces two parties to one another and thus becomes the combining element of two hitherto unrelated networks. BURT (2001) emphasizes the importance of these ‘structural holes’, because they allow people to access new resources. Introduction is mostly relevant in obtaining jobs, accommodation and loans. One of our interview partners summarized the importance of the third-party introduction in Dhaka’s slums in just five words:

“We cannot run without introduction” (Interview with a housewife from Mymensingh, Central Bangladesh, in Khilket).

Figure 4 presents a summary of the various aspects of social capital in Dhaka’s slums. The figure shows that the social interaction in Dhaka’s slums is made up of different components (networks, norms) and three kinds of ties. The components are based

on various motivations of each actor. Slum households cannot rely on only one network or one donor, but very often have access to a multitude of networks with various potential donors on different levels. It must be kept in mind though that the support provided by donors living in slum environments themselves is often modest in extent and quantity. It only helps the recipients ‘to get by’, but is hardly sufficient ‘to get ahead’.

8 Conclusions

Our findings clearly indicate that households in Dhaka’s slums are strongly affected by recurrent floods. It can be shown though that despite fragile livelihoods and disadvantageous living conditions,

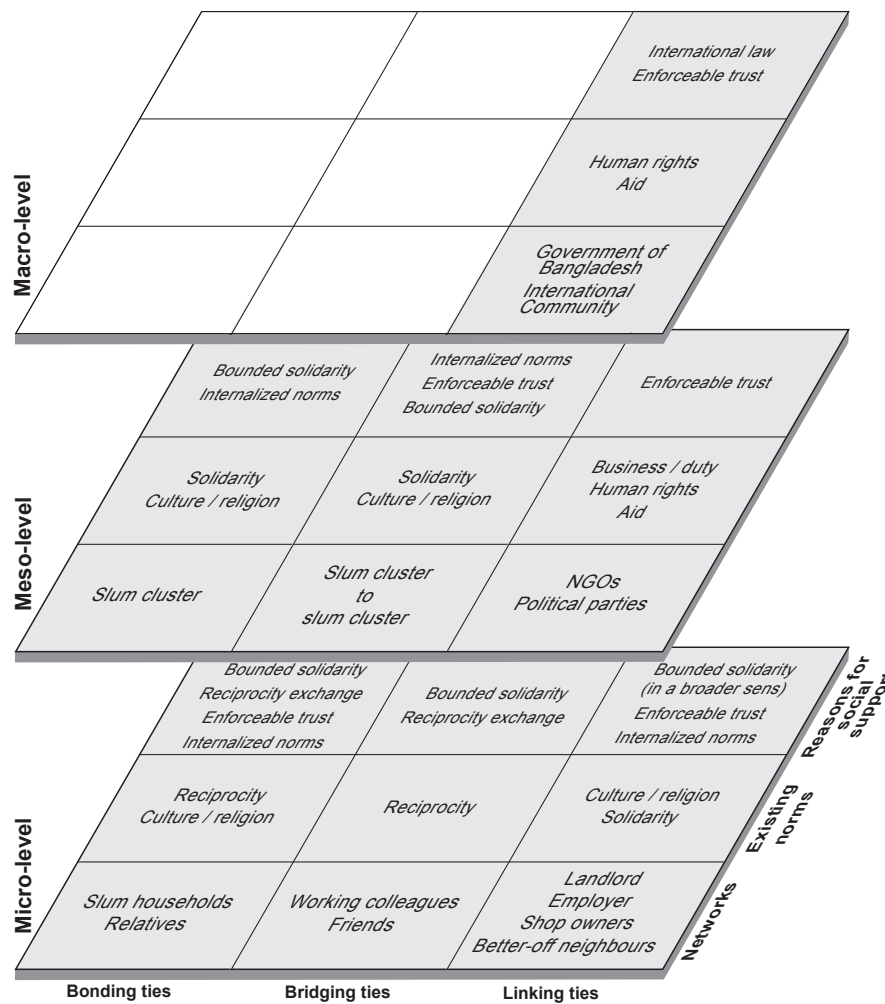


Fig. 4: Summary of social capital in Dhaka’s slums. Source: Draft based on HALPERN 2005 and own surveys 2009 and 2010

