HOUSEHOLD DISASTER PREPAREDNESS: ASSESSING THE IMPORTANCE OF RELATIONAL AND COMMUNITY SOCIAL CAPITAL

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ABSTRACT

AURELIE BRUNIE: Household Disaster Preparedness: Assessing the Importance of Relational and Community Social Capital
(Under the direction of Philip Berke)

Household preparedness can help save lives and curtail staggering losses from natural disasters around the world. Finding ways to promote preparedness has become urgent in developing countries, which bear an increasingly disproportionate share of losses. Social capital reflects the quality of human relationships and may provide a useful resource to encourage households to prepare before it is too late.

This study examines the influence of social capital on three aspects of household disaster preparedness: awareness of protective measures, knowledge of evacuation procedures and familiarity with response agencies. Two theoretical approaches to social capital are considered at the household-level: 1) relational social capital reflects the resources embedded in personal networks and is defined by resource composition, resource diversity and kinship composition; and 2) community social capital refers to the features of social organization (e.g., networks, norms and social trust) that promote cooperation within a group. Government representatives, civil society organizations in charge of disaster preparedness and community and household characteristics are also posited to influence household preparedness. Key informant interviews and a 182-household survey in 6 villages in Dominica in the Caribbean were used to assess the influence of relational and community social capital for locally-relevant measures of the

three aspects of household preparedness. Results were analyzed for each outcome using logistic regression.

The study's key findings support that social capital enhances household preparedness and that this influence is moderate to strong relative to other factors. The effects of relational and community social capital, however, are distinct and furthermore vary across aspects of preparedness. Moreover, only resource diversity and to some extent kinship composition prove valuable characteristics of social networks. Diverse and kin-centered networks are valuable for awareness of protective measures. Networks with more diversity further enhance knowledge of evacuation procedures. Community social capital, on the other hand, improves familiarity with response agencies. In addition to emphasizing the importance of relationships among people for disaster preparedness, this study provides much needed empirical evidence contrasting two widely-used approaches to social capital. Relational and community social capital correspond to different types of human interactions and have a different utility.

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CHAPTER 1

Impact of Social Capital on Household Preparedness

1.1. The Unsustainable Cost of Natural Disasters

Natural disasters cause staggering losses around the world. Although life losses have decreased over time, more and more people are affected each year (FAO, 2003). Economic losses have multiplied seven times since the 1950s to $703.6 billion in the 1990s and have reached an all-time high of $210 billion in 2005 (Munich Re Group, 2005, 2006).

Poverty in particular "plays a big role in keeping people vulnerable to disasters. And in the same fashion, disasters keep the poor in poverty by consistently wiping out the few resources they have" (World Bank, 2000 as cited in Tearfund, 2005b, p. 13). Poverty and disasters, therefore, are mutually reinforcing (Berke, 1995; Clarke, 2000; ECLAC & IDB., 2000; FAO, 2003; Freeman et al., 2003; IFRCS, 2003; Tearfund, 2005b; UNDP, 2001; World Bank, 2004b). The impact of disasters is the strongest on developing countries and it keeps getting worse, resulting each year in thousands of deaths and millions of dollars worth of damage. Between 1990 and 1998, developing countries have experienced 94% of the world's 568 major disasters and more than 97% of deaths (World Bank, 2001b). The damage to economies is also significant. Between 1985 and 1995,

for instance, losses amounted to 13.4% of the gross domestic product (GDP) in developing countries as compared with only 2.5% in industrialized countries (Höppe, 2007).

This impact is also felt by the international donor community both through significant amounts of destroyed development assistance and through the billions of dollars spent on emergency aid (Development Initiatives, 2005; IRIN, 2005; Tearfund, 2005a; World Bank, 2004b). The World Bank, for instance, has indicated spending about $38 billions in subsidies and loans for emergency aid in developing countries over the past twenty years (Höppe, 2007). And in 1998, Hurricane Mitch alone has reportedly setback the development of Honduras by 20 years (FAO, 2003; IFRCS, 2002). As a result, it has become urgent, both from a moral and an economic standpoint, to reduce the impact of disasters in developing countries (Tearfund, 2005a).

1.2. Household Preparedness

While addressing the root causes of vulnerability takes time and requires profound changes, disaster preparedness can help save lives and safeguard development (FAO, 2003; Tearfund, 2005b; World Bank, 2004c). Preparedness refers to activities taken in the context of threats that cannot otherwise be controlled (Perry and Mushkatel, 1986; Twigg et al., 2000). Although it has been defined inconsistently, preparedness generally has two aims: 1) to help people avoid threats and 2) to build capacity and to put mechanisms into place to facilitate an effective response (Perry and Mushkatel, 1986; Tierney et al., 2001; Twigg, 2004).

