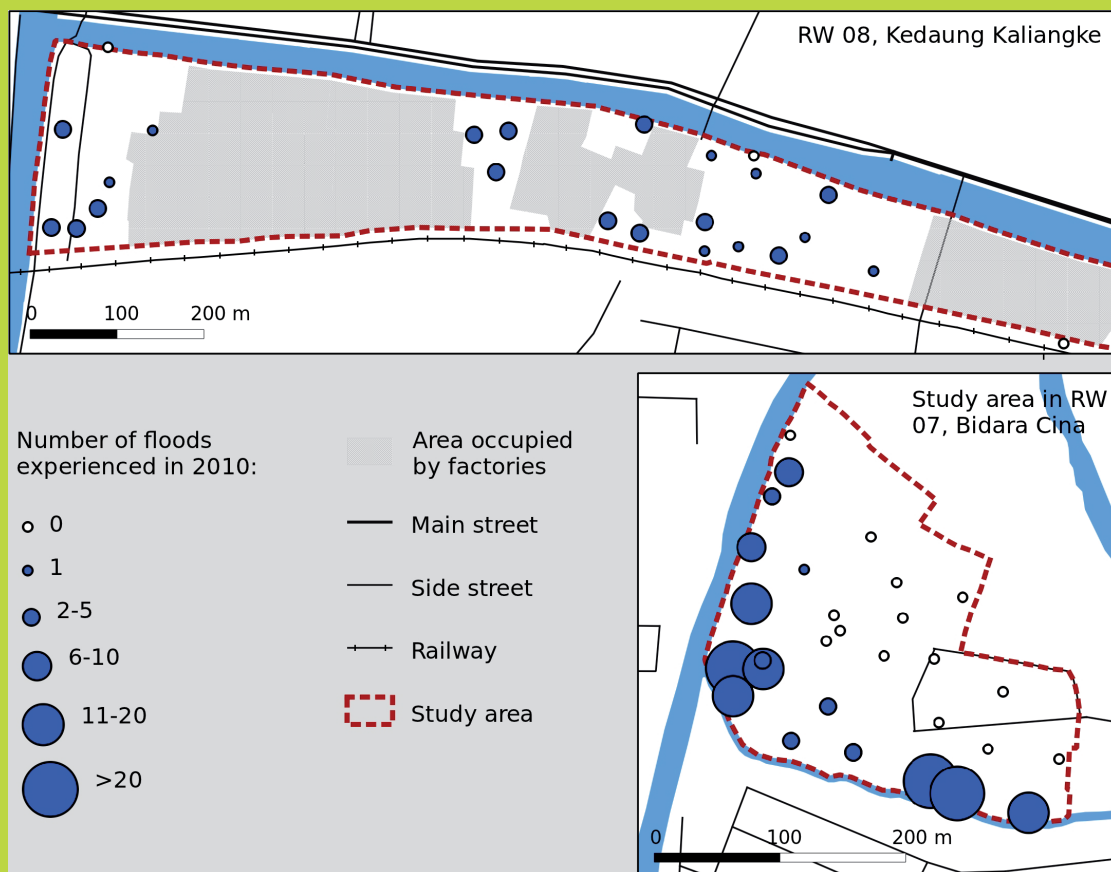


Deconstructing Flood Risks

A Livelihood and Vulnerability Analysis in Jakarta, Indonesia



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Terms and Abbreviations

<i>Arisan</i>	Rotating savings and credit association
<i>Bapak RW</i>	Synonym for <i>Pak RW</i> , used for the plural form as in <i>Bapak²RW</i>
<i>Betawi</i>	Population group commonly seen as the native Jakartans
CBDRM	Community Based Disaster Risk Management
<i>DKI Jakarta</i>	<i>Daerah Khusus Ibukota</i> or “Special Capital City Region” Jakarta, administered by a governor
GDP	Gross Domestic Product
GIS	Geographic Information System
<i>Ibu RT</i>	“Mother of the <i>RT</i> ”, wife of <i>Pak RT</i> and head of the <i>PKK</i> on <i>RT</i> level
<i>Ibu RW</i>	“Mother of the <i>RW</i> ”, wife of <i>Pak RW</i> and head of the <i>PKK</i> on <i>RW</i> level
ICBRR/CC	Integrated Community Based Risk Reduction and Climate Change Adaptation – Project implemented in 2007 by the Indonesian Red Cross, the Netherlands Red Cross, the German Red Cross and the IFRC in Jakarta
IDR	Indonesian Rupiah, 1 Euro ~ 12.000 IDR (at the time of research)
IFRC	International Federation of Red Cross and Red Crescent Societies
<i>Jl. or Jalan</i>	“Street”
<i>Kali mati</i>	“Dead river”, a dead stream branch of a river
<i>Kantor Lurah</i>	“Village head office”, office of the <i>kelurahan</i> administration
<i>Karang Taruna</i>	“Coral Cadet”, Indonesian youth association organised on <i>kelurahan</i> and higher levels
<i>Kartu Keluarga</i>	“Family card”, legal identification card/document of a nuclear family in Indonesia
<i>Kartu Miskin</i>	“Card for the poor”, health insurance card for economically disadvantaged people, provided by the government
<i>Kecamatan</i>	“District”, administrative subdivision of the <i>kotamadya</i> in Jakarta
<i>Kecap</i>	“Sauce”, usually soy or chili sauce
<i>Kelurahan</i>	“Village”, administrative subdivision of the <i>kecamatan</i> and lowest level of official government administration in Indonesia
<i>KIP</i>	<i>Kampung</i> Improvement Programme
<i>KK</i>	1. <i>Kepala keluarga</i> or “family head”, usually the male head of a nuclear family (here defined as a married couple with children). In Indonesian statistics, families are counted in <i>KK</i> 2. <i>Kartu keluarga</i>
<i>Koperasi simpan pinjam</i>	Savings and loan cooperative
<i>Kotamadya</i>	“Municipality”, administrative subdivision of <i>DKI Jakarta</i>
<i>KTP</i>	<i>Kartu Tanda Penduduk</i> , the Indonesian ID card issued at the age of 17 or upon marriage

Masalah	“Problem”
Mandi	Bathroom
Pak RT	“Father of the <i>RT</i> ”, the voluntary <i>RT</i> head elected by residents of the <i>RT</i>
Pak RW	“Father of the <i>RW</i> ”, the voluntary head of the <i>RW</i> elected by <i>RW</i> representatives
Pak Toyib	Informal neighbourhood head
Pengajian	Regular group meetings for praying and recitations
PKK	<i>Pemberdayaan dan Kesejahteraan Keluarga</i> or “family empowerment and welfare”, women’s association on <i>RT</i> , <i>RW</i> , <i>kelurahan</i> or higher levels
PMI	<i>Palang Merah Indonesia</i> , the Indonesian Red Cross
Puskesmas	Basic health care station in Indonesia owned by the government
RT	<i>Rukun tetangga</i> or “neighbourhood”, smallest administrative entity in Jakarta that typically consists of about 100 <i>KK</i>
RW	<i>Rukun warga</i> or “community”, administrative entity below the <i>kelurahan</i>
Saluran	Canal
Satgas Banjir	“Flood task force” consisting of local volunteers
SLF	Sustainable Livelihoods Framework
SKTM	<i>Surat Keterangan Tidak Mampu</i> , a letter granting discount on health treatment in government hospitals
Warung	Food stall or small restaurant

1 Introduction

“Flooding is the least of the problems, it is a usual thing.”

“We are not afraid of floods, we are used to them.”

– *Interviewees in East Jakarta, December 2010*

Statements like the above were given by several residents in neighbourhoods of Jakarta that are often described as being “most vulnerable” to flood hazards (Marschiavelli 2008; Texier 2008). Indeed, these people had their houses flooded up to the roof, forcing them to evacuate for weeks during a major flood in Jakarta in 2007, which killed up to 80 people and displaced between 340,000 and 400,000 (Brinkman and Hartman 2008: 2; Texier 2008: 1; Wilhelm 2009: 154). Is it possible that such disasters are just a minor issue for the supposedly most affected? Or are the above statements the result of subconsciously repressed disaster memories, or some kind of fatalism?

In Jakarta, several community-based projects on flood risk reduction emerged in recent years. These projects can be interpreted as responses to the growing emphasis on bottom-up, community-based approaches in the international research and policy community on disaster risk reduction (cf. UNISDR 2005: 3; Bollin and Hidajat 2006: 272). Organisations such as MercyCorps and UNESCO implemented projects that aim to strengthen local capacities of flood risk reduction in Jakarta’s most affected neighbourhoods. Typical project measures are awareness campaigns on solid waste issues, the strengthening of local disaster management and small-scale, physical measures of flood mitigation (cf. MercyCorps Indonesia 2009; Arduino 2010).

However, considering the introductory quotes above, the legitimacy of these projects – or at least of its labelling as “community-based” and “bottom-up” – comes into question. If flooding is not seen as a problem in Jakarta’s most affected neighbourhoods, these projects appear to miss the point. In other geographical contexts, scholars criticised that humanitarian organisations look through a “disaster lens” in their community assessments and tend to neglect local risk priorities when implementing community-based projects (cf. Allen 2003; Heijmans 2009).

Thus, the aim of this paper is to find out what is behind the apparently low priority of flood risk for the supposedly most affected people – an underrated issue in the research literature on flood or disaster risk reduction. The overall research question is therefore: *Is flooding a minor problem for the most affected households in Jakarta?*

Not presuming that people’s perception is largely blurred by suppressed disaster memories or fatalism leads to the following hypotheses:

- (H1) Flooding is a minor hazard since people are well-adapted and can minimize its impact on their livelihoods.
- (H2) Flooding is a small concern because people can rely on effective humanitarian assistance by the government, NGOs or other organisations.

(H3) People are exposed to other, more serious risks that need to be prioritized, making flooding a relatively minor issue.

From a household's perspective the first two hypotheses call for a more detailed picture of flood exposure and impact, coping and adaptation strategies and external assistance. These issues are investigated in this paper, using the analytical concepts of *hazard* and *vulnerability*. Anyhow, these concepts must not be narrowed down to an event-based understanding as it is sometimes done by humanitarian organisations (cf. Allen 2003), and in the disaster research literature (see Chapter 2.1). For an individual or household, flooding might just be one of many hazards: others (e.g. economic or health-related shocks or stresses) may constitute more serious threats to one's livelihood. In order to understand the low priority of flood risk, the third hypothesis might therefore be the most crucial to examine. To frame the analysis, three guiding research questions are formulated:

- How vulnerable are households to flooding in Jakarta's most affected neighbourhoods?
- What other risks affect these households in what way?
- How are risks perceived, prioritized and managed? What priority is given to flood risks?

An empirical livelihood and vulnerability analysis will try to answer these questions by using data from a field research in flood-prone neighbourhoods in Jakarta from October to December 2010. These neighbourhoods are part of the target areas of the "Integrated Community Based Risk Reduction and Climate Change Adaptation" (ICBRR/CC) project. The Indonesian Red Cross (PMI), the International Federation of Red Cross and Red Crescent Societies (IFRC), the Netherlands Red Cross and the German Red Cross implemented the project in 2007. Among others, the project addresses livelihood security as part of a more holistic approach to disaster risk reduction – something that will be discussed later in this paper. A total of 53 semi-structured household interviews were conducted, as well as 20 interviews and several informal discussions with key informants such as neighbourhood heads, community volunteers, and project-affiliated staff. The data derived from these interviews will be analysed in a mixed qualitative and quantitative approach.

In the following chapter, the basic concepts applied in this study will be clarified before reviewing research literature on risks, hazards and vulnerability in (mega)cities of the Global South. Furthermore, the analytical framework of the paper will be presented. Chapter Three gives an introduction to Jakarta. The geographic and historic context as well as socio-economic characteristics and environmental problems of the city will be outlined. Chapter Four describes the empirical approach of this study and provides a brief introduction to the study areas in Jakarta. Chapter Five presents the findings from the livelihood and vulnerability analysis. After providing details on how people make a living in the study neighbourhoods, results from a problem or hazard ranking are shown. Subsequently, an in-depth analysis of the impact of, coping with and adaptation to flood risks is conducted, before examining other risks households have to manage. Finally, Chapter Six concludes the findings of this paper by addressing the proposed hypotheses and discussing implications for community-based approaches of disaster risk reduction.

2 Risk from a Livelihood Perspective – Theoretical Approaches

In order to clarify the theoretical approaches of the paper, this chapter is structured into three sections. At first, three essential, analytical concepts are discussed and defined – risk, hazard and vulnerability. The second section deals with the production, impact and handling of risks affecting urban livelihoods in the Global South. The third section of this chapter presents the analytical framework for the empirical analysis in this study.

2.1 Key Concepts

A vast array of theoretical and empirical studies has emerged over the last decades that deal with risk, hazard and vulnerability. Among it, literature published in two different, sometimes related areas of research are relevant for this paper: disaster studies (e.g. Bankoff et al. 2004; Blaikie et al. 2003; Hewitt 1997) and development studies (e.g. Bohle 2007; Chambers 1989; Scoones 1998).

2.1.1 Risk

The term *risk* is widely used to describe the probability and/or consequences of a negatively perceived event or process that may happen. The term can be specified by that event or process (e.g. “earthquake risk” or “risks from smoking cigarettes”), by the way it affects people (e.g. “economic risks” or “health risks”) or by the affected subject (e.g. “household risks”). Risks can be avoided, accepted, reduced or mitigated: for instance, risks of traffic accidents can be avoided by travelling by train. However, people accept such risks for the sake of individual mobility and after all, alternative forms of travel are not risk-free either. Furthermore, the risk of a car crash can be reduced by driving slowly and mitigated by wearing a safety belt.

But how can risk be defined? Technical, scientific approaches would define it as the “product of the probability and consequences (magnitude and severity) of an adverse event” (Bradbury 1989: 382). Constructionist approaches challenge such an absolute definition of risk and argue that it must be understood “as a product of perception and cultural understanding” (Lupton 1999: 33; cf. Cardona 2004; Giordano and Boscoboinik 2002). Thereby, “weak social constructionist” positions see risks as cultural mediations of “real” dangers and hazards (Lupton 1999: 30), whereas “strong social constructionist” approaches assume that hazards or dangers themselves are socially constructed (ibid.).

It can be argued that risk is in fact inseparable from the notion of it, which in turn is shaped by a variety of cultural and other factors: flooding in Jakarta might be a good example of how flood risks are “constructed” very differently by intervening agencies and those being most affected. However, in order to “deconstruct” such perceptions, a rather realist approach to risk is adapted here. Although shaped by the view of the observer, “real” risks affecting livelihoods in Jakarta are assumed to exist. To some extent these

risks can be estimated in inter-subjective, if not objective ways.

In the disaster research literature, a common approach to estimate risk is to disaggregate this abstract concept and focus on its specific factors or components *hazard* and *vulnerability*, as schematised in the following pseudo-equation (modified from Blaikie et al. 2003: 49):

$$\text{(Livelihood) Risk} = \text{Hazard} \times \text{Vulnerability}$$

This paper focuses on livelihood risks, i.e. risks affecting a household's *livelihood* that “comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living” (Chambers and Conway 1991: 6). A household and its livelihood are at risk, if exposed to a hazard that the household is vulnerable to. Hazard and vulnerability are mutually conditioning concepts: if there is no hazard, one cannot be vulnerable; if there is no vulnerability, nothing is hazardous (Cardona 2004: 38). Still, in order to get a better comprehension of risk, it is still useful to independently conceptualise these two components (*ibid.*).

The terms hazard and vulnerability are widely used with multiple meanings. Similar to risk, they are concepts susceptible to being arbitrarily constructed. Therefore, the terms need clarification.

2.1.2 Hazard

A hazard can be defined as a phenomenon in the natural or artificial environment that poses threats (Hewitt 1997: 25). Among scholars and policy makers, there is often a focus on “the more extreme or novel dangers” (*ibid.*), neglecting the various potentially damaging events, stresses or trends many households in the Global South face on a daily basis. From a livelihood perspective, however, “extreme” hazards that lead to disasters are not necessarily more threatening than daily health hazards, such as contaminated drinking water, or economic hazards, for instance rising food prices.

In this study, a hazard is broadly understood as an *external phenomenon threatening a household's livelihood*. A hazard can be interpreted as an “external risk factor” that a household is exposed to, and that becomes a risk when coinciding with an “internal risk factor”, i.e. the vulnerability of a household (Cardona 2004: 38). This understanding of hazards corresponds with what scholars in development studies refer to as “shocks”, stresses” and to some extent “trends” and “seasonality” (see Scoones 1998: 6-7; Bohle 2007; Chambers 1989; DFID 1999).

2.1.3 Vulnerability

The concept of vulnerability is widely used in disaster and development research to describe and explain how and to what degree individuals, groups, communities or other units of observation are affected by external shocks and stresses, i.e. hazards. Still, interpretations of the term vary strongly among scholars.

In disaster research, the understanding of vulnerability often corresponds with the prevailing focus on extreme hazards, resulting in definitions such as:

“[...] the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard (an extreme natural event or process).” (Blaikie et al. 2003: 11)

In contrast, acknowledging the multiple risks many households in the Global South have to manage, the following definition is frequently cited in the development studies literature:

“Vulnerability [...] refers to exposure to contingencies and stress, and difficulty in coping with them. Vulnerability has thus two sides: an external side of risks, shocks, and stress to which an individual or household is subject; and an internal side which is defencelessness, meaning a lack of means to cope without damaging loss.” (Chambers 1989: 33)

The latter definition is more in line with the broader understanding of livelihood risks in this paper. Yet, it specifies an “external side” of vulnerability in the sense of *exposure* to hazards. Since vulnerability is understood as an internal risk factor, this study construes exposure as a phenomena distinct from vulnerability – being exposed to a hazard does not necessarily mean being vulnerable to it. Allen (2003) gives a comprehensive definition that clarifies the internal character of vulnerability, while referring to the various hazards one can be vulnerable to. This definition is adapted here and reads as follows:

“Vulnerability is defined as a degree of susceptibility to the effects of events or shocks, of processes of change or of a combination of factors, including stresses, which is not sufficiently counterbalanced by capacities to resist negative impacts in the medium to long term, and to maintain levels of overall well-being. Vulnerability is manifested as a limited or lessened ability to cope with potential or actual situations that may arise.” (Allen 2003: 170)

Based on this broad understanding of hazards and vulnerability, the following section theoretically approaches urban livelihood risks in the Global South.

2.2 Living with Risks in Cities of the Global South

It has often been stated that in the Global South, urban livelihoods are affected by very different risks than those in rural areas (Pelling 2003; Ruel et al. 2010; Schütte 2004: 6). This section therefore focuses on household risks specific to urban areas. Jakarta is often described as an emerging megacity¹ with an official city population of almost ten million and a metropolitan area with more than 20 million inhabitants (Kraas 2007; McCarthy 2003; cf. Chapter 3). Urban agglomerations on such a scale might produce very distinct living conditions and risks. Drawing from current academic literature, a brief introduction to megacities in the Global South as specific spaces of risk will be given, before outlining a variety of risks households in cities of the Global South have to deal with.

¹Megacities can be defined as urban agglomerations exceeding five or ten million inhabitants (see Hansjürgens et al. 2008: 21; Kraas 2007: 79).