slum dwellers are in most cases able to cope even with severe floods. One of the most important resources 'to get by' in times of crisis is social capital, which enables flood-affected people to receive social support when they are in need. Due to the high prevalence of trust, slum dwellers are able to borrow food, clothes, or money. The reason for slum dwellers to remain in Dhaka is the opportunity to earn a living for their families. This is from time to time severely hampered by natural disasters. However, through social capital those harsh times can be overcome. Crises are an everyday phenomenon for slum dwellers in several ways. As a result their support networks are well established and permanently tested. Single events like a disastrous flood can be handled because slum dwellers have redundant and flexible access to various other people as well as to the provision of loans and material and non-material support. Every single household has little, but collectively they have enough to survive. After the flood recedes, income can be quickly regained through informal modes of employment.

Social capital and informal modes of transactions make poor urban households resilient, as both allow them to react to and to cope with natural extreme events.

However, this only works to a certain degree. The urban poor still suffer tremendously from natural extreme events. Floods regularly destroy their savings and leave them with debt and illness. After these natural events, the urban poor are even poorer and even more in need of basic means of livelihood. Moreover natural extreme events reinforce slum dwellers to stay in the slum. The problems of organizing basic needs are so dominant that they hardly have a chance for economic development or 'to get ahead'. In the end, disasters regularly destroy their prospects for a better life – either in better-off areas in Dhaka or by returning to their home village, a dream of many slum dwellers. Thus, slum dwellers are resilient to the point that they have the ability to recover and overcome even a severe crisis. But they are very rarely resilient to the point that they are able to fundamentally improve their living conditions and to decrease their long-term vulnerability.

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References

- ADGER, W. N. (2003): Social capital, collective action and adaption to climate change. In: *Economic Geography* 79 (4), 387–404. DOI: [10.1111/j.1944-8287.2003.tb00220.x](https://doi.org/10.1111/j.1944-8287.2003.tb00220.x)
- (2006): Vulnerability. In: *Global Environmental Change* 16, 268–281. DOI: [10.1016/j.gloenvcha.2006.02.006](https://doi.org/10.1016/j.gloenvcha.2006.02.006)
- AHMAD, M. (2005): Bottom up – NGO sector in Bangladesh. Dhaka.
- ALAM, M. and RABBANI, G. (2007): Vulnerabilities and responses to climate change for Dhaka. In: *Environment and Urbanization* 19 (1), 81–97. DOI: [10.1177/0956247807076911](https://doi.org/10.1177/0956247807076911)
- ANGELES, G.; LANCE, P.; BARDEN-O'FALLON, J.; ISLAM, N.; MAHBUB, A. and NAZEM, N. I. (2009): The 2005 census and mapping of slums in Bangladesh: design, select results and application. In: *International Journal of Health Geographics*, 8 (32), 1–19.
- BANKS, N.; ROY, M. and HULME, D. (2010): Neglecting the urban poor in Bangladesh: research, policy and action in the context of climate change. In: *Environment and Urbanization* 23 (2), 487–502. DOI: [10.1177/0956247811417794](https://doi.org/10.1177/0956247811417794)
- BOHLE, H.-G. (2005): Soziales oder unsoziales Kapital? Das Sozialkapital-Konzept in der Geographischen Verwundbarkeitsforschung. In: *Geographische Zeitschrift* 93 (2), 65–81.
- BORSODORF, A. and COY, M. (2009): Megacities and global change: case studies from Latin America. In: *Die ERDE* 140 (4), 341–353.
- BOURDIEU, P. (1983): Ökonomisches Kapital, kulturelles Kapital, soziales Kapital. In: KRECKEL, R. (ed.): *Soziale Ungleichheiten*. Göttingen, 183–198.
- BRAMMER, H. (2000): Controversies surrounding the Bangladesh Flood Action Plan. In: PARKER, D. J. (ed.): *Floods*. London, 302–315.
- (2004): Can Bangladesh be protected from floods? Dhaka.
- BRAUN, B. and ASSHEUER, T. (2011): Floods in megacity environments – vulnerability and coping strategies of slum dwellers in Dhaka/Bangladesh. In: *Natural Hazards* 58 (2), 771–787. DOI: [10.1007/s11069-011-9752-5](https://doi.org/10.1007/s11069-011-9752-5)
- BURT, R. S. (2001): Structural holes versus network closure as social capital. In: LIN, N.; COOK, K. and BURT, R. S. (eds.): *Social capital. Theory and research*. New York, 31–56.