2.2.1 Megacities as spaces of risk

In the Global South, megacities have been described as distinct “arenas of vulnerability and resilience”, where risks and vulnerabilities, but also unique opportunities “to buffer various types of shocks without the loss of livelihoods” are produced (Sakdapolrak et al. 2008: 11; cf. Hansjürgens et al. 2008: 20).

An often-stated characteristic of megacities is a pronounced socioeconomic inequality among their population that comes with a lopsided distribution of influence and power (Keck et al. 2008: 28; Sakdapolrak et al. 2008: 11). Likewise, hazard exposure and vulnerability are shared highly unequal among the city population. “Poor” and “marginalised” population groups in megacities are often found to be especially vulnerable to a variety of hazards (Pelling 2003: 3; Sakdapolrak et al. 2008: 11). Yet, such patterns can be found in smaller cities, towns or rural areas as well (Hewitt 1997: 153f.; Pelling and Mustafa 2010). So what are the specific characteristics of megacities putting people at risk? Hansjürgens et al. (2008: 21) argue that risks and vulnerabilities in megacities are shaped by a distinct combination of scale, speed and complexity.

“Scale” is probably the most obvious characteristic of megacities. Scale not only refers to the large population size of megacities, but also to their heavy demand of resources that can produce environmental risks. For instance, parts of Jakarta are found to be sinking due to heavy and uncontrolled groundwater extraction, further aggravating predicted effects of sea level rise (cf. Chapter 3.2). Besides, the sheer number of people exposed to a single hazard is often greater than in smaller cities or rural areas (Hansjürgens et al. 2008: 21).

“Speed” describes the high “velocity of change” in megacities of the Global South (Hansjürgens et al. 2008: 21). This not only refers to the rapid population growth, but also to the effects of rapid changes in lifestyle – for instance, a high proliferation of private cars and motorbikes (Hansjürgens et al. 2008: 21; cf. Chapter 3.1.1).

What can be interpreted as a combination of size and speed, megacities are characterised by a high degree of “complexity” (Hansjürgens et al. 2008: 21). In their “Megacity Resilience Framework”, Sakdapolrak et al. (2008) attempt to capture the complexity of megacities in three different, but interrelated nexuses:

- “Global-local nexus”: There is a high interrelation between issues on different geographic scales. In particular, global issues have a strong influence on city development and on local realities. Megacities form centres of growth, where foreign investment and economic advance highly affect in-migration and the speed of city development. From a livelihood perspective, global issues can produce risks that are particularly pronounced in megacities of the Global South (Sakdapolrak et al. 2008: 11).
- “Formality-informality nexus”: Processes and activities take place in a continuum of formality and informality, producing both risks and opportunities. In particular, widespread, rather informal income opportunities are usually less secure, but they are often more flexible and can help people to flexibly cope with economic stresses and shocks (Sakdapolrak et al. 2008: 12; cf. Etzold et al. 2009).

- “Social-ecological nexus”: Megacities must be regarded as coupled socio-ecological systems. They depend on environmental services from the local and surrounding ecosystem. Rapid and unregulated city growth, resource overexploitation and degradation often leads to poor living environments where health risks are produced and large parts of city populations are exposed to natural hazards (Sakdapolrak et al. 2008: 11, 13-14).

The above characteristics and nexuses are not limited to megacities alone, since they are likely to be observed in smaller cities of the Global South as well. However, it is the extreme character of such issues that can make megacities distinct arenas of risk. Drawing from literature on urban livelihoods and vulnerabilities, an outline of various risks individuals or households in cities of the Global South have to manage is provided in the following.

2.2.2 Livelihood risks in the city

For urban residents relying solely on cash economy, economic risks such as indebtedness, loss of income or unemployment might often constitute priority issues. Schütte (2004: 12ff.), for instance, found income failure to be a major risk as perceived by residents of Kabul, Herat and Jalalabad in Afghanistan. However, income failure is not only a risk itself, but also a cause and effect of other risks, e.g. health-related. Poor nutrition and bad health can be a direct consequence of income failure, while the illness of a household member can lead to income gaps (cf. Agarwal et al. 2010: 64ff.).

A high dependency on cash income can also produce vulnerability in terms of food security, especially for economically disadvantaged city dwellers who often spend most of their income on nutrition. As a consequence, the so-called urban poor are often found to be particularly vulnerable to rising food prices (Ruel et al. 2010; Cohen and Garrett 2010).

Especially in emerging megacities, city planning can produce risks for marginalised population groups. For instance, Bohle and Sakdapolrak (2008) show how livelihoods of residents in informal settlements in Chennai, India are threatened by forced displacement and how people deal with such risks. The clearance of informal settlements has also been an issue in Jakarta (Spreitzhofer 2009: 75ff.).

It has often been stated that among city populations in the Global South, the urban poor are most affected by health risks (see e.g. Ergler et al. 2011; Harpham and Molyneux 2001). People living in so-called slums often have to face poor water- and sanitation infrastructure, exposing them to various health hazards. Poorer residents have also been found to be more exposed to occupational health hazards and traffic related accidents than wealthier citizens (Agarwal et al. 2010: 68). However, a major factor making people vulnerable to health hazards is the limited access to health services for the urban poor due to economic and other reasons (Agarwal et al. 2010: 66; Ergler et al. 2011).

Several studies deal with “natural” hazard risks in cities, often identifying poor and marginalised city dwellers as the groups most exposed and vulnerable to hazards such as landslides, earthquakes or floods (see e.g. Pelling 2003; Pelling and Wisner 2009). In the following, a more detailed review of studies on flood-related, urban livelihood risks is provided.

2.2.3 Urban flood risks

In many cities of the Global South, uncontrolled urbanisation has led to a high frequency of at times extreme flood events. Contributing factors include a reduced permeability of ground surfaces, increased water run-off rates and poor drainage systems (Few 2003: 44). Not all parts of a city are equally affected – flooding is mostly concentrated in low-lying parts, especially near rivers or canals. It is often poorer residents that settle in these areas (Chatterjee 2008: 101; Few 2003: 49; Mustafa 2005: 566, 582).

While in rural areas, flooding often brings ecological benefits to households (Blaikie et al. 2003: 203f.; Few 2003: 45f.), urban floods are usually perceived as overwhelmingly negative events.ⁱⁱ First of all, floods can lead to the destruction or damage of property. Apart from that, Few (2003: 46) finds health impact to be “one of the most most significant [...] effects of flooding”. Strong currents and electrocution can cause injuries or death and floods are often described as posing a high risk of communicable diseases on people (Few 2003: 46; Blaikie et al. 2003: 220f.). Though, the effects of flooding on health are complex and difficult to measure (Few 2003: 46). A more direct impact of floods on urban livelihoods is found to be the interruption of work: for people with rather informal occupations and no fixed income, floods can be very costly (Zoleta-Nantes 2000: 77).

Several studies deal with coping- and adaptation strategies of people affected by urban flooding. Such strategies rely on both physical and non-physical means of coping and adaptation (Few 2003: 51). For instance, physical means can be the construction of houses on stilts or the improvement and maintenance of drainage channels (Jabeen et al. 2010: 423ff.). Non-physical means can be livelihood diversification and “social coping mechanisms [including] assistance from kinship networks and self-help groups” (Few 2003: 51). However, many of these strategies are not directly flood-related, since they aim at generally reducing vulnerability to shocks and stresses (Few 2003: 52). From a livelihood perspective, the separation of flood from other risks can thus be rather artificial (cf. Blaikie et al. 2003: 5).

During and after extreme flooding, access to relief provided by the government, NGOs or other organisations can be a crucial determinant of vulnerability (Blaikie et al. 2003: 216ff.). On the one hand, the provision of emergency shelter, medicine, food and drinking water is easier to organise in cities than in remote rural areas. On the other hand, socio-economic and political marginalisation might constitute access barriers for some population groups in a city (cf. Chatterjee 2008).

In disaster research, it has been acknowledged that especially lower-income residents “do not always prioritise protection from natural hazards over economic or everyday health concerns” (Few 2003: 53; cf. Blaikie et al. 2003: 122). Hence, interventions to strengthen capacities to cope with flood risks “need to be placed within a broader development agenda that integrates environmental, economic and social risk concerns” (Few 2003: 53). Still,

ⁱⁱExceptions might be financial benefits for labourers clearing waste or for “those national and local institutions sustained by the external resources targeted towards flooding” (Few 2003: 45). Mustafa (2005: 573) cites a resident of the Rawalpindi/Islamabad conurbation in Pakistan describing the positive effect of flooding to annually clean up the cities, “something that would not happen otherwise”.

various scholars observe a technocratic hazard-focus among intervening agencies who focus on physical mitigation measures and fail to address local needs (Blaikie et al. 2003: 120; Cannon 2000: 47f.). As indicated earlier, such tendencies are also observed in community-based approaches of risk management (see Box 2.1).

Box 2.1: Community-based Disaster Risk Management – emergence of approach and critique from the literature

In the research and policy community on disaster risk reduction, there is a growing emphasis on bottom-up, community-based approaches to prevent, mitigate and cope with disasters (van Aalst et al. 2008; Allen 2006; Bollin and Hidajat 2006: 272). The Hyogo Framework for Action, adopted by most UN member states in 2005, stresses the need for building hazard resilience "in particular at the community level" (UNISDR 2005: 3).

As a consequence, a growing number of Community-based Disaster Risk Management (CBDRM) projects emerges in countries of the global south to facilitate and strengthen community-driven initiatives of disaster risk reduction (Allen 2003; Heijmans 2009; Yodmani 2001). This emergence can be attributed to the critique by various scholars on the technocratic hazard-focus of policy makers and intervening agencies (see e.g. Cannon 2000: 47f.; Hewitt 1995: 118). Responding to these criticisms, various aid organizations have adopted participatory tools of community assessment such as the Vulnerability and Capacity Analysis supported by the IFRC (van Aalst et al. 2008).

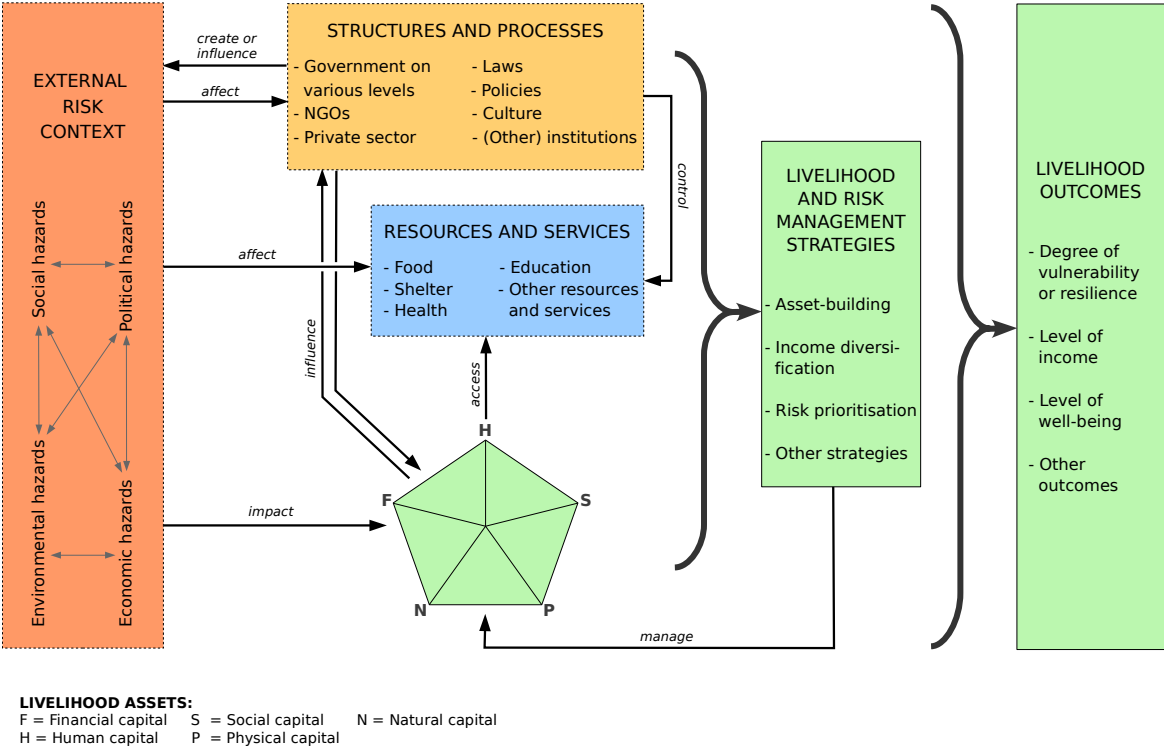
Still, many of these organisations tend to use a "disaster lens" in their community assessments and overlook local risk priorities when implementing community-based projects. As Heijmans (2009: 2) points out: "[...] the nature of CBDRM responses is shaped through the world views of the intervening agencies and implicit interpretations of disaster situations, making it difficult to reach the most vulnerable people in communities." Thus, project activities mainly consist of technical measures and educating people on what to do in times of disaster (Heijmans 2009: 26). Likewise, in an article on CBDRM in the Philippines, Allen (2003) states: "The ideas, knowledge and strategies of local people tend only to be considered in as far as they fit within the bounds of externally imposed programme or project definitions of vulnerability to disaster" (Allen 2003: 180). A focus on the preparation for physical events prevails, while local priorities and underlying causes of vulnerability are neglected. By imposing an event-centred construction of vulnerability from above, implementing organisations contradict fundamental principles of their own community-based approaches (Allen 2003: 174, 181).

2.3 Analytical Framework

The objective of this study is to find out whether or not flooding is just a minor problem for those having to deal with it in Jakarta. For this purpose, three guiding research questions have been formulated to analyse in detail how households are affected by flood and other risks, and how they perceive, prioritise and manage these risks.

Risks are highly interrelated in (mega)cities of the Global South, and shaped by a complex variety of social, economic and political factors. But how can this complexity be addressed analytically from a household- or livelihood perspective? Various scholars and institutions have developed conceptual frameworks or models to provide some guidance for the analysis of livelihoods, household risks and vulnerabilities (e.g. Blaikie et al. 2003: 87ff.; DFID 1999; Moser 1998; Sanderson 2000). These frameworks are based on shared ideas, but use different ways of depicting and structuring the issues observed. For this analysis, the

Sustainable Livelihoods Framework (SLF) developed by DFID (1999) is found to be most applicable. With various modifications that are partly influenced by Sanderson’s (2000: 53) urban version of CARE’s Household Livelihood Security model, the SLF is applied as the analytical framework in this paper.



Source: modified from DFID (1999) and Sanderson (2000: 53)

Figure 2.1: Analytical framework

As its name indicates, the framework puts livelihoods in the centre of attention, and delineates the manifold ways livelihood strategies and outcomes are influenced. In particular, it helps grasping the various ways a livelihood can be affected by risks. On the one hand, the framework delineates how vulnerability is an outcome of livelihood assets and strategies that are shaped by access to resources and services. On the other hand, it indicates the need to understand the external risk context affecting a livelihood (see Figure 2.1).

Livelihood assets can be understood as “capitals” households draw on to make a living. Assets can be classified into five different, highly interrelated capital types symbolised as an asset-pentagram in Figure 2.1. First of all, **financial capital** can be a crucial asset for making a living as well as for coping with risks. This is especially the case in urban areas, where “the building of financial assets is almost always a key activity for greater livelihood security” (Sanderson 2000: 54). **Human capital** stands for the “skills, knowledge, ability to labour and good health” enabling people to pursue their livelihood strategies in order to achieve positive livelihood outcomes (DFID 1999: 7). **Social capital** in turn refers to the social resources people draw on to improve their living standard and to reduce their vulnerability. This includes vertical (between patron and client) and horizontal (between people with shared interests) networks and relationships of trust, as well as membership

of more formalised groups with shared rules, norms and sanctions (DFID 1999: 9). **Physical capital** comprises productive assets needed for making a living, as well as housing and infrastructure. In this regard, tenure is a key aspect: for instance, owning a house increases creditworthiness and provides the opportunity to earn money from renting out rooms (DFID 1999: 13; cf. Sanderson 2000: 54; Moser 1998: 4). The fifth asset type of the pentagram, **natural capital**, is sometimes omitted in asset typologies of urban livelihoods (cf. Moser 1998; Sanderson 2000). Natural capital, defined as “natural resource stocks from which resource flows and services useful for livelihoods are derived” (DFID 1999: 11), are indeed of less importance in urban than in rural areas. But migrants from rural areas might still own agricultural land in their home village that can be sold in times of stress. Furthermore, the availability of small parcels of fertile land in a city can increase livelihood security through urban agriculture (see e.g. Maxwell 1995).

The availability of assets or capitals determines a household’s access to **resources and services** such as labour, health services or water. Moreover, it determines the extent to one can influence the structures and processes controlling them. **Structures and processes** comprise the government on various levels, the private sector, laws or culture. On a higher and more indirect level, they can also embody international trends, for instance an increased focus on climate change related issues by development organisations. Such structures and processes shape the **external risk context**, comprising the hazard-side of risks or what is often referred to as shocks or stresses. This can be seen as “the part of the framework that lies furthest outside people’s control” (DFID 1999: 4). As outlined earlier in this chapter, (urban) households can be exposed to a variety of highly intertwined environmental, economic, social or political hazards. Hence, flooding must be seen as one of many interacting hazards, shaped and influenced by various structures and processes. As illustrated in Figure 2.1, hazards impact livelihoods through the decline of livelihood assets. At the same time, however, livelihood assets are used to “buffer” households from such shocks or stresses. As (Moser 1998: 3) points out, a high vulnerability therefore manifests itself in a low asset base. Adapting to risks can be understood as a constant building and rebuilding of asset portfolios (Moser 1998: 6ff.).

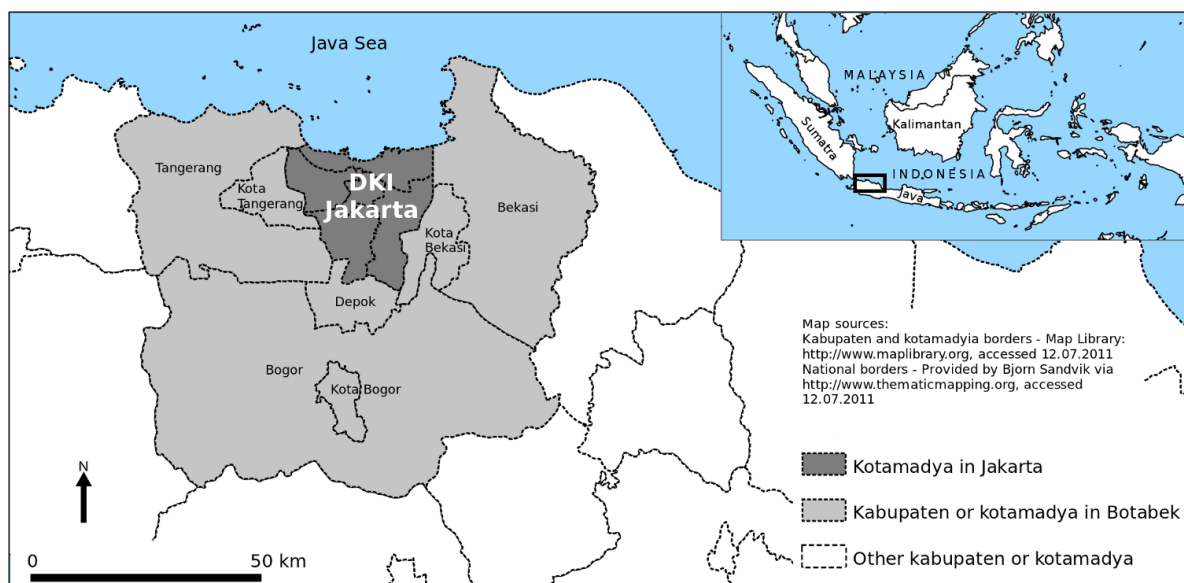
In the context of multiple hazards, transforming structures and processes and based on available assets, households develop complex **livelihood and risk management strategies** to reduce vulnerability and to achieve positive **livelihood outcomes** (see Figure 2.1). Apart from gaining income and saving money for times of need, this can include investing in social capital through helping out neighbours, diversifying income sources, or more risk-specific activities such as physical modifications on houses to reduce flood impact. Nevertheless, since assets are limited, households have to prioritise risks. This often includes the acceptance of some risks through avoiding others: for instance, living in flood-prone areas can be an accepted “cost” of owning a house that would not be affordable in other parts of the city. Thus, an analysis of the perception, prioritisation and management of flood risks by households can not be comprehensive without assessing the “portfolio” of risks they have to cope with.

3 Introducing Jakarta – The Context

Before going into empirical details on the household or neighbourhood level, an introduction to the socioeconomic, political and geographic context is needed. Thus, this chapter is divided into two sections: Section 3.1 presents Jakarta, focussing on the various structures and processes that shape risks and vulnerabilities in the city and its specific neighbourhoods known as *kampung-kampung* or *kampung*²ⁱ. Section 3.2 discusses causes and scale of flooding in Jakarta.

3.1 Jakarta – Global Metropolis or “City of *Kampungs*”?

Indonesia is a tropical island country in Southeast Asia. It has approximately 238 million inhabitants and accommodates the largest Muslim population of the world. The country can be seen as “one of the world’s emerging middle-income countries” (Wie 2010: 12). Jakarta is the capital city of Indonesia, located on the island of Java, the most densely populated island in Indonesia (see Map 3.1).



Source: own design

Map 3.1: Jakarta and Botabek

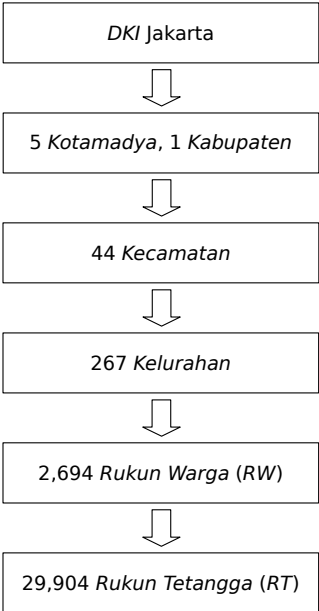
The city constitutes the political and economic centre of Indonesia, administered by a governor as a province or “Special Capital City Region” (DKI or *Daerah Khusus Ibukota*). According to the central bureau of statistics for DKI Jakarta, its official population was 9.588.198 people in the year 2010 (BPS Provinsi DKI Jakarta 2010). However, population

ⁱIn Indonesian language, plurals are indicated by doubling the respective noun or – in written language – by adding a superscripted ‘2’. *Kampung-kampung* or *kampung*² are therefore plural forms of *kampung*. However, the plural form is not used if a number or amount is indicated as in *dua* (“two”) *kampung* or *banyak* (“many”) *kampung*.

estimates are usually higher and range from 11.2 to 15.2 million for the same year (Ernst 2008; Spreitzhofer 2007: 164). On a city area of 661 km² (Spreitzhofer 2009: 72), these figures indicate a population density between 14,500 and 23,000 people per km². The population growth rate has declined, but Jakarta’s population is still estimated to increase of about 130,000 people per year (Szymkowiak 2011: 32).

Jakarta is part of a large urban agglomeration of 6,160 km² or seven times the size of Berlin (Spreitzhofer 2009: 72), spreading over three Indonesian provinces (DKI Jakarta, Banten and Java Barat). This area is often referred to as “Jabotabek” or “Jabodetabek”, named after the included cities and municipalities of Jakarta, Bogor, Depok, Tangerang and Bekasi (see Map 3.1). Jabotabek has an estimated population of 24 million inhabitants (WWF 2009: 13; Szymkowiak 2011: 32). According to these estimates, the agglomeration has a population density of about 3900 people per km², similar to the city of Berlin. Nevertheless, this chapter focusses on the city of Jakarta itself.

Jakarta is subdivided into five *kotamadya* or municipalities: Jakarta Utara (North Jakarta), Jakarta Timur (East Jakarta), Jakarta Selatan (South Jakarta), Jakarta Barat (West Jakarta) and Jakarta Pusat (Central Jakarta). Furthermore, DKI Jakarta includes the island *kabupaten* or “regency” of Kepulauan Seribu, known as the 1000 islands. Each *kotamadya* or *kabupaten* is divided into several *kecamatan*² (subdistricts), which in turn consist of different *kelurahan* or administrative “villages” (see Figure 3.1). The *kelurahan* is the lowest level of government administration with formally paid employees. Nonetheless, each *kelurahan* is divided into a number of *RW* (*rukun warga* or “community”). Each *RW*, in turn, consists of about five to 20 *RT* (*rukun tetangga* or “neighbourhood”). In the two studied *RW* of this paper in East and West Jakarta (see Map 3.2), one *RT* typically includes about 100 households. Every *RW* as well as every *RT* has a locally elected voluntary representative of the city administration called *Pak RW* (“Father or the *RW*”) or *Pak RT* (“father of the *RT*”).



Source: Korff (2009: 51) citing BPS Provinsi DKI Jakarta (2009)

Figure 3.1: Administrative division of Jakarta

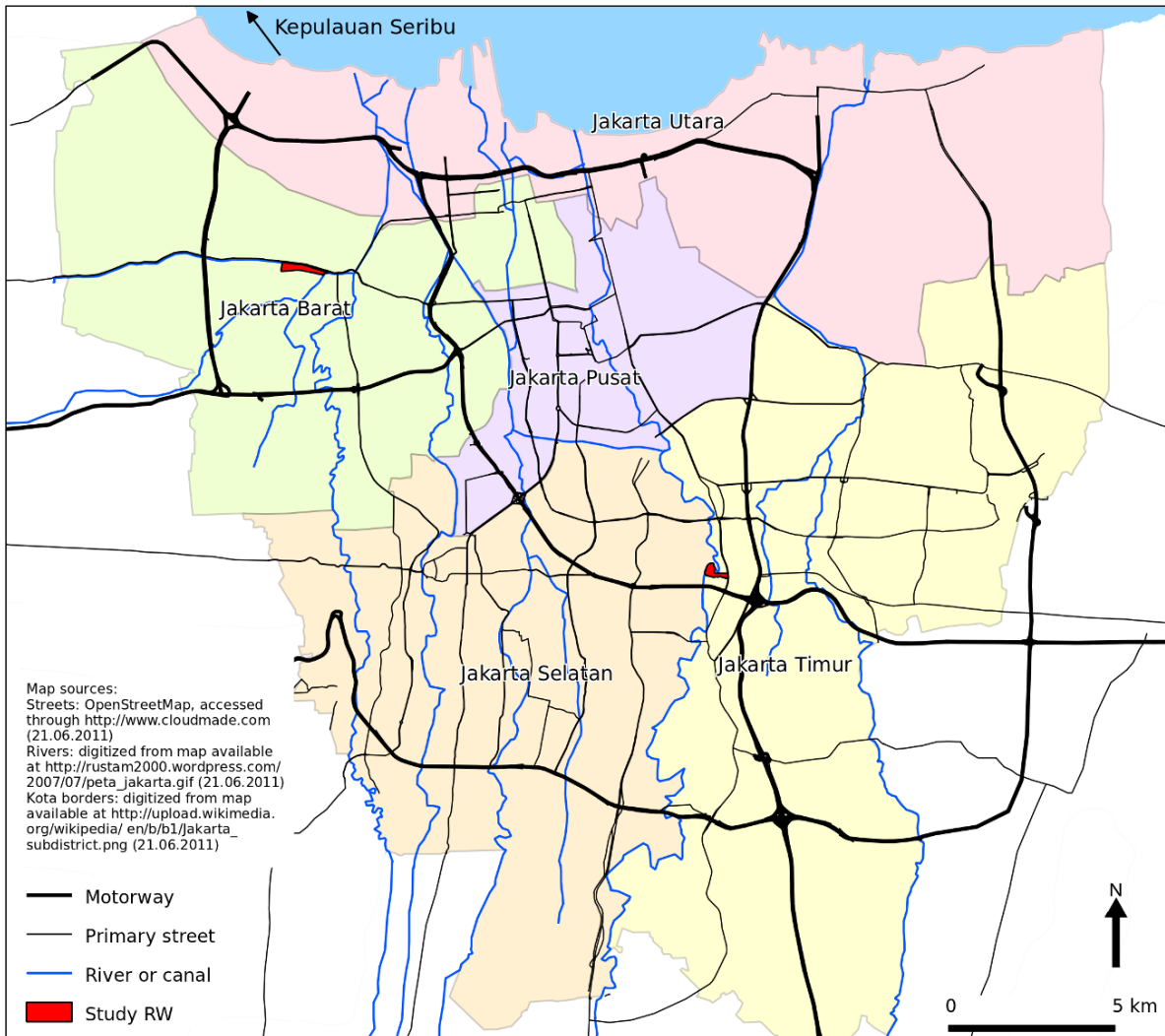
3.1.1 From Batavia to modern Jakarta

In the following, Jakarta’s city development will shortly be described in three different phases – the colonial period, the post-colonial period until the end of the New Order regime in 1998, and the situation since then.

Colonial Batavia

In the 17th century, the Dutch took command over a trading port town called Jayakarta on the northern coast of Java. The town was renamed Batavia, administered and expanded by the East Indies Company (*Vereenigde Oost Indische Compagnie*). By 1799, Batavia was

declared capital city of the Dutch East Indies, the occupied territories that later became the Republic of Indonesia. In 1811 its population was about 47,000 people; through expanding further south it increased to about 500,000 in the 1900s (Winarso 2011: 166f.). In addition to the well-planned city centre near the port, today known as *Kota*, several sub-centres had been established along the main road axes running from the north to the south of the city. Between these centres were scattered the continuously growing, traditional *kampung*² or villages (Steinberg 2007: 355).



Source: own design

Map 3.2: DKI Jakarta

Jakarta 1950–1998

Batavia became Jakarta and capital city of the new republic with the Indonesian independence in 1950. However, city development continued to follow a pattern of “urban social dualism” between formal and informal development (Winarso 2011). During the era of Sukarno, the first president of Indonesia, city planning was mainly limited to prestigious projects like the construction of a central business district and the national monument (Steinberg 2007; Winarso 2011: 167). Several housing complexes were developed

for high- and middle-income residents. Yet, the majority of the city population that increased from about 1.5 to 2.9 million inhabitants between 1952 and 1961 lived in so-called *kampung* settlements characterised by a high population density and a poor infrastructure (Winarso 2011: 167f.). During the “New Order” (*Orde Baru*) regime of President Suharto from 1966 to 1998, a dualistic development prevailed. On the one hand, three decades of economic growth and foreign investment went along with the orderly construction of various skyscrapers and shopping malls, and with an expansion of “New Towns” or gated communities especially in suburban areas. On the other hand, the vast majority of the migrant population continued to settle informally in the *kampung* neighbourhoods that were largely neglected by the city administration (Winarso 2011: 170ff.). In 1990, Jakarta’s population had increased to about 8.2 million people (Spreitzhofer 2007: 164).

The Asian financial crisis that began in 1997 had devastating effects in Indonesia. Especially in urban areas, people’s welfare suffered from capital outflows and inflation, and official poverty rates rose significantly (Wie 2010: 9ff.; McCarthy 2003: 3). The crisis triggered protests and mass violence in Jakarta and throughout the country, and eventually led to the resignation of Suharto in 1998.

Jakarta since 1998

Since the fall of Suharto, major political reforms have shaped the political system of Indonesia, which is now a representative democracy with a directly elected president. However, the country still suffers from an intransparent bureaucracy and high levels of corruption in local governments (cf. Kuncoro 2006; Olken 2006). Economically, Indonesia has recovered from the financial crisis and has shown significant growth rates for the last decade (Wie 2010: 10). Though, poverty rates are still high in the country with an official number of 37.2 million people below the poverty line (Wie 2010: 13).

In Jakarta, development patterns similar to the Suharto era prevail. Domestic and international investors compete over increasingly expensive land in order to develop apartment buildings, condominiums and shopping malls for high- and mid-income residents. Winarso (2011: Fig. 8-4, Tab. 8-7) counted 67 shopping malls or centres in Jakarta, while five new shopping centres were under construction in the city by 2006. Jakarta produced around 14 percent of the Indonesian GDP in 2008, while its inhabitants constituted only about three percent of the national population (BPS Provinsi DKI Jakarta 2009, cited in Korff 2009: 52). According to Hartono and Irawan (2011: 44), however, DKI Jakarta shows the highest income inequality among Indonesian provinces. The authors compute a GINI coefficient of 0.4 for DKI Jakarta in 2006, while the national GINI coefficient in 2006 is calculated as 0.34.ⁱⁱ

With an insufficient public transport system and an ever-growing number of private vehicles, the city has become infamous for its notorious traffic gridlocks that are further aggravated by flooding. About three million private cars and six million motorcycles were registered in Jakarta in 2008, while the annual growth rate of vehicle sales is estimated to be almost nine percent in Indonesia (The Jakarta Post 2009).

ⁱⁱThese figures might be underestimated: according to UNDP, the GINI coefficient for Indonesia was 39.4 in 2005 and 37.6 in 2007 (UNDP 2011).

Besides traffic congestion, flooding is a frequently debated issue in Jakarta and often seen as a major problem for the city (see e. g. Steinberg 2007; The Jakarta Post 2011b; cf. Section 3.2). Clean water in turn is rare: only about 40 percent of the city's population has access to piped water that is provided by two different water companies, while 20 percent buy water from private vendors and 40 percent use bore wells (Steinberg 2007: 358). Excessive and uncontrolled ground water extraction has led to salt water incursion in areas up to 12 km from the coast and is found to be a major cause of land subsidence. Due to exorbitant construction and ground water exploitation, parts of Jakarta are sinking up to 12 cm per year (Brinkman and Hartman 2008: 6; Firman et al. 2011: 374; Leisch 2000: 24).

Other problematic issues are insufficient waste disposal and sanitation systems, producing health hazards to the population. About 14,700 m³ of the daily produced 23,400m³ of garbage are handled by the city's sanitation system – a large share of the remaining garbage is believed to end up in Jakarta's rivers, canals and open drainage (Steinberg 2007: 359). Only a fraction of the 1.2 million m³ of sewerage produced daily can be treated by the sewer system of the city that dates to colonial times. Although two thirds of households in Jakarta rely on private septic tanks, sewerage often ends up in Jakarta's rivers and canals that are already contaminated by untreated industrial refuse (McCarthy 2003: 17; Steinberg 2007: 359).

Such environmental hazards are often found to especially affect Jakarta's neighbourhoods known as *kampung*² (McCarthy 2003: 17ff.; Wilhelm 2009: 156ff.). These specific settlements are characterised in the following.

3.1.2 Jakarta's *kampung*²

Jakarta is sometimes called "city of *kampungs*" – some authors claim that about 60 percent of the city's population reside in such settlements (Steinberg 2007: 356; Zhu 2010: 9).ⁱⁱⁱ The Indonesian word *kampung* has two meanings. Originally, it stands for hamlet or village. In the urban context, however, it is often used to refer to a densely populated, incrementally developed neighbourhood not planned by the city administration (Winarso 2011: 180).

Jakarta's *kampung*² are often characterised by a limited road access, an insufficient water- and sanitation infrastructure that produces health risks, lacking drainage systems and a high exposure to flooding (McCarthy 2003: 19f.; Winarso 2011: 181). While Jellinek (2003: 172) specifies urban *kampung*² as "poor" settlements, others describe them as containing a mix of lower, lower middle, and some middle class families (McCarthy 2003: 1; Spreitzhofer 2007: 173).

Not at least because of its frequent association with "slums" (Spreitzhofer 2009: 82; Winarso 2011: 180f.), the term of *kampung* has a negative connotation. According to an Indonesian employee of the German Red Cross (GRC), many Jakartans do not like their

ⁱⁱⁱMcCarthy (2003: 6), however, citing the Urban Poor Consortium (www.upc.org), provides figures that are far more conservative: "It is likely that somewhere between 20–25 per cent of Jakarta residents actually reside in *kampungs* with an additional 4–5 per cent squatting illegally on riverbanks, empty lots, and flood plains overlooking Jakarta's crumbling canal system [...]."

neighbourhood being called *kampung*, since it usually refers to a “less-developed place or village” (discussion with GRC employee in Jakarta, 13.10.2010). In academic literature, the concept of *kampung* was especially popular in the 1980s and early 1990s (cf. Guinness 1986; Jellinek 1991; Sullivan 1980, 1992). Still, connotations might change over time. In order to avoid stigmatisation, it is therefore decided not to use the term when referring to the study areas of this paper. Nevertheless, the term is used in this chapter to generally refer to the many densely populated, incrementally developed neighbourhoods in Jakarta prone to flooding and/or other environmental risks.

It is hard to determine the legal status of most *kampung* neighbourhoods. Although developed without regulation by the city administration, the majority of these neighbourhoods are administrated through the *RW* and *RT* system that includes the registration of every resident with the local *Pak RT*. McCarthy (2003: 1) states that most *kampung* residents have some sort of legal land title, although “they are not always able to prove it to the satisfaction of Indonesia’s corrupt court systems”.

As indicated earlier, many *kampung*² had been traditional rural villages before they were “trapped” in an urban setting and densified and expanded with the population growth of the city (Winarso 2011: 181). Migrants from rural areas mostly settle in these neighbourhoods that are described as maintaining some characteristics of a traditional, rural way of living (ibid.). Except for McCarthy (2003), though, only little empirical research literature on *kampung* life in Jakarta has been published in the last 20 years. Spreitzhofer (2007, 2009) for instance, probably the most well-known researcher on Jakarta in German-Austrian Geography, bases his assumptions on social aspects in Jakarta’s *kampung*² mainly on field research conducted by Jellinek (1991), Murray (1991) and Sullivan (1992). In his study of urban *kampung*² in Java, Sullivan (1992: 71, 130) stresses the strong social pressure among residents to be good neighbours and to engage in *gotong royong*, a Javanese term referring to mutual aid and cooperation among villagers or neighbours. Other authors similarly report a relatively strong sense of community among *kampung* residents, although mostly limited to the proximate neighbourhood or within the *RT* (Jellinek 1991: 26; Lont 2007: 173f.; McCarthy 2003: 19ff.).