- CENTRE FOR URBAN STUDIES (CUS); NATIONAL INSTITUTE OF POPULATION AND TRAINING (NIRPORT) and MEASURE EVALUATION (2006): Slums of urban Bangladesh: mapping and census, 2005. Dhaka and Chapel Hill.
- CHATTERJEE, M. (2010): Slum dwellers response to flooding events in the megacities of India. In: *Mitigation and Adaptation Strategies for Global Change* 15, 337–353. DOI: [10.1007/s11027-010-9221-6](https://doi.org/10.1007/s11027-010-9221-6)
- COLEMAN, J. (1988): Social capital in the creation of human capital. In: *American Journal of Sociology Supplement* 94, 95–120.
- CROSS, J. A. (2001): Megacities and small towns: different perspectives on hazard vulnerability. In: *Environmental Hazards* 3 (2), 63–80. DOI: [10.1016/S1464-2867\(01\)00020-1](https://doi.org/10.1016/S1464-2867(01)00020-1)
- DIEKMANN, A. (2007): Dimensionen des Sozialkapitals. In: FRANZEN, A. and FREITAG, M. (eds.): *Sozialkapital – Grundlagen und Anwendungen*. Köln, 47–65.
- FOLKE, C. (2006): Resilience: The emergence of a perspective for social-ecological systems analyses. In: *Global Environmental Change* 16 (3), 253–267. DOI: [10.1016/j.gloenvcha.2006.04.002](https://doi.org/10.1016/j.gloenvcha.2006.04.002)
- FRANZEN, A. and POINTNER, S. (2007): Sozialkapital: Konzeptionalisierungen und Messungen. In: FRANZEN, A. and FREITAG, M. (eds.): *Sozialkapital – Grundlagen und Anwendungen*. Köln, 66–90.
- GEOMATICS LAB (2010): Geodateninfrastruktur. Geographisches Institut, Humboldt-Universität zu Berlin. Berlin. <http://gdi.geo.hu-berlin.de/> (Date: 10.Mar 2010).
- HALPERN, D. (2005): *Social capital*. Cambridge.
- ISLAM, N. (2005): Natural hazards in Bangladesh: studies in perception, impact and coping strategies. Dhaka.
- ISLAM, K. M. N. (2006): Impacts of flood in urban Bangladesh: micro and macro level analysis. Dhaka.
- JABEEN, H.; ALLEN, A. and JOHNSON, C. (2010): Built-in resilience: learning from grassroots coping strategies to climate variability. In: *Environment and Urbanization* 22 (2), 415–431. DOI: [10.1177/0956247810379937](https://doi.org/10.1177/0956247810379937)
- KHAN, M. H.; KRÄMER, A. and GRÜBNER, O. (2009): Comparison of health-related outcomes between urban slums, urban affluent and rural areas in and around Dhaka Megacity, Bangladesh. In: *Die ERDE* 140 (1), 69–87.
- KRANTZ, L. (2001): *The sustainable livelihood approach to poverty reduction*. Stockholm.
- KRIESI, H. (2007): Sozialkapital. Eine Einführung. In: FRANZEN, A. and FREITAG, M. (eds.): *Sozialkapital – Grundlagen und Anwendungen*. Köln, 23–46.
- MITCHELL, J. K. (ed.) (1999): *Crucibles of hazard: megacities and disasters in transition*. New York.
- MOSER, C.; NORTON, A.; STEIN, A. and GEORGIEVA, S. (2010): Pro-poor adaptation to climate change. Based on studies in Kenya and Nicaragua. In: *Social Development Notes* 132, 1–4.
- MOZUMDER, P.; BOHARA, A. K.; BERRENS, R. P. and HALIM, N. (2008): Private transfers to cope with a natural disaster: evidence from Bangladesh. In: *Environment and Development Economics* 14, 187–210. DOI: [10.1017/S1355770X08004804](https://doi.org/10.1017/S1355770X08004804)
- NAWAZ, T. (2006): Growing slums of Dhaka: can we not do anything for them? In: *The Daily Star*, 26 May 2006.
- NELSON, D. R.; ADGER, W. N. and BROWN, K. (2007): Adaptation to environmental change: contributions of a resilience framework. In: *Annual Review of Environment and Resources* 32, 395–419. DOI: [10.1146/annurev.enrgy.32.051807.090348](https://doi.org/10.1146/annurev.enrgy.32.051807.090348)
- PELLING, M. (2011): *Adaptation to climate change – From resilience to transformation*. New York.
- PELLING, M.; HIGH, C.; DEARING, J. and SMITH, D. (2008): Shadow spaces for social learning: a relational understanding of adaptive capacity to climate change within organisations. In: *Environment and Planning A* 40, 864–884. DOI: [10.1068/a39148](https://doi.org/10.1068/a39148)
- PORTES, A. (1998): Social capital: its origins and applications in modern sociology. In: *Annual Reviews in Sociology* 24, 1–24. DOI: [10.1146/annurev.soc.24.1.1](https://doi.org/10.1146/annurev.soc.24.1.1)
- PUTNAM, R. D. (1993): *Making democracy work: civic traditions in modern Italy*. Princeton.
- (2000): *Bowling alone: the collapse and revival of American community*. New York.
- RAJUK PLAN (2009): *Dhaka City and Rajuk Plan (Future Dhaka City)*. Dhaka.
- RASHID, S. F. (2000): The urban poor in Dhaka City: their struggles and coping strategies during the floods of 1998. In: *Disasters* 24 (3), 240–253. DOI: [10.1111/1467-7717.00145](https://doi.org/10.1111/1467-7717.00145)
- SATTERTHWAITE, D.; HUQ, S.; REID, H.; PELLING, M. and ROMERO LANKAO, P. (2009): Adapting to climate change in urban areas: the possibilities and constraints in low- and middle-income nations. In: BICKNELL, J.; DODMAN, D. and SATTERTHWAITE, D. (eds.): *Adapting cities to climate change: understanding and addressing the development challenges*. London, 3–47.
- SMIT, B. and WANDEL, J. (2006): Adaptation, adaptive capacity and vulnerability. In: *Global Environmental Change* 16, 282–292. DOI: [10.1016/j.gloenvcha.2006.03.008](https://doi.org/10.1016/j.gloenvcha.2006.03.008)
- STALENBERG, B. and VRIJLING, H. (2009): The battle of Tokyo and Dhaka against floods. In: *Built Environment* 35, 471–491. DOI: [10.2148/benv.35.4.471](https://doi.org/10.2148/benv.35.4.471)
- SUNDARI, S. (2005): Migration as a livelihood strategy: a gender perspective. In: *Economic and Political Weekly* 40, 2295–2303.
- UITTO, J. I. (1998): The geography of disaster vulnerability in megacities. In: *Applied Geography* 18, 7–16. DOI: [10.1016/S0143-6228\(97\)00041-6](https://doi.org/10.1016/S0143-6228(97)00041-6)
- UNITED NATIONS (2010): *World population prospects: the 2009 Revision*. New York.