From 1969 to 1994, the Indonesian government implemented the so-called Kampung Improvement Programme (KIP). Jakarta’s *kampung* neighbourhoods experienced some improvements in basic infrastructure to enhance health and sanitation (Steinberg 2007: 358; Winarso 2011: 181). Yet, Spreitzhofer (2007: 175) criticises that the program focused on *kampung*² most accessible by Western observers, rather than targeting the areas most in need. The KIP and its successor, the Urban Housing Renewal Program, have often led to “*kampung* clearance” (Spreitzhofer 2007: 176). Between 2000 and 2005, more than 63,000 people were forcefully displaced by the city administration, with many of them receiving little or no compensation (www.achr.net, cited by Spreitzhofer 2007: 177–178). City governance is generally found to be discriminatory against residents engaged in rather informal activities: in the same period, the confiscation and destruction of 23,000 *becak* (bicycle rickshaws) and 62,000 mobile vendor’s shops were reported and 550 street musicians were arrested in 2003 alone (ibid.).

So far, few researchers have paid attention on how households in Jakarta's *kampung*² are affected by social, political or economic risks. Besides some observations on the political marginalisation of *kampung* dwellers by Spreitzhofer (2007; see above), only McCarthy (2003: 10ff.) describes the negative effects of the Asian economic crisis from the perspective of residents of a *kampung* in Central Jakarta. While he found that “food security has never been under any real threat”, households had to significantly reduce consumption and sell off household items (McCarthy 2003: 14). The crisis led to a total halt in construction in early 1998, with devastating effects in the observed *kampung*, where many male household heads were employed in construction (McCarthy 2003: 10).

The few published studies dealing with environmental risks in Jakarta mainly focus on the city level, without further investigating how *kampung* and other residents are affected (see e.g. Firman et al. 2011; Steinberg 2007). However, at least three significant analyses on local vulnerabilities to flooding in Jakarta are available to date. A study by Texier (2008) provides some insights on how households were affected and coped with the extreme flood in 2007, while Marschiavelli (2008) conducted a detailed, but rather technocratic vulnerability assessment in Kampung Melayu, a flood-affected *kelurahan* close to one of the study areas in this paper. Wilhelm (2009) provides a brief and valuable analysis of *kampung* dweller's adaptation to flooding. Findings from these studies will be considered in Chapter 5. In the following, a brief overview on floods and their causes in Jakarta is given, before introducing the research methods and study areas of this paper.

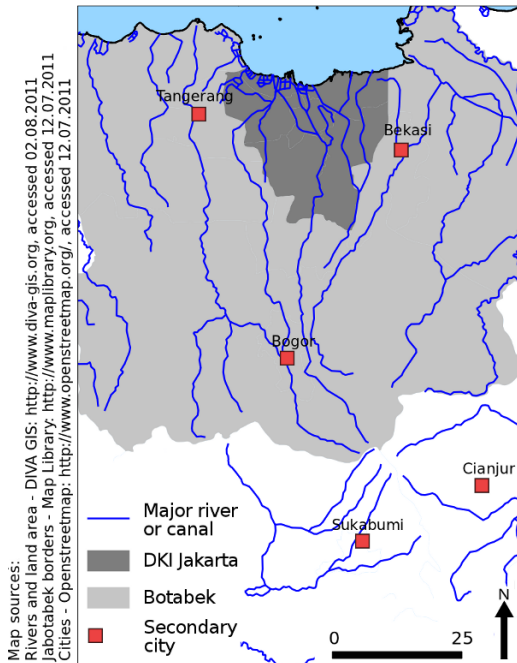
3.2 Flooding in Jakarta

Jakarta has a long history of flooding that goes back to colonial times. Much of Jakarta's current canal system was built by the Dutch in order to control the water flows in and around old Batavia (Blaikie et al. 2003: 219). Jakarta is affected by flooding every year, while major floods tend to occur once every five years in the rainy season. After a heavy flood in 1996, the year 2002 witnessed the largest flood in Jakarta's history that killed 25 people. Still, the extreme flood in February 2007 outclassed the 2002 event, inundating about 40 percent of the city, killing up to 80 people and displacing between 200,000 and 400,000 (Brinkman and Hartman 2008: 2; Texier 2008: 1; Wilhelm 2009: 154).

Thirteen rivers intersect Jakarta (Brinkman and Hartman 2008: 1). The main source of flooding is precipitation in the watersheds of these rivers that originate in the southern parts of Jabotabek (see Map 3.3): Bogor, a city located in this area, has an annual precipitation of about 1,600 mm (Weather2 2011). Average precipitation rates vary strongly during the year – the area is characterised by a rainy season from about November to March or April, and a dry season from April or May to October (ibid.). Furthermore, the northern parts of Jakarta are regularly affected by flooding from tidal waves – about 40 percent of the city area lies below sea level (Wilhelm 2009: 154). Land subsidence and climate change-induced sea level rise are projected to aggravate tidal flooding in the future (WWF 2009: 14). Wilhelm (2009) refers to an unspecified World Bank report that finds an astronomical cycle of 18.6 years to currently cause sea-level rise in the Jakarta Bay – given the current land subsidence rates, a strip of five km between coast and city centre are

projected to be underwater in 2025 (Wilhelm 2009: 154; cf. Süddeutsche Zeitung 2008).

For the most part, however, flooding in Jakarta is directly man-made. The causes are manifold: deforestation in the upper parts of the watershed led to higher water run-off and sedimentation rates in the rivers, while uncontrolled urbanisation has substantially



Source: own design

Map 3.3: Major rivers in Jabotabek area

waterproofed the ground surfaces in Jakarta, preventing water from infiltrating during floods (Texier 2008: 362). The canal and drainage systems of Jakarta did not make up with the rapid city growth and its function is often limited by illegal construction along canals or in retention areas. The East Flood Canal, originally planned by a Dutch engineer in 1918, is currently under construction but the completion has been delayed several times. The canal is designed to mitigate flooding in the eastern part of the city (The Jakarta Post 2011a). Furthermore, the large amount of garbage ending up in Jakarta's rivers or canals blocks the drainage system (Wilhelm 2009: 154). Jakarta's poorer residents are often blamed to substantially increase flooding by settling on riverbanks and throwing garbage into the water (Steinberg 2007: 360; Texier 2008: 362).

4 Methods and Study Areas

The research questions of this study are addressed in an analysis of empirical data collected in a livelihood and vulnerability analysis in different neighbourhoods of Jakarta. These neighbourhoods are located in some of the most flood-affected areas in the city. They are part of the target areas of the ICBRR-CC project implemented by various Red Cross organisations in 2007 (cf. Box 5.1). In order to get new insights into the targeted communities, the project-affiliated staff in Jakarta facilitated and encouraged this research.

In the first phase from 2007 to 2010, the ICBRR-CC target area comprised two *kelurahan* in East, and two in West Jakarta. Two study areas were selected upon consultation with local PMI staff and volunteers. It was decided to select one *RW* in West and one *RW* in East Jakarta (see Map 3.2 for their location in the city). Selection criteria were that the *RW*² should be affected by flooding, border a major river or canal, and cover areas of a similar population size. In West Jakarta, *RW 08* in *Kelurahan Kedaung Kaliangke* was selected, while in East Jakarta, research was conducted in *RW 07* in *Kelurahan Bidara Cina*.

4.1 Empirical Approach

During field research, expert interviews, semi-structured household interviews as well as observations, transect walks and mappings were carried out. Interviews with households and key informants were conducted with the assistance of four different local, voluntary interpreters recruited by the PMI. Depending on the availability of the interpreters, an average of three field days per week was carried out on weekdays and weekends between October 21st and December 19th, 2010. Between field days, the qualitative interview data was digitised and quantifiable information was entered into a database.

4.1.1 Expert interviews with NGO staff and local key informants

Apart from several informal discussions with Red Cross staff, two employees of NGOs active in flood-affected neighbourhoods in Jakarta were interviewed. However, the focus of interest was on local experts or key informants in the study areas. Among others, *RW* heads (*Bapak²RW*) were interviewed, as well as several *Pak RT*. Furthermore, members of the local *PKK* (women's group) and members of "community-based action teams" (CBAT) formed by the Red Cross served as key informants. In Bidara Cina, a group discussion was conducted with *Pak RW*, a women's group member, a *kelurahan* officer, and two or three members of the local *karang taruna* (youth association). The interviews with local key informants provided helpful context information on the studied neighbourhoods, especially regarding social capital and access to resources and services.

4.1.2 Semi-structured household interviews

The main data sources of this research are the 53 semi-structured household interviews that were conducted in the study neighbourhoods. These interviews constitute the major

information source on livelihood assets, access to resources, risk management strategies, livelihood outcomes and various other factors and influences outlined in the analytical framework (see Chapter 2.3). An interview guideline of about three pages and a short questionnaire on household statistics were developed and applied. Furthermore, a hazard or problem ranking was conducted during all household interviews (cf. Chapter 5.2). Most interviews lasted between one and two hours.

A household is defined as a group of individuals living under the same roof with a shared household economy. Households are not to be confused with the abbreviation *KK* (*kepala keluarga*) that refers to the male “family head” and is used in Indonesian population statistics to count nuclear families¹. Still, a household often consists of a nuclear family and other relatives (cf. Chapter 5.1.3). In the following, the *KK* of the dominating nuclear family in a household, as well as a widower or single man keeping his own household, is referred to as the “male head of household“. A “female head of household“ denotes the wife of the *KK*, a widow, or a single woman keeping her own household. Seventy-four percent of household interviews were held with the female, 26 percent with the male head of household.

In the study areas, a minimum of two to three household interviews were conducted per *RT*. Within each *RT*, respondents were selected by randomly asking people on the street or, if the door was open, at the entrance to their houses for permission to interview. There were three exceptions: Two households in Kedaung Kaliangke were selected by asking neighbours for households with members working in the nearby factories (see Map 4.1). One household was chosen by a *kelurahan* officer accompanying the author on the first field day in Bidara Cina. In total, 53 household interviews were conducted – 24 in the first, and 29 in the second study area.

This analysis has to deal with some missing data in the household database, due to various reasons. Firstly, a result of the semi-structured interview design is that not all topics of the interview guideline can be covered to the same extent in all interviews. Respondents were given the freedom to get more into detail at certain points – sometimes this made it necessary to shorten other interview topics. Secondly, some respondents could not answer some of the questions in detail or did not seem comfortable to do so, especially when it comes to household economy or health-related issues. Finally, some aspects are missing in the first few interviews, because they were only discovered after the research was already in progress. However, most of the data analysed here is available for at least 80 to 90 percent of the interviewed households. When providing percentages, missing values are indicated by denoting the number of observations (N).

4.1.3 Observations and mappings

During and between the household interviews, observations were conducted in order to gather additional data mainly on physical capital and flood exposure. Before starting with household interviews, transect walks were conducted with *Pak RW08* (in Kedaung

¹In this study, a nuclear family is defined as a married couple with their children.

Kaliangke) and with a *kelurahan* officer (in Bidara Cina) to get an overview of the study areas. The *RW* and *RT* borders in the study areas, main streets and the location of the interviewed households were mapped during the field visits and entered into a GIS (Geographical Information System) database.

4.2 Introduction to Study Areas

The field research for this paper was carried out in two different neighbourhoodsⁱⁱ in Jakarta that are sometimes referred to as *kampung*². The study areas will briefly be introduced in the following, starting with *RW* 08, Kedaung Kaliangke.

4.2.1 *RW* 08 in Kedaung Kaliangke, West Jakarta

RW 08 is located in *Kelurahan* Kedaung Kaliangke, *Kecamatan* Cengkareng, Jakarta Barat (West Jakarta). It is located in the very south of the *kelurahan*, isolated from other parts of Kedaung Kaliangke by the *Saluran* (“canal”) Mookervaart (see Map 4.1). Its other borders are defined by a small stream to the east, a railway to the south and – separated by a dam with a street on it – the Cengkareng Drain to the west.

The *RW* covers an area of about 23.2 hectares and encompasses eight different *RT*. However, about 11.8 hectares are occupied by factories. In *RT* 05 and parts of *RT* 04, a factory produces *kecap* (soy and other sauces) for ABC Food Indonesia, a company owned by Heinz. A neighbouring factory in *RT* 04 produces batteries. The third factory in *RW* 08 is located in *RT* 01 and produces cookies and crackers. The residential settlements are located between these factories.

Residents of *RW* 08 sometimes call their area *kampung*, but usually they refer to a specific “pocket” of houses between the factories rather than to the *RW* as a whole. As stated by a CBAT member in *RT* 06, the area west of the ABC factory can be seen as a different *kampung* than the areas east of the battery factory.

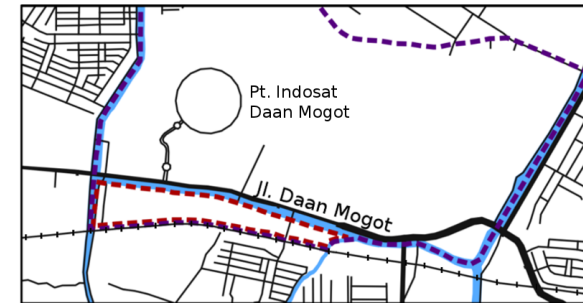
According to *Pak RW*, factories partly occupy illegal land along the canal and add to a decrease in water retention area. The factories pay “special rent” to the government. Besides, three or four wooden stilt huts in *RW* 05 were observed to be built on the strip of about five meter of land officially designated as untilled. Some households use the ground for building terraces and others use the space for chicken cages or temporary *warung*² (food stalls or small restaurants). Interestingly, the *RW* office that is used for meetings of neighbourhood heads is unlawfully built on land bordering the *saluran*. There is one neighbourhood that *Pak RW* refers to as “illegal”. Along the railway in *RT* 01, several houses occupy land belonging to a railway company. According to *Pak Toyib*, the informal head of this neighbourhood, 55 *KK* or “nuclear families” live in these houses and pay “special rent” to the railway company.

ⁱⁱ A neighbourhood is understood as a geographic cluster of households that might be characterised by a sense of community. Neighbourhood is a cognitive concept that can correspond with the *RT*, *RW* or *kampung*, depending on who is asked.



- Kelurahan Kedaung Kaliangke
- RW 08 (study area)
- RT border
- Examined household
- Side street
- ++ Railway

Map sources:
 Satellite data - Google Earth, picture date 15.02.2010, image by DigitalGlobe 2011
 Streets - OpenStreetMap, accessed through <http://www.cloudmade.com> (21.06.2011)



Source: own design

Map 4.1: RW 08, Kelurahan Kedaung Kaliangke, West Jakarta

The official population of the study area is 1074 *KK*. Table 4.1 shows the official distribution of *KK* among the eight different neighbourhood units. Yet, the number of those *KK* or individuals that are not registered in Jakarta can only be estimated. About 21 percent of the interviewed households in *RW 08* do not have the *Kartu Keluarga* (family ID card) Jakarta, the official document assigning the formal residence status for the family members (see Chapter 5.1.1). Accounting for this figure, there would be 282 unregistered *KK* in *RW 08*. *Pak RW* in turn estimates that approximately 30 percent (~470 *KK*) of the residents in *RW 08* are not registered in Jakarta.

Table 4.1: Registered nuclear families (*KK*) in *RW 08*, Kedaung Kaliangke

<i>RT 01</i>	150 <i>KK</i>
<i>RT 02</i>	130 <i>KK</i>
<i>RT 03</i>	128 <i>KK</i>
<i>RT 04</i>	136 <i>KK</i>
<i>RT 05</i>	100 <i>KK</i>
<i>RT 06</i>	105 <i>KK</i>
<i>RT 07</i>	155 <i>KK</i>
<i>RT 08</i>	170 <i>KK</i>
Total	1074 <i>KK</i>

Based on an estimated average of four family members per *KK*ⁱⁱⁱ, this study area would have an official population of about 4300 people. Based on the estimate by *Pak RW*, the unofficial population is around 6100 people. The approximate population density is therefore between 180 (official figure) and 260 (estimated figure) people per hectare.

Source: data from *Pak RW 08*

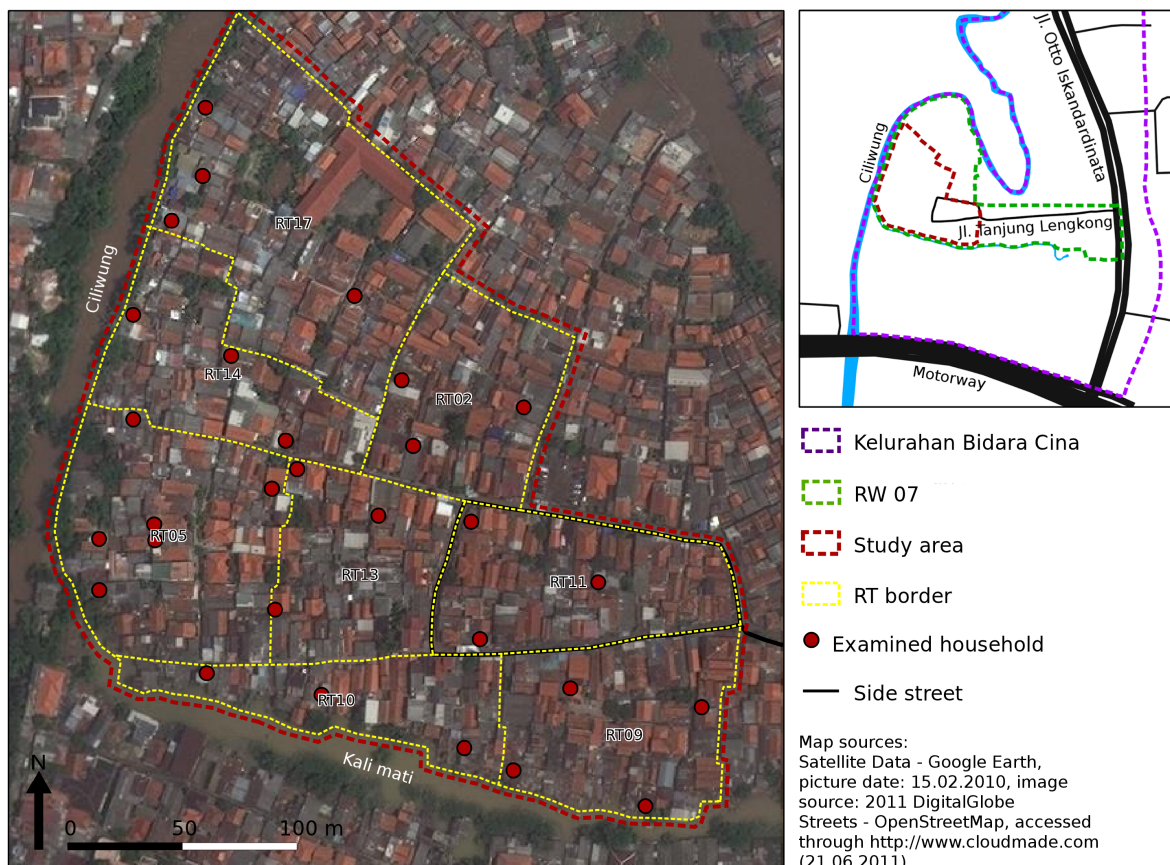
Large parts of the *RW* get flooded frequently. The areas in the centre of the *RW* and near the railway are most affected, since they are located on the lowest ground within the *RW*. As soon as the water in the Mookervaart rises, water flows through the drainage to these areas. The water level of the Mookervaart canal is mainly determined by two factors: rain in southern Jabotabek and sea water level in the Jakarta bay. The highest water level of the Mookervaart so far was 180 cm above normal in 2007, causing flooding of up to 170 cm in the study area. Furthermore, *RW 08* is frequently affected by flooding from drainage overflow after heavy rain in the *RW*. Details on flooding in both study areas will be provided in Chapter 5.3.

4.2.2 *RW 07* in Bidara Cina, East Jakarta

The second study area, *RW 07* in Bidara Cina, encompasses 18 different *RT*. In order (a) to have a comparable population size in both study areas, and (b) to have enough time for conducting a minimum of two to three household interviews in each *RT*, it was decided to narrow down the study area in East Jakarta to a cluster of 8 *RT* with a population of 950 *KK* (see Map 4.2; Table 4.2).

Kelurahan Bidara Cina is located in *Kecamatan Jatinegara*, Jakarta Timur (East Jakarta). The study area in *RW 07* is located on the eastern bank of Jakarta's main river, the Ciliwung. It borders a dead stream branch (*kali mati*) of the Ciliwung to the south, Otto Iskandarinata Road to the east and *RW 06* to the north. *RW 07* covers an area of about 14.3 hectares, while the size of the study area is about 6.1 hectares.

ⁱⁱⁱThe average household size in the household sample is 4.3. In some cases however, a household comprises more than a nuclear family (cf. Chapter 5.1).



Source: own design

Map 4.2: RW 07, Kelurahan Bidara Cina, East Jakarta

A clear distinction between legally and illegally occupied land could not be made here. While one respondent states that he has a land certificate, another explains that her household does not possess one but “this is normal in this area”. Others reported to have a letter from the *kantor lurah* or from the government on *kotamadya* level attesting them the right to stay on the land their house is built on.



Photo: M. Spies, November 2010

Figure 4.1: The kali mati in RT 10, RW 07, Bidara Cina

The closer one gets to the river, the lower lying and – according to *Pak RT 13* – the cheaper the land becomes. It can be observed that the housing quality drops remarkably when getting closer to the Ciliwung and the dead river. While many houses further away from the rivers (especially in *RT 02*, *11* and *13*) are relatively big with gated dooryards, clean facades and well-maintained tile roofs, houses closer to the water are smaller, more run-down, with thin and sometimes wooden walls and tin roofs.

According to *Pak RT 13*, people living in

RW07, Bidara Cina, sometimes refer to their neighbourhood as *Kampung* Tanjung Lengkong, named after the side street leading to the area (see Map 4.2). The study area has an official population of 950 KK (see Table 4.2). Compared to Kedaung Kaliangke, the share of unregistered households is significantly lower. According to the estimates of various RT heads, at least 79 KK in the study area do not have the *Kartu Keluarga* for Jakarta, resulting in an unofficial population figure of 1027 KK or more. However, the household sample does not support these estimates: only one of the 29 interviewed households does not have the *Kartu Keluarga* yet.

With an estimated average of four family members per KK, the study area in RW07 would have a population of 3800 official residents, and an unofficial population figure of at least 4108. The approximated population density is thus between 623 (official figure) and 675 (unofficial figure) people per hectare. Compared to the study neighbourhood in West Jakarta, the population density is about 2.9 to 3.4 times higher. Yet, this discrepancy can for a good part be explained by the occupation of almost half of the first study area by factories (see Section 4.2.1).

When the water level of the Ciliwung rises from high precipitation rates in southern Jabotabek, the lower parts near the river and the *kali mati* get flooded frequently. The satellite picture in Map 4.2 shows a minor flood in February 2010 that inundated parts of RT05, RT10 and RT09. During the extreme floods in 2002 and 2007, the whole study area was drowned with many houses flooded up to the roof (cf. Chapter 5.3.2). In contrast to RW08 in Kedaung Kaliangke, local rain does not cause flooding in the RW. Rainwater runs off to the Ciliwung and *kali mati*, flowing towards the northern parts of the city.

Table 4.2: Registered nuclear families in study area of RW08, Bidara Cina

RT 02	70 KK
RT 05	150 KK
RT 09	131 KK
RT 10	107 KK
RT 11	111 KK
RT 13	105 KK
RT 14	96 KK
RT 17	180 KK
Total	950 KK

Source: interviews with RT heads and their wives (*Pak* and *Ibu RT*)

5 Handling Risks in Jakarta's Flood-Prone Neighbourhoods

Having outlined the theoretical framework (Chapter 2), regional context (Chapter 3), research methods and study areas (Chapter 4), this chapter presents the findings from the empirical study of livelihoods, risks and vulnerabilities in flood-affected neighbourhoods of Jakarta. Following the logic of the analytical framework, it begins with a detailed analysis of livelihood assets used and strategies followed by the examined households in order to make a living (Section 5.1). In this regard, an introduction to their socio-economic context is provided. An understanding of this context is necessary to analyse and interpret people's perception of risks as outlined in Section 5.2. In particular, the findings from a hazard or vulnerability ranking conducted during the household interviews are presented here. Based on these findings, the subsequent sections focus on the impact of, coping with and adaptation to major risks in the study areas. Since it is the focus of interest of this paper, Section 5.3 presents the findings on risks associated with flooding. In Section 5.4, the impact and management of other livelihood risks are outlined in order to find out, how flooding is embedded in the "portfolio" of risks households have to face. For this purpose, risks considered in the problem ranking (Section 5.2) are exemplified – in particular health risks, risks associated with unemployment and fire risks.

In the following, insights into both study areas will be presented and discussed simultaneously, to point out similarities and differences. For simplification, the first study area is referred to as "Kedaung Kaliangke" and the second study area as "Bidara Cina". Yet, this does not imply that the characteristics of the study areas are representative for the *kelurahan* they are located in.

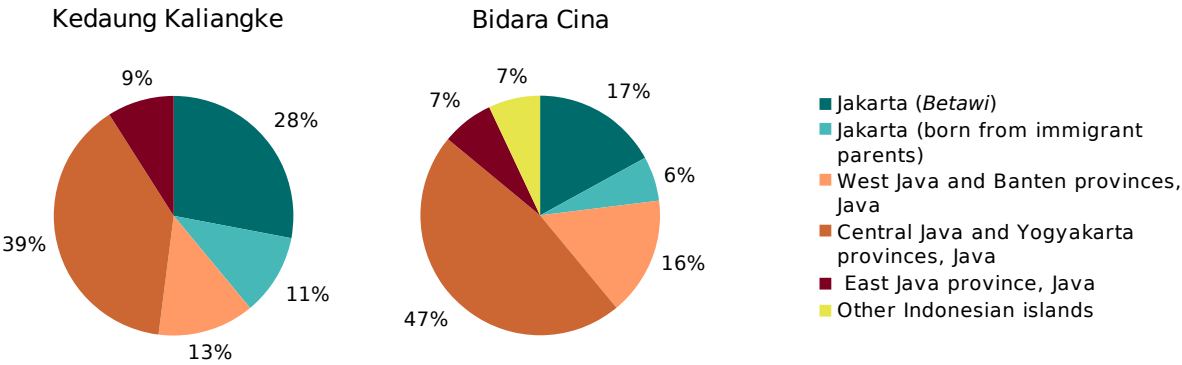
5.1 Urban Livelihood Systems

In this section the socio-economic characteristics and livelihood strategies of the study households are analysed. For this purpose, the immigration composition and residential status of the study population are examined (Subsection 5.1.1), before focusing on housing and other physical livelihood assets (Subsection 5.1.2). An analysis of strategies to draw on "human capital" to seize the opportunities provided by the specific environment of Jakarta follows (Subsection 5.1.3). Then insights into household economies are provided (Subsection 5.1.4), revealing that households follow manifold strategies to enhance their economic situation – not at least by participating in various financial self-help groups (Subsection 5.1.5).

5.1.1 Migrant background and residence status

Both study areas are characterised by a predominant population of migrants, mainly from rural parts of Java. *Betawi* or "native" Jakartans constitute a minor share of the study population – 28 percent of male and female household heads in Kedaung Kaliangke, and only 17 percent in Bidara Cina. Few of the male and female heads of the studied households

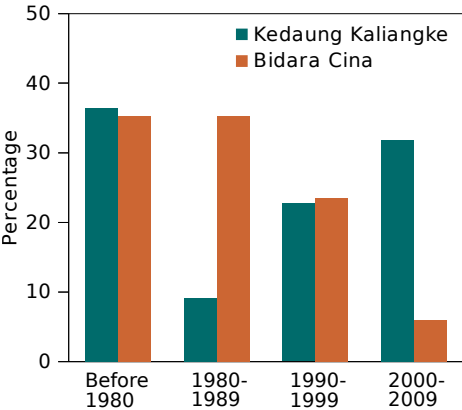
are born in Jakarta to immigrant parents. The majority has migrated to the city in order to find work – around 60 percent of in Kedaung Kaliangke and almost 80 percent in Bidara Cina (see Figure 5.1).



Source: own household survey 2010 (Ked. Kaliaanke: N=46; Bid. Cina: N=55)

Figure 5.1: Areas of origin of male and female heads of households

More than one third of them (36 percent in the first, 35 percent in the second study area) came to Jakarta before 1980. A large share of immigrants in Kedaung Kaliangke arrived more recently, while a steady decline of immigration can be observed in Bidara Cina since the 1980s (see Figure 5.2). On average, male and female heads of migrant households have lived for 22 years (Kedaung Kaliangke) or 28 years (Bidara Cina) in the city.



Source: own household survey 2010 (Ked. Kaliaanke: N=22; Bid. Cina: N=34)

Figure 5.2: Time of migration of household heads to Jakarta

Several household occupants lived in other parts of Jakarta before and some have moved within their neighbourhood. The average time respondents have spent in their current house is 13 years in Kedaung Kaliangke and 16 years in Bidara Cina.ⁱ

In the household survey, 86 percent of the male or female household heads have the *KTP* Jakarta, the ID card attesting their formal status as a resident of the city – 78 percent in Kedaung Kaliangke and 96 percent (all except one person) in Bidara Cina. Children or teenagers under the age of 17 are officially registered as Jakartans, if the *Kartu Keluarga* of their family is issued for Jakarta. Among others, at least one parent must possess the *KTP* for Jakarta to be able to get the *Kartu Keluarga* Jakarta covering the children.

The procedure to get the *KTP* Jakarta is handled by the *Kantor Lurah* (office of the *kelurahan* administration).ⁱⁱ Reference letters from the government and the police in the home village are needed and the *Kantor Lurah* usually asks for a guarantee letter from relatives registered in Jakarta. In addition, the *Pak RT* and *Pak RW* in charge of the applicant must sign the request. The process to get the *KTP* Jakarta takes about

ⁱKed. Kaliangke: N=18, Bid. Cina: N=16

ⁱⁱThe following information regarding the *KTP* Jakarta is mainly derived from an interview with *Pak RT* 08 in Kedaung Kaliangke.

six months and officially costs 100.000 IDR (Indonesian Rupiah; 1 Euro ~ 12.000 IDR). People depend on the arbitrary decisions by the government and the procedure often includes bribes. One respondent living in the squatter settlement along the railway in Kedaung Kaliangke states that she and her husband did not apply for the *KTP* Jakarta yet, because it is too expensive – they would have to pay 525.000 IDR to get the two *KTP* and the *Kartu Keluarga* for their family. According to *Pak Toyib*, only 15 of the 55 households living in this settlement have the *Kartu Keluarga* Jakarta. Not possessing the *KTP* and *Kartu Keluarga* Jakarta has several implications for individuals or families. Apart from not being allowed to vote for *Pak RT* (McCarthy 2003: 15), without formal residence status it is difficult to get a water, electricity or bank account. Furthermore, as discussed in Section 5.4.1, the access to health services is limited.

5.1.2 Shelter and household assets

About 40 percent of the studied households own their residence, while 13 percent live in a house owned by one of the household head's parents. Almost half (47 percent) rent their accommodation – most of them in Kedaung Kaliangke. Here, many respondents live in very basic row houses with just one room lacking a private *mandi* (simple bathroom) and toilet. Four study households, all located in Kedaung Kaliangke, gain income from letting houses. Two of them own several row houses in the *RW*, earning between three and five million IDR per month from it – a significant income in an *RW* with an average household income of about 2,420,000 IDR per month (cf. Section 5.1.4).

The majority of the houses respondents live in are built of brick or stone walls with tiled or tin roofs, depending on the economic situation of the household. Apart from one respondent living in a wooden cottage in Kedaung Kaliangke, only in Bidara Cina several study households live in houses with walls from other materials (usually a mix of brick, wood and corrugated tin; see Figure 5.3). The average dwelling size is 2.8 small rooms, but living spaces vary strongly between households. In Kedaung Kaliangke, 17 percent of the respondents have a second floor in their house, while in Bidara Cina this share is 59 percent. The reason for this discrepancy is obvious – flood levels in Bidara Cina are considerably higher than in Kedaung Kaliangke. Fifty-two percent of the study households in Kedaung Kaliangke have a private toilet in or attached to their house or share one with neighbours. However, almost half of the respondents must use a public toilet, adding to their daily living expenses (see Table 5.2, Section 5.1.4). In Bidara Cina, in turn, 97 percent of the study population have their own toilet or share it with neighbours, while only one household uses a public toilet.



Photo: M. Spies, November 2010

Figure 5.3: Dwelling of study household in RT 14, RW 07, Bidara Cina

As mentioned earlier, water access is limited in Jakarta. In the first study area, 58 percent of the respondents have access to piped water, while eight percent or two households use ground water. The remaining third uses a shared or public tap. In the second study area, however, only four percent or one household uses piped water. The majority – 78 percent – uses ground water by operating a private or shared electric pump. Nineteen percent of the examined households extract ground water with a hand pump or simple well.

About half of the studied households (51 percent) possesses a motorbike and two have a car. Although a household's economy can be significantly burdened by paying back the credit needed for such an investment (see Section 5.1.4), a motorbike can provide additional income security by providing the opportunity to gain income by transporting passengers. The Central Bureau of Statistics (*BPS*) Jakarta estimates that 130,000 unregulated *ojek* (motorcycle taxis) operate on Jakarta's streets (Jakarta Globe 2011).

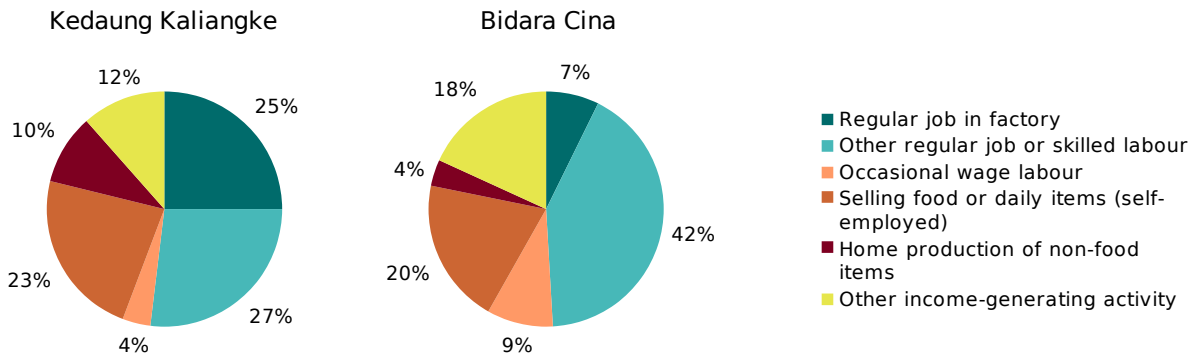
5.1.3 Household composition and income-generating activities

About 72 percent of the studied households are nuclear families. In 28 percent of the cases, a nuclear family shares their household with other relatives such as the father, sister or nephew of one of the household heads. In the study areas, it was not observed that unrelated people share accommodation. Household sizes range from one to nine members, with an average of 4.3 members. About 10 percent or five households, four of them in Kedaung Kaliangke, have their children living with the grandparents or other relatives in the home village in Java. The respondents stated that living is cheaper and safer there and in one case the child takes care of the grandmother in the home village. At the time of research, the average age of all members of the studied households was 29 years.

Education is valued high among households. Almost all household members in the age of seven to 18 years currently visit elementary, junior high or senior high school. Among the adult household members, 96 percent have finished elementary school, 68 percent junior and 50 percent senior high school. Seven percent (nine people) have finished college or hold a university degree.

While some households rely solely on the income of one household member, others have up to six household members in remunerated jobs. On average, a household has two members generating income from a variety of occupations. Nine percent of income-generating household members have two jobs at the same time.

About half of the primary occupations can be classified as regular jobs or skilled labour, with only a slightly higher share in Kedaung Kaliangke than in Bidara Cina. In Figure 5.4 a distinction is made between factory workers and people working in other regular jobs or skilled labour: one fourth of income-generating household members in Kedaung Kaliangke work in one of the nearby factories, while in Bidara Cina factories employ only seven percent of the working household members. However, this contrast might be underestimated by the household sample: in Kedaung Kaliangke, *Pak RW 08* and a CBAT member stated that around 60 percent of the working population in the *RW* are factory employees, most of them employed by the factories located in the study area.



Source: own household survey 2010 (Ked. Kalianke: N=52; Bid. Cina: N=55)

Figure 5.4: Variation of primary occupations among income-generating household members

Other primary occupations classified as regular jobs or skilled labour are bus driver, office employee or medical assistant in the local *Puskesmas* (government-owned basic health care station). One household has two members working as college and university lecturers. Between four (Kedaung Kaliangke) and nine (Bidara Cina) percent of the working household members gain income from occasional labour, such as working in construction or as a porter in the market. About 23 percent of the income-generating household members in Kedaung Kaliangke and 20 percent in Bidara Cina sell food or daily items – in their own *warung*, on the street or in a home-based shop. Other common income-generating activities were sewing clothes or other sorts of home production, with 10 percent in the first and four percent in the second study area. Various other occupations were observed, among others driving *ojek* (three cases), occasional laundry service in the neighbourhood (two cases), lending money (one case) or collecting and selling garbage (one case). As a secondary occupation, selling food, working as a babysitter or other types of occasional work were specified.

When defining informal jobs as income-generating activities that are “unrecognised, unrecorded, unprotected or unregulated by public authorities” (Becker 2004: 8), 50 percent of the 117 primary and secondary occupations are assumed to be informal. Thirty-five percent can be classified as formal occupations, while 15 percent (mostly self-employed businesses) can not be categorised. On the household level, the study areas show a discrepancy in the distribution of formal occupations: in Kedaung Kaliangke, 62 percent of the studied households have at least one member in a job classified as formal, while in Bidara Cina, this share is 52 percent.ⁱⁱⁱ Whether formal or informal, from a livelihood perspective it is important to determine the degree of security that a certain job arrangement offers (cf. Section 5.4.2).

The amount of income from these occupations varies strongly, even among people with similar jobs. Food sellers, for instance, make between 15,000 and 150,000 IDR per day. Factory workers in turn earn something between 650,000 and 1,500,000 IDR per month. Details on household income are provided in the following.

ⁱⁱⁱHouseholds with member in job classified as formal: N=30 (Ked. Kaliangke: N=15, Bid. Cina: N=15); households without member in job classified as formal: N=14 (Ked. Kaliangke: N=4, Bid. Cina: N=10); unclear cases: N=9 (Ked. Kaliangke: N=5, Bid. Cina: N=4)

5.1.4 Household economy

The average monthly household income is relatively similar in both study areas, with about 2.4 million IDR in Kedaung Kaliangke and 2.6 million IDR in Bidara Cina (see Table 5.1). The minimum household income in the survey, 150,000 IDR per month, was reported by a widow living with her disabled daughter in Bidara Cina. However, this figure is most likely underestimated, since the household's expenditures are reported to be about five times higher – the respondent added that she occasionally gets support from her second daughter, who does not live in the household. The highest household income with about 20,000,000 IDR per month was observed just about 50 meters away. In this household with eight members, four people gain income from relatively well-paid jobs.