- VOLBEDA, S. (1989): Housing and survival strategies of women in metropolitan slum areas in Brazil. In: *Habitat International* 13, 157–171. DOI: [10.1016/0197-3975\(89\)90029-5](https://doi.org/10.1016/0197-3975(89)90029-5)
- WENGER, E. (2000): Communities of practice and social learning systems. In: *Organization* 7, 225–246. DOI: [10.1177/135050840072002](https://doi.org/10.1177/135050840072002)
- WOOD, G. D. (1998): Security and graduation: working for a living in Dhaka slums. In: *Discourse – Journal for Policy Studies* 2, 26.
- WOOLCOCK, M. and NARAYAN, D. (2000): Social capital: Implications for development theory, research, and policy. In: *The World Bank Research Observer* 15, 225–249. DOI: [10.1093/wbro/15.2.225](https://doi.org/10.1093/wbro/15.2.225)
- WOOLCOCK, M. and SWEETSER, A. T. (2002): Social capital: the bonds that connect. In: *ADB Review* 34, 26–27.
- WORLD BANK (2011): Measuring the dimensions of social capital. *Social Capital*. Washington. <http://go.worldbank.org/BOA3AR43W0> (Date: 17 Dec 2011).
- WWF (2009): Mega-stress for mega-cities: a climate vulnerability ranking of major coastal cities in Asia. Gland.

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