Table 5.1: Income per month (in IDR)

	Average	Minimum	Maximum	N
Household income in Kedaung Kaliangke	2,421,000	479,000	5,900,000	23
Household income in Bidara Cina	2,625,000	150,000	20,000,000	26
Household income (all households)	2,530,000	150,000	20,000,000	49
<i>Financial means available per household member</i>	<i>623,000</i>	<i>75,000</i>	<i>2,500,000</i>	<i>49</i>

Source: own household survey 2010, N=49; 1 Euro ~ 12,000 IDR

Income differences are generally high. On average, each studied household has 20,800 IDR per day available per household member. Yet, the wealthiest third has almost seven times the amount of money available per household member compared to the 33 percent of households with the lowest income, who live from less than 9,000 IDR (around one US dollar) per day and per person. A GINI coefficient of 0.45, computed from the monthly income of the studied households^{iv}, supports this finding and is significantly higher than the coefficient calculated by Hartono and Irawan (2011) for Jakarta (cf. Chapter 3.1.1).

Table 5.2 shows major regular household expenditures sorted by average amount of expense. The highest expenditure is on food: households spend an average of 55 percent of their household income on nutrition. At least six households spend an average of almost one third of their income on paying back credit – five of them for a motorbike they purchased recently. Especially when children visit high school, expenditures like pocket money and money needed for transport to school are high. In 23 households, an average of one fifth of the household income is used for such children's needs. These expenses often exceed the school fees that average 12 percent of the income of the respective households. Ten households send on average 12 percent of their monthly income to relatives on a regular basis. In five households, however, the money is given to relatives taking care of the respondents' children in the home village. Several interviewees reported that their household occasionally supports relatives in times of need. For the 22 households renting their accommodation, the rent requires an average of 16 percent of the monthly house-

^{iv}N=49; the GINI coefficient calculated from the financial means available per household member is almost identical

Table 5.2: Major household expenditures per month (in IDR)

	N*	Average	Minimum	Maximum	Average share**
Daily nutrition	50	832,000	300,000	3,000,000	55%
Paying back credit	6	827,000	450,000	2,000,000	31%
Children's needs (present children only)	23	362,000	12,500	1,182,000	20%
Support to relatives	10	326,000	33,000	700,000	12%
Rent	22	289,000	50,000	800,000	16%
School fees	14	208,000	17,000	600,000	12%
Electricity	41	106,000	12,000	400,000	5%
Public toilet and <i>mandi</i> (estimated)	12	97,000	24,000	150,000	8%
Piped water	17	75,000	12,000	250,000	3%
Drinking water	20	72,000	11,000	330,000	3%

* N = number of households who specified expense

** Average share = average expense ÷ income (of N households)

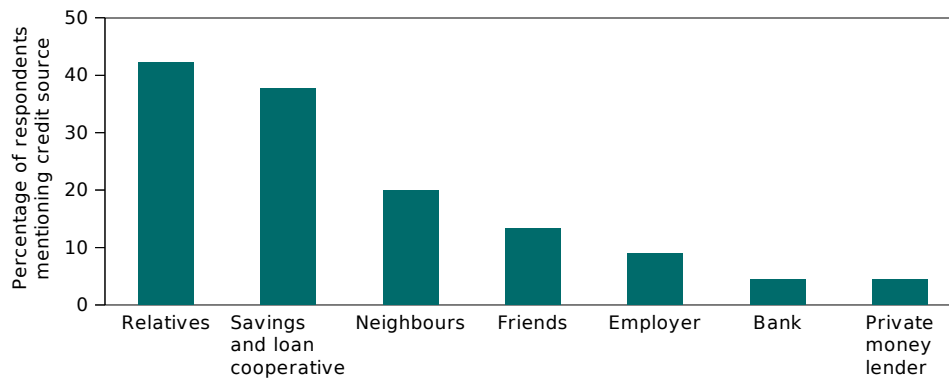
Source: own household survey 2010, N=50; 1 Euro ~ 12,000 IDR

hold income. Other regular expenditures include electricity (all households have access, 41 specified the expense), public toilet or *mandi*^v, piped water and drinking water (see Table 5.2).

When asking respondents about their household's possibilities to take loans, about eight percent (four of 48 respondents) stated they do not have any credit sources because they never borrow money. The majority of households however specified one or two credit sources (see Figure 5.5). Among the specified credit sources, relatives are named the most often – 42 percent of the respondents stated that they can borrow money from their kin. In both study areas, almost all households have relatives living in Jakarta and more than 70 percent within the same *RW*. Small-scale savings and loan cooperatives (*koperasi simpan pinjam*) are mentioned by 38 percent. These cooperatives are described in greater detail below. Twenty percent specified their neighbours as a credit source. Other mentioned credit sources were friends (13 percent), the employer or boss (nine percent), a bank (four percent – two households) or a private money lender (four percent).

About 65 percent of the studied households stated that they save money regularly. Depending on the household income, the amount of money they save varies strongly. Most respondents could not give exact numbers since their household savings vary strongly from day to day or month to month, depending on the expenses. As a rough estimate, most of these households put aside an average of about 1000 to 3000 IDR per day, or 30,000 to about 100,000 IDR per month. Five respondents specified that their household manages to save at least 300,000 IDR of their income per month, two of them even between two and three million IDR. While some households keep their savings at home, others save money in a *koperasi simpan pinjam* or have relatives saving it for them in a bank account.

^vHousehold members using the the public toilet in Kedaung Kaliangke have to pay between 500 and 1000 IDR for each usage, and an additional 1000 IDR for using the *mandi*. Figures in Table 5.2 are based on an estimated expense of 1000 IDR per household member per day.



Source: own household survey 2010 (N=59 credit sources specified in 44 households)

Figure 5.5: Credit sources specified by respondents

Thirty-seven percent of the studied households have a bank account – mostly those with a relatively high income.^{vi} It is common to give some money to the children, who save it in school for education fees – usually organised by their teacher. Reasons for saving money are education (four mentions), health care (four mentions) or more generally “times of need” (four mentions). Five respondents mentioned that their household saves money for times of flooding, for instance in order to be able to fix damages to their house. Households without savings stated that they can not afford to do so.

5.1.5 Financial self-help groups

Households participate in numerous social activities in their neighbourhoods. Apart from *RT* meetings for prayer (almost all study households are Muslim) and Friday meetings to clean the streets and drainage, the most notable social institutions are financial self-help groups. About 73 percent of the examined households have one or more members active in *arisan*, rotating savings and credit associations. Furthermore, 33 percent of the respondents stated that the male or female head of their household is a member of a *koperasi simpan pinjam*. In the following, *arisan* groups and *koperasi²simpan pinjam* are described more in detail.

Arisan can be found in several variations all over Indonesia. In regular meetings, each member of an *arisan* group contributes a specific amount of money to a kitty. Usually determined by a lot, one or several winners – depending on the size of the group – are chosen to receive the kitty. While still contributing money to the kitty, the winner(s) is/are excluded from the subsequent lotteries until each participant has received a kitty and a new *arisan* round begins (Lont 2000: 160).

Mostly on *RT* level and especially common among female heads of households, *arisan* is practised monthly, sometimes weekly in the study areas. While in Kedaung Kaliangke, *arisan* groups are rather small, in Bidara Cina the *Arisan RT* groups usually consist of around 50 members, with a maximum of 95 to 100 members in *RT 05*. The average monthly contribution (of the 16 households where it was specified) is 98,000 IDR, with a minimum of 15,000 and a maximum of 500,000 IDR. *Arisan* is not limited to the more affluent households: 69

^{vi}N=49; the average income of the 18 households with bank account is 4,151,000 IDR

percent of the third with the lowest household income practice *arisan*, contributing an average of 51,000 IDR^{vii} per month.

Arisan meetings often constitute the main gatherings of the *RT*. In *RT* 14, Bidara Cina, for instance, *arisan* meetings for men are conducted on the second Sunday each month. This is used as an opportunity by *Pak RT* to announce news from the *Kantor Lurah* that he usually receives in the first week of the month. On the other hand, *arisan* has an important economic function: people are constrained to regularly put away money that they will get back in a lump sum that can be saved or invested. One respondent in Bidara Cina, for instance, stated that each time she receives the kitty, she invests the money in her little shop.

However, as Lont (2000) found in other parts of urban Java, there can be a strong social pressure to join *arisan* meetings since not participating in such organisations “is perceived as tantamount to saying that one is not interested in one’s neighbours” (Lont 2000: 174). For instance, *Pak RT* 14 in Bidara Cina takes it as given that all family heads participate in *Arisan RT*, except “some who are new in this area – but usually people join it three or four months after arriving here”. Among others, a good relationship to the neighbourhood head can be crucial for the access to free or discounted health services (cf. Section 5.4.1). This somewhat compulsory character of *arisan* can also produce economic risks. Since people are usually not able to influence the moment at which they receive the kitty, the money used for *arisan* might not be available when people need it (cf. Lont 2000: 177). Furthermore, since household budgets are limited, *arisan* can restrain people from joining other forms of saving groups that are more helpful for bridging income gaps.

Various *koperasi simpan pinjam* (or just *simpan pinjam*) organised on different scales can be found in the study areas. Among the 17 study households who participate in a *simpan pinjam*, ten are members of savings and loan cooperatives organised on *RT* level in Bidara Cina. These small-scale cooperatives are mostly organised by and for women and exist in at least five of the eight visited *RT* in Bidara Cina. According to several *RT* heads and respondents from study households, monthly saving contributions are usually around 5000 IDR and each *simpan pinjam* has specific rules regarding the amount and purpose of loan its members can get. In one case, a *simpan pinjam* only provides loans for the establishment of micro-enterprises such as producing sweets for sale, while another local cooperative grants loans for “times of need”. In a *simpan pinjam* in *RT* 09 with currently 33 members in Bidara Cina, the total assets were 23 million IDR at the time of research and members were granted loans of up to two million IDR. In *RT* 14, the maximum amount of a single loan was between two and three million IDR, while one household in *RT* 05 (maybe over-)stated that they can take loans of up to 10 million IDR from the *simpan pinjam* in his *RT*.

Such cooperatives on *RT* level were not observed in Kedaung Kaliangke. This may be due to the high percentage of factory workers who – according to *Pak RW* and a CBAT member – generally have access to savings and loan cooperatives organised in the factories. In two studied households in Kedaung Kaliangke, both household heads save between 10,000

^{vii}N=5; five of the 11 households specified their contribution to *arisan*

and 25,000 IDR per month each in cooperatives of the *kecap* and battery factories they work for. Interest-free loans of up to six or seven millions are granted there. One of the two households recently took two loans of a total of 10 million IDR from the *koperasi* for renovating their house – they will pay it back in 12 monthly rates.

Other heads of examined households participate in *koperasi²simpan pinjam* organised or facilitated by colleagues (one household), by the *Kantor Lurah* (one household) or by the ICBRR/CC project of the Red Cross (one household; cf. Box 5.1).

5.2 Perception of Risks

In the introduction of this paper, quotations from interviews underlined that flooding is perceived as a minor problem. These statements originated from a hazard or problem ranking conducted during the household interviews.

At the beginning of field research, six major hazards or *masalah* (“problems”) were identified in interviews and discussions with local Red Cross staff, *Pak RW 08* and a CBAT member in the first study area. At the end of each household interview, respondents were asked to rank these hazards/problems according to severity of threat to their household.^{viii} The six *masalah* to be ranked were flooding, fire, loss of job or non-availability of work and three different *masalah kesehatan* (“health problems”): dengue fever, tuberculosis and diarrhoea. Although a differentiation between these *masalah* is somewhat artificial, since they are interdependent, the ranking provides an impression of how the interviewees perceive risks. Furthermore, respondents were requested to explain the rank orders and asked if they can think of any other *masalah* threatening their household. Table 5.3 summarises the results of the ranking exercise. The *masalah²* are sorted by their average rank among all studied households (1=biggest problem, 6=smallest problem).

Table 5.3: Average ranking of hazards/problems by interviewees

<i>Masalah</i> (“problem”)	All households		Kedaung Kaliangke		Bidara Cina	
	Average	STD*	Average	STD	Average	Std
Fire	2.1	1.5	1.5	0.6	2.6	1.8
Loss of job / no work available	3.3	1.9	2.4	1.6	4.0	1.8
<i>Masalah²kesehatan</i> (“health problems”)	3.6	1.0	4.4	0.6	3.0	0.8
Dengue fever	2.8	1.2	3.3	1.2	2.4	1.1
Tuberculosis	3.7	1.6	4.6	1.1	3.0	1.5
Diarrhoea	4.2	1.3	5.1	0.9	3.6	1.1
Flooding	4.8	1.3	4.1	1.3	5.3	1.0

*STD=Standard Deviation

Source: own household survey 2010 (N=51; Ked. Kaliangke: N=22; Bidara Cina: N=29)

^{viii}Sometimes further explanation or probing such as “Which one would be the biggest problem for your household if it occurs? Which would be the second biggest?” was necessary.

The ranking confirms that flooding is perceived as a relatively minor problem. Its average rank is 4.8, constituting the lowest mean rank among the six hazards. Notably, respondents in the second study area rank flooding especially low: although floods are significantly more extreme in Bidara Cina (cf. Section 5.3.2), respondents living here assign a mean rank of 5.3 to flooding. In Kedaung Kaliangke, the average rank is 4.1. Reasons for the low rank of flooding were cited earlier: flooding is “usual”, “routine” and it “is common here, not really causing problems” (respondents in RT 08, Kedaung Kaliangke and RT 05 and 06, Bidara Cina). In other parts of Jakarta, Wilhelm (2009: 159) finds similar perceptions of flood risks: *kampung* residents perceive flooding as *biasa* (“normal”), not as a calamity.

Health problems are generally ranked higher than flooding, with an average rank of 3.6. Among these, diarrhoea gets the lowest average rank of 4.2. Although often coinciding with flood occurrence, diarrhoea constitutes a common illness symptom in the study areas (cf. Section 5.4.1). The high occurrence of diarrhoea might be the main reason for ranking this illness low compared to the other *masalah*² – people know how to handle it. Tuberculosis, in turn, was assigned an average rank of 3.7. Anyhow, none of the studied households had been affected by this illness at the time of data gathering or respondents were not willing to talk about it. Only three households in Bidara Cina have heard of tuberculosis cases within the *RW*. In the course of the field research, it was therefore decided not to go into details of tuberculosis risks.

Dengue fever is ranked as the biggest of the given health problems and is perceived as the second largest among all ranked hazards/problems with a mean rank of 2.8. This can be explained by the fact that dengue fever can be life-threatening and its treatment often involves expensive stays in the hospital – a high economic burden for those without health insurance. In general, interviewees ranking health problems high mostly explained it by the treatment costs and restraints from working (cf. Section 5.4.1).

Loss of job or non-availability of work, depending on the type of occupation, ranks third with an average rank of 3.3. Though, its ranking order varies strongly among households as a standard deviation of 1.9 indicates. Generally, a significant difference between the two study areas can be observed. In Kedang Kaliangke, the mean rank is relatively high with 2.4, while in Bidara Cina loss of job or non-availability of work is on average ranked 4.0. The main reason for this discrepancy is probably that regular jobs providing additional benefits – such as access to credit and a health insurance – are more common among respondents in Kedaung Kaliangke than in Bidara Cina. Respondents with household members in such jobs have more to lose, thus ranking this problem higher (cf. Section 5.4.2).

Fires are perceived as the biggest hazard with an average rank of 2.1. It is especially ranked high in in Kedaung Kaliangke (mean rank: 1.5), where several fire outbreaks occurred in recent years (cf. Section 5.4.3). Most respondents justified the high ranking of fire by indicating substantial fear for their house and all their belongings. Furthermore, the potential threat to lives was a stated reason. Texier (2008: 366) supports this high prioritisation of fire risks in other parts of Jakarta, observing in her study that “40 percent of the interviewees actually mentioned fires as the principal danger against 25 percent for floods”.

Respondents were asked, if they can think of any other threats to their household not addressed in the ranking exercise. Anyhow, only a few other *masalah* were specified. One person in Kedaung Kaliangke mentioned the danger of drowning in the nearby river. Her son had drowned in 2002 and until 2008, this happened to a child living in the study area every year. One respondent married to a bus driver mentioned a risk of traffic accidents – the company he works for would only pay 30 percent of the damage. Another interviewee, who lives in the “illegal” neighbourhood near the railway in Kedaung Kaliangke, indicated a risk of train accidents and explains that she has to watch for her children all day. She also mentioned to be afraid of forced migration – if the railway company wants to expand the railway track, her family would not have much time to look for a new place to live.

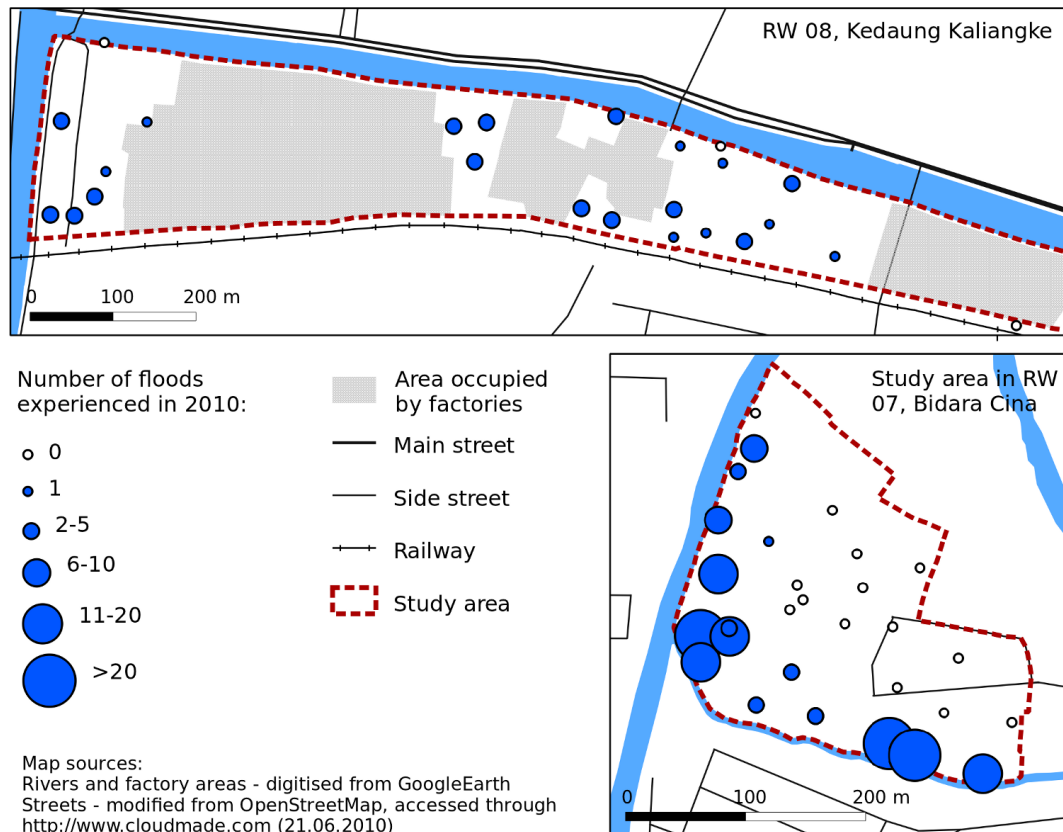
Obviously, the perception of risks largely depends on the specific living circumstances as well as on previous experiences. But furthermore, the capacities to cope with these risks are of crucial importance. Having presented the socio-economic context of households in the previous section, the focus now turns to their vulnerability. In the following section, impact and handling of flood risks are analysed in more detail, while health-related risks, risks associated with unemployment and fire hazards are examined in Section 5.4.

5.3 Living with Flood Risks

5.3.1 Occurrence and magnitude of flooding

In both study areas, people reported a high frequency of small to moderate floods. Map 5.1 shows the number of floods experienced by the studied households in 2010 (until the time of research). In Kedaung Kaliangke, 88 percent of the households had their house flooded in 2010 – one third once, 41 percent twice and 12 percent or three households at least three times. On average, floods lasted one or two days, reaching a level of up to 40 cm inside the house – in one case up to one meter. In Bidara Cina, 52 percent or 15 study households were affected by flooding in 2010. Floods are far more frequent than in Kedaung Kaliangke: only seven percent or two households had their house flooded one or two times in 2010, while 14 percent had it flooded four times already. As a result of the high fluctuation of the water level of the Ciliwung, 31 percent of the interviewees experienced that their house was flooded a minimum of 10 times in 2010, at least three of them even more than 20 times. Similar to the first study area, floods usually last not more than one or two days. But here, the average height of the highest flood respondents had to cope with in 2010 is more than double as high – about 90 cm, with a minimum of 15 cm and a maximum of 200 cm.

Respondents in Kedaung Kaliangke remembered Jakarta’s major flood event of 2007 as less outstanding as one might expect. Floods of similar heights were also reported for the years 2005 and 2006. Some respondents stated that these floods were even higher than the one in 2007, but since the highest water level of *Saluran Mookervaart* was in 2007 (according to *Pak RW*), they might have confused the years. Nonetheless, dwellings were on average flooded by 105 cm of water during the highest flood in the last five years, with a maximum of 170 cm. Only one respondent living next to the railway has not experienced flooding in her house yet. Apart from the dam separating the residential area from the Cengkareng



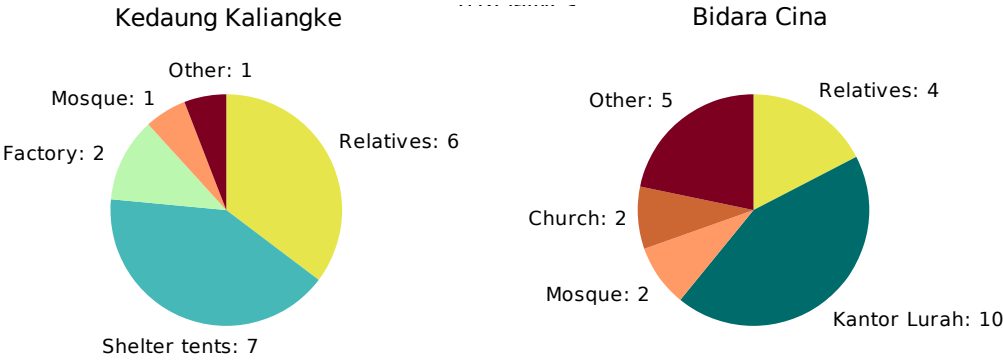
Source: own design, data from household survey 2010

Map 5.1: Number of floods experienced by study households in 2010

Drain, the railway constitutes the highest part of the study area and has been spared from flooding so far. Since most households have a ground floor only, 18 of 23 households (77 percent) had to evacuate their house at least once due to flooding within the last five years. On average, they left their house for one week. During the most recent evacuation, six of them found refuge in their relatives' houses – five in Jakarta and one in the home village (see Figure 5.6). Seven households stayed in evacuation tents on the railway or dam, provided by relief organisations or the government, while two households evacuated to one of the factories in the *RW*. One household found a place to sleep in the local mosque, others stayed in their subtenants house.

The second study area in turn was highly affected by the flood of 2007 that constituted the most severe inundation respondents experienced so far. All except two households, who moved to this neighbourhood after 2007, experienced their house being flooded by more than two meters. In more than half (nine of 17) of the studied households with two floors, the water reached the second floor – in at least five cases up to the roof. As a consequence, 23 of 27 study households in Bidara Cina (85 percent) had to evacuate their house for an average of 23 days. While the flood lasted about two weeks, people could not move back directly, because a thick layer of up to 80 cm of mud remained in their houses. Among those households, who evacuated, four stayed with relatives in Jakarta, while 10 households found shelter in the *Kantor Lurah*, that – located within the *RW* near the main

road (Jl. Otto Iskandardinata) – was spared from flooding. Two households evacuated to a nearby mosque and two to a church within the *kelurahan* (see Figure 5.6). Others found shelter in a friend’s house (two households), in a school (one household) or could afford to rent a room (two households).



Source: own household survey 2010 (Ked. Kalianke: N=17; Bid. Cina: N=23)

Figure 5.6: Evacuation shelters during last major flood (number of households per shelter type)

The big floods in the years 1996 and 2002 (see Chapter 3.2) were discussed less explicitly during the interviews. In both study areas, several interviewees remembered these floods as significant events, forcing them to evacuate their house. Some residents in Kedaung Kaliangke reported that the flood of 2002 was the highest so far. In Bidara Cina, the 2002 flood was remembered as being extreme and inundating the whole study area, but the flood of 2007 was the highest to date.

5.3.2 Impact and coping mechanisms

Overall, material adversities are lower than expected. When asking respondents about the various impacts of flooding on their household, only two stressed that losses of household items were severe. In these two specific cases however, the interviewees blamed themselves for not taking the flood warning serious. As a result, they lost important documents, schoolbooks and their TV sets to the flood. Some respondents reported damages to household items such as furniture and clothes. Only one interviewee reported significant damage to his house, which was subsequently fixed with the help of a government grant of 100,000 IDR. On average, respondents have lived in the study area for at least 13 to 16 years (see Section 5.1.1). Of course, after experiencing their house being flooded several times, people do not invest much money in household items that are susceptible to flooding. Apart from a TV that every household possesses, electronic devices were observed to be rare, as were upholstered furniture. In Bidara Cina, 80 percent of the studied households in who experienced flooding in 2010 have two floors, enabling them to move to the upper floor when the flood strikes. Usually, susceptible household items such as TVs, beds and wardrobes are stored permanently in the second floor. In Kedaung Kaliangke, however, only 14 percent or three houses being flooded in 2010 have a second floor. The majority of households cope with the frequent floods by putting electric devices on tables and storing susceptible belongings on high racks. A major concern is the loss of important documents

such as birth certificates or the *Kartu Keluarga* as well as money: people often store them just below the roof, wrapped in several layers of plastic bags.

Furthermore, physical adaptations on houses are common. For instance, most houses have heightened door sills and/or installed wooden boards in front of their door to keep out garbage and mud that comes with flooding. Many of the studied households have a bunk bed, especially those sharing just one room. One respondent in Kedaung Kaliangke stated that when their living space was inundated by 50 to 80 cm during a flood in October 2010 (see Figure 5.7), the whole family (husband and wife, three children and a baby) shared the upper bed for three nights. It was observed that beds are generally not lower than 60 cm above the ground. Several interviewees indicated that as long as they have a place to sleep, they do not evacuate their house and continue their daily household activities such as cooking and washing, sometimes standing more than knee-deep in water.



Photo: M. Spies, October 2010

Figure 5.7: Flooding in RT 04, RW 08, Kedaung Kaliangke (picture taken from railway)

As stressed by Wilhelm (2009: 158) as well, a major flood-related concern is the loss of income. A street food seller puts it as follows: “when the flood comes, the biggest risk is not being able to work” (woman in RT 03, Kedaung Kaliangke). In 15 household interviews the interruption of work for several days, in three cases for one or two weeks, was mentioned as a consequence of flooding and it can be assumed that most households have been affected by flood-related income gaps. Still, none of the interviewees reported serious problems resulting from income failure due to flooding. People stated that they either used their savings (nine mentions), received financial help from relatives (four mentions), borrowed money from neighbours or colleagues (three mentions) and in two cases, the main earner of the household had just received the weekly wage when the flood stroke. What might be most important, however, is that during major floods, people received free food in the emergency shelters, relieving them from their biggest household expenses (see Section 5.1.4).

None of the interviewees mentioned casualties or serious injuries in their household. The consulted key informants did not remember any flood-related fatalities in the study areas, with one exception: during the 2007 flood, a resident of the second study area died from a lung infection. But at least 27 of the 53 study households experienced health problems related to flooding: 20 respondents mentioned skin diseases, 17 mentioned diarrhoea, nine mentioned fever and five interviewees reported influenza as a consequence of flooding in their household. One respondent related her suffering from dengue fever to the spread of mosquitoes after a moderate flood in 2008. During an interview with *Pak RW* and a *PKK* member in the first study area, it was mentioned that outbreaks of dengue fever commonly occur about two weeks after flooding.

Still, respondents in both study areas indicated a good access to free medicine and health treatment during and after major floods (see Section 5.3.4) – even for curing dengue fever. Three cases of flood-related diarrhoea were reported to be severe – two of them had to be cured in hospital. In one case, the treatment was paid by the factory’s health insurance where the father of the ill child works (cf. Section 5.4.1). In the second case, however, the household paid for the treatment by themselves. The mentioned case of dengue fever was cured in the house of the respondent’s daughter who is married to a doctor.

5.3.3 Emergency structures and early warning

In both study areas, well-functioning emergency structures were observed. All respondents who evacuated their house during the major floods in 2005, 2006 (Kedaung Kaliangke) and 2007 (Kedaung Kaliangke and Bidara Cina) managed to evacuate in time. In one case though, during the 2007 flood in Bidara Cina, a widow and her disabled daughter went up to the windowless second floor and got trapped with flood water on the ground floor. The woman seemed traumatised, when talking about the incident. She stated they stayed on the second floor for two months, with water gradually rising waist-high. She explained to have survived only by cooking instant noodles, praying and reading in the Qur’an every day. Apart from this, interviewees did not report any serious complications during evacuation. They all managed to evacuate by themselves or with the assistance of neighbours or volunteers, most likely coming from the *Satgas Banjir*, local task forces for flood response (cf. Arduino 2010).

By and large, early warning systems appear to function well. Flood warnings are mainly communicated hierarchically along the local government and *RW/RT* structures: typically, the *Pak RW* gets informed by the *Kantor Lurah*, when a big flood is predicted to come. *Pak RW* instructs the *RT* heads who then either personally inform the residents of their neighbourhood or, as reported in Kedaung Kaliangke, use the speaker of the local mosque to announce the flood warning. In Bidara Cina, *RT* heads have sirens in their house that are switched on, when they receive a warning of the highest emergency level: people know the signal well, which instructs them to evacuate the neighbourhood.

In general, floods in Bidara Cina are more predictable than in Kedaung Kaliangke. *Kelurahan* officials responsible for flood-related tasks, *Pak RW 07* and at least one of the interviewed *Pak RT* have direct radio contact with officials monitoring the water level at a major flood-gate of the Ciliwung near Bogor. It takes about eight to ten hours, till water passing the floodgate reaches Bidara Cina – sufficient time for residents to bring their motorbikes to the main street, secure important household items and evacuate the neighbourhood. In 2007, all studied households had been warned several hours before the area was flooded. Besides, various interviewees had received a warning by *Pak RT* in August 2010 just before the highest flood of that year occurred. Nevertheless, people living close to the rivers have to be alert permanently, since most small or moderate floods occur without prior warning. In the study area in Kedaung Kaliangke, floods are more difficult to predict – local rain, precipitation in southern Jabotabek and tidal currents determine flooding here (see Chapter 4.2.1). Nonetheless, at least 14 of the studied households received flood warnings, before they had to evacuate their house in 2005, 2006 and/or 2007. Two interviewees on the other

hand explained that they did not receive a warning prior to the 2007 flood, but decided by themselves to evacuate, when the water reached a serious height. Generally, respondents in Kedaung Kaliangke stressed the informal warning systems in the neighbourhoods, for instance stating:

“We take precautions when there is flooding near the railway. Communication is good in the community, so we will know it.” (Woman in RT 02, Kedaung Kaliangke)

Building on such apparent self-help mechanisms, community-based projects of disaster risk reduction have targeted the study areas. While in Kedaung Kaliangke, the ICBRR/CC project of the Red Cross (see Box 5.1) rather focusses on other project components, according to *Pak RW 07*, 75 members of the *Karang Taruna* (and probably *Satgas Banjir*) in Bidara Cina received a CBAT training in emergency tasks after the 2007 flood. Furthermore, during a group discussion in Bidara Cina, *Karang Taruna* members and other community volunteers remembered a community-based flood risk reduction project carried out by the UNESCO providing them with radios and other emergency equipment. This project approached the study area after the flood in 2007 (cf. Arduino 2010).

5.3.4 Relief assistance

As indicated in Chapter 2.2.3, a household’s access to relief structures can be a crucial factor of vulnerability. Indeed, the survey shows that most households depend on external assistance, when evacuating their house – during the last major flood, more than 60 percent relied on emergency shelters provided by various relief institutions (see Section 5.3.1). Most interviewees reported the relief assistance overwhelmingly positive, because they had access to free food, medicine and medical treatment for common flood-related illnesses.

A large share of this assistance was provided by the government. In this regard, residents might benefit from the strategic importance of Jakarta as the capital of Indonesia, as an article on AlertNet states when referring to the 2007 flood: “During the crisis, the government responded quickly because the area was part of the capital and received a lot of media attention, residents said” (Mega 2010). According to *Pak RT 09*, a special government fund was used for supporting residents in repairing their houses after the flood in 2007. Furthermore, a social fund provided support to every family in the most flood-affected neighbourhoods with cash after flooding – official residents received 275.000 IDR per *KK*, while families without the *Kartu Keluarga* received 150.000 IDR each. How effective this measure was, still remains open to debate. During the interviews, only one respondent reported to have received this financial help.

The PMI was the relief organisation most frequently mentioned by respondents.^{ix} Others re-

^{ix}During the 2007 flood in Jakarta, field kitchens established by the Indonesian Red Cross provided about 35,000 meals per day, while an additional 11,800 food kits and 2,000 boxes of mineral water bottles were distributed. Furthermore, the PMI provided about 11,600 patients with the necessary health services for flood-related illnesses, and distributed various other relief items such as hygiene, school and house cleaning kits (IFRC 2007: 2f.).

Box 5.1: Community-based Disaster Risk Management and the Red Cross approach in Jakarta

What can be seen as part of a general trend towards community-based approaches in disaster risk management (CBDRM, see Box 2.1), several projects emerged in Jakarta that aim at empowering flood-affected neighbourhoods to reduce or manage flood risks. For instance, UNESCO, MercyCorps, Action Contre la Faim and the USAid-sponsored “Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia” conducted various activities to strengthen capacities of flood preparedness (ADPC 2010; Arduino 2010; MercyCorps Indonesia 2009; PDRSEA 2006). Other typical project components are small-scale mitigation projects such as improving waste management and sanitation, and awareness campaigns on causes and risks associated with floods. Given the findings in the study areas of this paper, however, the appropriateness of at least the latter activities must be challenged. As Texier (2008: 368) points out, such programs “seem to be inappropriate as risk perception is already high among flood victims.”

The ICBRR/CC project, implemented by a cooperation of Red Cross societies in 2007, follows a broader approach. While a focus lies on measures similar to the above mentioned (increasing awareness, building disaster response capacity), it addresses health risks and aims at strengthening livelihoods by facilitating more formalised savings and loan cooperatives (PMI 2006; Wage-maker et al. 2011). At the time of research, these cooperatives were still in the development stage and only one of the examined households participated. Yet, considering that people’s capacities to cope with floods are already high and that flood risks are not a priority, this project component might be the most appropriate one to reduce households’ vulnerability to hazards. The strengthening of economic security not only makes people less dependent on relief assistance during major floods, but constitutes an integrated approach to address the various risks a household faces.

In this regard, another project component discussed during the time of research seems meaningful: the incorporation of microinsurance – backed by Rabobank Group – in the savings and loan cooperatives to insure perceived and measurable risks. Nevertheless, the outcome of this component crucially depends on which risks are insured. People will not invest in flood insurance when flooding is not perceived as a big risk. However, they may be willing to join a micro health insurance that appears to be a more pressing need, and that would cover a large share of the flood-related risks anyway (cf. Sections 5.2 and 5.4.1).

ported health care and food donations by religious organisations, NGOs and the Indonesian army. The private sector constitutes another significant actor: respondents in Kedaung Kaliangke stated that during major floods, the factories offer shelter, medical treatment and sufficient food to residents of the *RW* for free, regardless whether a family member works in the factory or not. In addition, Wilhelm (2009: 158) finds that companies use flood events to strengthen brand awareness among consumers in Jakarta, e.g. by providing free telephone services or distributing their newest products as food donations. In Kedaung Kaliangke, a respondent mentioned that during the 2007 flood, a TV station (probably Indosat, see overview map in Map 4.1) opened a health service station and provided free treatment to residents of the area.

In summary, evidence suggests that the study population has developed a high capacity to cope with flood risks. Still, not all households can be denoted *resilient* to flooding as their high dependency on external assistance indicates. There is, however, a lack of external assistance during smaller floods and in “normal” times. People must cope with most risks by themselves, as shown in the following.

5.4 Other Livelihood Risks

As outlined in the theoretical part of this study, people in megacities of the Global South often have to deal with a variety of daily, chronic or event-related risks threatening their livelihoods. The problem ranking in the study areas indicated that among the hazards or risks households face, flooding is considered a minor threat. Hence, this section aims at analysing and discussing why other risks are considered more serious. However, not all risks or hazards households may have to cope with can be considered here. Without claiming to be comprehensive, this section focusses on three different, major types of threat to livelihoods accounted for in the hazard/problem ranking – health risks, loss of job or non-availability of work and fires.

5.4.1 Health risks and access to treatment

As the problem ranking shows, getting ill was overwhelmingly perceived as more problematic than flooding. Although some diseases might occur more often during and after floods (see Section 5.3.2), related health hazards such as standing water or contaminated drinking water prevail in “normal” times as well: “We did not get diarrhoea after flooding yet, but sometimes in normal times” (woman in *RT 07*, Kedaung Kaliangke). Dengue fever often occurs following a flood as well, but also constitutes a major health hazard independent from flooding (see Box 5.2). Furthermore, water-related and vector-borne diseases are not the only health problems people have to face: diarrhoea was only in three, dengue fever in two of the mentioned cases the reason for seeking treatment in a hospital. Altogether, 14 respondents reported that a household member has stayed in hospital already – amongst others due to a heart attack, a stroke, an allergic reaction and in two cases due to complications while giving birth. From a livelihood perspective, it is therefore important to determine strategies and possibilities to generally cope with health problems, whether they are flood-related or not.

In nine of the 14 reported hospital stays, households had to pay for the treatment by themselves. However, four of them received financial support by the *SKTM* program of the government (see below). In four cases, treatment was covered by the insurance provided by the employer of the male household head. In one case, the household could get free treatment by possessing a *Kartu Miskin* (“card for the poor”, see below). In the following, the study households’ access to treatment is described more in detail.

When people get ill, the *Puskesmas* (government-owned basic health care unit) is usually the first address to seek treatment: sixty-two percent or 25 of 40 respondents stated that they use the *Puskesmas* service, others (especially wealthier residents) prefer to see a private doctor. For a small administrative fee of 2,000 IDR, registered and non-registered residents can see a general practitioner and get medicine. Only few of the interviewees who use the service complained about the quality of it, even though waiting hours can be very long. If an illness can not be cured at the *Puskesmas*, patients are referred to a government-owned hospital where they have to pay for the treatment by themselves, unless they have a health insurance or get financial support from the government. Two different types of government support were observed in the study areas:

- The *Surat Keterangan Tidak Mampu (SKTM)* is a letter granting discount on health treatment in government hospitals. Lower-income patients can ask their *Pak RT* for providing them with this letter that must be approved by *Pak RW* and the *Kantor Lurah*. People especially depend on the decisions of *Pak RT* and employees in the hospital who determine the amount of discount granted by assessing the patient's economic situation. Nonetheless, four study households have received the *SKTM* already, granting them discounts of 50 to 80 percent. A necessary precondition to get the *SKTM* is the possession of the *KTP* or *Kartu Keluarga* Jakarta.
- The *Kartu Miskin* is a health insurance card for economically disadvantaged people provided by the government. Families (*KK*²) having this card can get free health treatment in the *Puskesmas* as well as in government hospitals. The application procedure is similar to applying for the *SKTM*, but takes at least two weeks and families must fit certain criteria that assign them as poor and needy. The entitlement to the *Kartu Miskin* appears to depend on the arbitrary acts of *Pak RT* and decision makers on higher levels. *Pak RT* 08 in Kedaung Kaliangke, for instance, stated he has his own criteria of selecting candidates – among others, a household income of less than 500,000 IDR and at least three children. Only one of the studied households has the *Kartu Miskin*: a married couple with two children and a monthly income of 600,000 IDR, living in *RT* 06, Kedaung Kaliangke. One household used to have the card, but it was taken away from them recently (see Box 5.3). Similar to the *SKTM*, formal residents can get the *Kartu Miskin* only.

Box 5.2: Dengue fever occurrence in the study areas

Dengue fever, a potentially life-threatening disease transmitted by mosquitoes, frequently occurs in the study areas. Three severe cases of the illness were reported in the examined households.

In Kedaung Kaliangke, the most recent epidemic occurred about 10 days after a flood in August 2010, infecting at least 13 people in the study area and killing two in the neighbouring *RW* (Interview with *Pak RW* 08 and female CBAT member, Kedaung Kaliangke). Other respondents in Kedaung Kaliangke reported an epidemic in 2009, forcing two neighbours to stay in hospital and causing two fatalities nearby (probably in the neighbouring *RW*). These outbreaks occurred “even though there was no flooding” (woman in *RT* 08, Kedaung Kaliangke). Other respondents mentioned outbreaks of the fever in 2008, among others leading to the death of a child in the study area.

Occurrence (or awareness) of the fever seems lower in Bidara Cina, where one of the three cases in the study households was reported. Some interviewees remembered outbreaks in the neighbourhood, but none could provide concrete figures. One respondent in *RT* 10 mentioned that one inhabitant of the study area died from dengue fever in 2009. Nevertheless, mosquito fogging – commonly conducted after the diagnosis of local dengue outbreaks – was taken as a measure during field research in both study areas.

The prevention of dengue fever occurrence is generally a high priority in local governments. Apart from fogging, *PKK* members are financially supported by the *kelurahan* administration to conduct regular *jumantik* (monitoring of mosquito larvae) visits in their *RT*. Most interviewees (75 percent in Kedaung Kaliangke, 86 percent in Bidara Cina) confirmed that their residence is regularly inspected by the *PKK*. Usually, these activities called *jumantik* are conducted between weekly and monthly.

Nine study households or 17 percent have a health insurance provided by the employer of one of the household heads. Yet, only in four of these cases the insurance covers all household members to 100 percent, while in five households either just parts of the treatment costs are covered or not all household members are insured. In all four fully insured households, the insurance is provided by the factory one or both household heads work for. Three of them work in the *kecap* or battery factories in the first study area. Both of these factories provide the nuclear families of their workers with an insurance covering 100 percent of the treatment costs in specific hospitals. For minor illnesses family members get free treatment by selected doctors (respondents in RT 03, 04 and 08, Kedaung Kaliangke). Thus, it is likely that a major share of residents in the first study area benefit from a functioning health insurance, since a large part of the working population is employed by these two factories (see Section 5.1.3). Still, most of the examined households have to pay for health treatment by themselves. Even if they receive the *SKTM*, health issues can pose a serious burden on their household economy.

Box 5.3: Two examples demonstrating how health problems can burden a household's economy

Example one: Traffic accident causing income crisis

A study household in RT 08, Kedaung Kaliangke consists of a married couple, a 19 year old daughter, a 16 year old and a one year old son. The daughter contributes about 300,000 IDR per month to the household income by working in a printing company. The main earner of the household is her father, working eight hours per day, seven days per week as a busdriver. Two months ago, he was involved in a traffic accident. Fortunately, there were no serious damages he had to pay for. Unfortunately, he broke his arm. Since the *Kartu Miskin* had been taken away from the household in 2009 “because there was something wrong with the card and the criteria”, they had to pay for the treatment by themselves. The injured man could borrow the 500,000 IDR needed for the treatment from his colleagues. Since the accident, however, he can only use one arm for driving the bus and had to reduce his working hours. Usually, he would earn about 30,000 IDR per day, but now he can barely make 20 to 25,000 IDR and still has to pay back the loan from his colleagues. As a consequence, the elder son had to stop visiting high school – the household cannot afford it any more.

Example two: Income gap since main earner suffered stroke

In RT 10, Bidara Cina, a married couple shares a household with their 23 year old son. The 52 year old male head of household used to work as a driver, but is physically disabled since he had a serious stroke in 2007. Following the stroke, he stayed in hospital for 21 days. Unfortunately, he had to stop the therapy because the household could not afford it any more. His wife started working after his stroke. She and her son can gain a monthly income of about 1,500,000 IDR. A large share of the income is used for the therapy of the disabled household head. The income is not sufficient to get proper treatment, although the household can get an *SKTM* granting them 50 percent discount whenever they need it.

As the two case studies in Box 5.3 show, this burden is two-fold: the treatment can be very expensive, while income gaps result from a lack of working ability. The latter constitutes a risk not only limited to jobs classified as informal, as several respondents mentioned that the companies household members work for do not pay for non-productive time caused by illnesses. Given the limited access to government support, most households cope with

the economic burden of health problems by cutting expenses, mobilising additional labour resources, using their savings and/or approaching the various sources of credit as presented in Section 5.1.4. Furthermore, people probably try to keep a good relationship with *Pak RT* to improve their chances of getting the *SKTM* or *Kartu Miskin*. Still, non-registered residents are excluded on principle and can only apply for government support in their home town or village. In the study population, most households without the *Kartu Keluarga* Jakarta have an insurance provided by a household head's employer, but the described access barrier might have more serious implications in other parts of Jakarta.

To some extent, small-scale risk transfer mechanisms were observed. In several *RT* in Bidara Cina, each household contributes between 1,000 and 4,000 IDR per month to a social fund. If a resident *RT* gets ill and has to be treated at the hospital, he or she usually receives 100,000 IDR from the fund. Additionally, neighbours sometimes collect money spontaneously when someone is in need, but the funds raised are unlikely to be sufficient if someone is seriously ill. According to a health and nutrition advisor from *MerciCorps* Indonesia, the cheapest room rates in government hospitals might be around 200,000 to 300,000 IDR, while medicine and treatment has to be paid extra. Severe cases of dengue fever, for instance, can make hospital stays of several days or up to two weeks necessary, thus clearly exceeding the support available from small-scale risk transfer mechanisms.

5.4.2 Loss of job or non-availability of paid work

In urban areas, where most households rely solely on cash income, the availability of paid work is the basis for making a living. Nevertheless, respondents ranked loss of job or non-availability of work with a general high variation, while a difference between both study areas becomes apparent (see Section 5.2). Here, the distinction between different occupation types becomes helpful for explaining this variation.

As mentioned earlier, several members of the studied households have formal jobs that not only constitute a steady source of income, but also provide health insurances as well as opportunities to borrow significant amounts of money in times of need (see Section 5.1.3). Obviously, losing such a job constitutes a big risk, since employees and their households would lose all these benefits. If they are lucky, they would be left with some financial compensation or with the money they regularly contributed to the savings and loan cooperative. Box 5.4 gives an example of how the loss of job influenced the livelihood of a study household and how the household coped with it.

Even if the issue of health insurance is not involved, the loss of a formal job is perceived as a high risk. For instance, a factory worker in Bidara Cina ranking loss of job as the biggest hazard explains:

“If I lose my job and a family member gets ill, I won't be able to borrow money from my boss for the treatment. Besides, people in the hospital will ask if I have a job.” (Man in *RT* 17, Bidara Cina)

On the other hand, one respondent married to a factory worker stated that the loss of her husband's job – including the health insurance for the family – would not be a big problem

for their household, since they have savings on a bank account and own a rice field in their home village: “We can always move back to Central Java and make our own business there” (woman in *RT 07*, Kedaung Kaliangke).

Several respondents, mostly from households active in rather informal jobs such as selling food or occasionally fixing computers, stated that losing the job is less of a problem, since they can always find a new one (Woman in *RT 09* and man in *RT 17*, Bidara Cina). Generally, people gaining income from rather informal sources perceive losing the job or not getting paid work as a smaller problem than those having a regular job. As a woman keeping a small home-based shop and married to an *ojek* driver puts it: “as long as we stay healthy, we can work!” (Woman in *RT 13*, Bidara Cina). All in all, respondents with one or more household members working in jobs classified as formal (see Section 5.1.3) ranked loss of job higher than others, with an average of 3.0 compared to 3.9.

Box 5.4: Coping with unemployment in Kedaung Kaliangke

In a household in *RT 07*, Kedaung Kaliangke, the male head used to work as a security guard in a factory. Eight months ago, he got fired and did not receive any compensation, leaving the household with the 450,000 IDR per month his wife earns through sewing and babysitting and 50,000 IDR per month support from their older daughter who lives in a different part of Jakarta. The 23 year old daughter who lives with the parents lost her job (in a shopping mall) as well and has difficulties to find a new one – her parents could not afford high school education for her. Nevertheless, she managed to establish a small shop in the house that will help the household to recover from the income failure. Still, the loss of her father’s job was perceived as a serious loss since they used to have a health insurance from his employer: when the daughter had a severe allergic reaction and had to go to the hospital, the factory paid for her treatment. Now, they use herbal medicine and try to stay healthy.

By and large, it seems that if one is flexible, the city provides sufficient opportunities to make a living, making people often less worried about finding work than one might expect. However, people regularly have to cope with temporary income gaps, since income opportunities are seldom secure. As shown in Section 5.1, households follow a variety of strategies to “buffer” their livelihoods – most importantly by diversifying their income sources, saving money and investing in social capital, for instance by keeping good relations to neighbours in their *RT*. Nevertheless, loss of job or non-availability of work can be a major source of income failure and constitute a high risk for those who can lose more than just a source of income: if one of the factories in the first study area did stop operating, hundreds of workers and their families would not only lose their major source of income, but would also become highly vulnerable to health problems. On the one hand, they would lose their health insurance. On the other hand, they would lack the income needed for costly hospital treatments. *SKTM* and *Kartu Miskin* are then alternative forms of insurance, but access barriers to these programs are high since many of the workers and their families are unlikely to be registered as formal residents of Jakarta.

5.4.3 Fire hazards

In Jakarta's densely populated neighbourhoods, major fire outbreaks frequently occur (McCarthy 2003: 18; Wilhelm 2009: 157). This is also reflected in the respondents' perception of fires as the biggest threat among the hazards or problems observed (see Section 5.2). However, fire cases were only reported in the first study area, where two respondents had experienced it yet. The first case occurred in 1984 and seriously damaged the dwelling a respondent rented. While the damage was paid by the owner, the interviewees' household had to re-establish most of its belongings. In 2005, an elderly man lost his house in a nearby *kelurahan* to a fire. He and his late wife managed to save their clothes, important documents and the TV, but were forced to move to a wooden shack located in the study area. He still lives in this hut owned by a man for whom he collects garbage from the river.

Respondents remembered several fire cases in Kedaung Kaliangke. After a fire destroyed a house in 2000, at least four fire outbreaks were reported that occurred between 2003 and 2008 in the study area. Fortunately, no casualties were caused so far. Nonetheless, one of the fires destroyed two homes, including the residence of a respondent's kin. According to the interviewee, her relatives lost everything except for some documents that could be saved. Luckily, the extended family could take care of them. In another case, a fire caused by the unwary use of an oil stove burned down one house, forcing the residents to evacuate to temporary shelters next to the railway. Other fires could be extinguished quickly by residents, affecting only parts of a house. It was generally stressed that neighbours quickly respond to fire outbreaks by carrying buckets of water and helping to save important household items.

According to *Pak RW*, fire hazards are especially high during power cuts at night – people use candles, sometimes not taking care of them properly. As a result, fire occurrence is especially high during floods, when electricity is cut off. In general, fire awareness was reported to be high among residents. Besides, people are regularly reminded in the mosque or by *Bapak²RT* to be careful, especially during floods, power cuts and when the weather is exceedingly hot and dry. Other respondents denoted the low accessibility for fire engines as a major risk factor: isolated by the surrounding factories, the *saluran* and the railway, most houses in the study area are accessible by motorbike or foot only.

Although fire occurrences were only found in the first study area, they constitute a substantial risk for the examined households, who do not have any insurance for the house they own. Besides, it must be questioned if households renting their dwelling are better off. People might have to compensate the damage to the house they live in, even if they are not responsible for it:

“I am afraid because our landlord told us that we have to pay for the house if anything happens.” (Woman in *RT 03, RW 08, Kedaung Kaliangke*)

Other than floods, fires are not predictable. Options to control them are very limited, making people feel helpless against them. Apart from the large physical threat, this might be a major reason why people rank fire hazards as the principal danger – far more concerning than floods, and more threatening than the daily economic constraints and health hazards they have to cope with.

6 Conclusions

Flooding is a dominating environmental problem in Jakarta, where densely populated neighbourhoods referred to as *kampung*² are often the areas most prone to inundation. People living in these neighbourhoods are regularly made homeless for several days, sometimes weeks, and have to deal with disruptions of work during floods, while facing an increased risk of water-related diseases. Nonetheless, this study has shown that people living in some of the most affected parts of the city do not see flooding as a pressing issue – floods are perceived as routine, normal events, and not causing serious problems.

This perception is not without reason: the empirical analysis has revealed that from the perspective of the examined households, flooding is indeed a rather subordinate problem they have to deal with. These people do not just live in constant fear of the next flood, but have adapted to the environment they live in. The studied households show a high awareness of risks associated with flooding and have developed various coping mechanisms, such as modifying and routinely securing their physical assets, keeping savings for flood times and being prepared for evacuation. Furthermore, well-functioning structures of flood warning and emergency response were apparent in the study areas. Thus, the common assumption that residents of these and similar neighbourhoods constitute the population groups most vulnerable to flooding must be challenged. In contrary, it appears that the findings from this livelihood and vulnerability analysis support the first hypothesis made in the introduction:

(H1) Flooding is a minor hazard since people are well-adapted and can minimize its impact on their livelihoods.

However, the households and neighbourhood communities examined cannot be seen as overall resilient (as opposed to vulnerable) to major floods. As stressed in the theoretical part of this paper, the degree of vulnerability of an individual, household or community is crucially influenced by the (institutional) structures and processes shaping their environment. With regard to risks induced by flooding this means that extreme inundations such as the 2007 event were likely to become major threats, if these neighbourhoods would not receive any support from the government or other organisations. However, in the conducted interviews, relief assistance during major flood was perceived overwhelmingly positive and has been a crucial factor for many households to cope with major floods. Although the second hypothesis can not be fully verified, its content must be acknowledged:

(H2) Flooding is a small concern because people can rely on effective humanitarian assistance by the government, NGOs or other organisations.

It becomes clear that coping and adaptation strategies on the household and neighbourhood level must be interpreted in an integrated manner with external structures and mechanisms. It is therefore difficult to validate the two hypotheses stated above, since they are mutually dependent. Nonetheless, evidence suggests that flood risks are surprisingly well

managed, making them a relatively minor concern among the various economic, social and other risks people have to deal with. As exemplified on three different types of challenges prevailing in the study areas – health-related risks, loss of job or non-availability of work and fire hazards –, it was pointed out that risks other than flood-related constitute more serious threats to livelihoods. Economic barriers to health services and a limited access to government support in non-flood times are priority issues for many, if not most people living in these neighbourhoods that are further aggravated by insecure sources of income. In addition, a high occurrence of fire outbreaks in one of the two study areas constitutes a serious danger to people – compared to floods, losses can be far more disastrous. Not without reason the hazard and problem ranking conducted in this study revealed that fire is perceived as the principal hazard, followed by loss of job and health problems, while flooding was in most cases clearly ranked as the lowest threat to the respondent's households. By and large, the findings of this study confirm the third hypothesis:

(H3) People are exposed to other, more serious risks that need to be prioritized, making flooding a relatively minor issue.

Nonetheless, it must be stated that these risks or their associated hazards are strongly interdependent – the clearest connections are probably between flooding and health hazards, and between health and economic risks. Anyhow, it could be shown that from a livelihood perspective, a separation of the several risks and hazards households have to cope with is artificial and not always helpful. Coping and adaptation strategies are often designed to address various risks at the same time, with saving money as the most basic, but very effective form of insurance.

The field research for this study was limited to two small neighbourhoods in Jakarta – generalisations of the findings must therefore be carried out cautiously. Nevertheless, it is important to emphasise that risk is a cognitive concept, which is constructed in very different ways by different people from different sociocultural contexts. When addressing risks in a community-based manner, intervening agencies must take local perceptions of risks seriously, instead of designing measures of risk reduction according to their own understanding of disaster risks. A presupposition should be that affected people themselves know better what risks are more and what risks are less severe for them. Helping people to improve emergency structures in their neighbourhood and making them less dependent from external assistance is a respectable goal, but its appropriateness on the one hand, and its self-sustaining effect on the other hand must be questioned, if people do not feel their needs addressed. Still, taking local risk priorities seriously does not necessarily mean to not address flood risks at all, but intervening agencies of disaster risk reduction must widen their focus with regard to their activities on the local level. As described above, flood and other risks are highly interrelated and coping strategies often address various risks at the same time. By focussing on improving the access to health services or strengthening existing mechanisms to cope with income gaps, for example, prioritised needs would be addressed while at the same time reducing major risks associated with at least small or moderate floods.

In the ICBRR/CC project targeting the study areas of this paper, the Red Cross has already widened their focus by addressing livelihood security by the facilitation of bottom-up savings and loan cooperatives. Based on ideas that are not new in the study areas, these cooperatives aim at providing a more secure and formalised opportunity to save money and take credit than the small-scale *simpan pinjam* observed in the study areas. In addition, at the time of research the project planned to extend these cooperatives by addressing livelihood risks through micro insurances – a novel approach that appears to be promising, but whose local applicability needs to be proved.

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