Households and communities are critical units of analysis in research that examines disaster preparedness strategies. Households and communities are the first

responders and the ones best aware of their unique needs and capabilities (IFRCS, 2002, 2003; Perwaiz et al., n.d.). In large-scale disasters, households and communities must be prepared to be self-sufficient until official responders and/or international assistance can reach all affected areas and residents. This may take up to several days, particularly when national emergency response systems are affected themselves to some extent. Furthermore, not all disasters are large enough to attract attention and receive external assistance. Yet even smaller events can have dramatic cumulative effects locally and communities and households are often left to deal with these impacts on their own (ADPC, 2003; Delaney et al., 2004; Kokawa, 2003).

This study elects to focus on household preparedness. While community preparedness in developing countries has received increased attention in recent research, the factors that influence household preparedness in these settings are less understood. Yet households can and do act to protect lives and properties and further contribute to the response and recovery of themselves and their communities (ADPC, 2003; Kokawa, 2003; IFRCS, 2002; Tearfund, 2005b).

Several factors influence household preparedness in developing countries. Disaster preparedness is often institutionalized, at least to some extent, and several institutional actors work to enhance households' capacity to take preventive measures and respond quickly and efficiently to emergencies. Specific arrangements vary across places but responsibility is often shared between government agencies and local civil society organizations (e.g., local disaster committees or other formal and informal local groups) (Quarantelli, 1995; Twigg et al., 2001). Research on household preparedness indicates that other factors beyond the efforts of these institutional actors ultimately affect

the decision to prepare for and respond to disasters (Howell, 2003; NRC, 2006; Tierney et al., 2001). These factors, for instance, include the socio-economic characteristics of households, disaster experience and further factors pertaining to the quality of relationships among people, such as social networks (Kirschenbaum, 2004; Perry and Nelson, 1991; Tierney et al., 2001) and community bondedness (Murphy et al., 2005; NRC, 2006; Turner et al., 1986). Considerable advances have been made in our understanding of some of these factors, particularly with respect to the socio-economic correlates of preparedness. The different types of interactions among people and their influence on preparedness, however, remain understudied. Yet pre-existing networks of relationships have been repeatedly associated with the success of emergency response and recovery (Berke et al., 1993; Buckland and Rahman, 1999; Comfort, 1999; Hurlbert et al., 2000; Jessamy & Turner, 2003; Kartez, 1984; Murphy et al., 2005; Zhao and Dalen, 2006 and others). It is thus conceivable that these networks would also help people prepare for disasters before they happen.

1.3. Social Capital and Household Preparedness

This study is intended to fill the gap regarding the role of human interacting and networking in our current knowledge of the factors associated with household preparedness. The social capital literature offers a springboard to learn more about whether and how individuals' relationships to others encourage them to behave proactively before disasters. Used to capture how features of social organization facilitate particular forms of action and cooperation, social capital has drawn increasing attention by scholars over the last two decades. Social capital has empirically been linked to positive outcomes in a variety of domains such as schooling and education (e.g.,

Coleman, 1988; Field et al., 2000; Schneider et al., 1997), community life (e.g., Krishna, 2002), work and organizations (e.g., Lin, 2001; Zhao, 2002), democracy and governance (e.g., Brehm and Rahn, 1997; Putnam et al., 1993; Rothstein, 2001; Ulsaner, 2003), collective action (Evans, 1997; Krishna, 2002; Lyon, 2000; Ostrom, 1997, 2000), and economic development (e.g., Krishna, 2002; Narayan and Pritchett, 2000; Portes and Sensenbrenner, 1993; Szreter, 2000; Warren et al., 2001; Woolcock, 1998)[1].

Evidence on social capital, however, remains scarce in the disaster literature. It is acknowledged that social capital can prove useful to mobilize communities to deal with disasters both in industrialized and developing countries (Dynes, 2002; NRC, 2006; UNDP, 2004). Social capital has further been used in a few studies of disaster response (see, for instance, Buckland and Rahman, 1999; Murphy et al., 2005) and recovery (see, for instance, Hurlbert et al., 2000; Zhao and Dalen, 2006). How social capital contributes to shaping disaster-related attitudes and behaviors before disasters, however, has received virtually no attention. This study attempts to address this gap and examines the relationship between social capital and household preparedness in developing countries.

1.4. Study Purpose

Because disasters can strike at any time, maintaining a high state of readiness at all times is essential. Yet disasters tend to have low salience in people's lives outside of specific events or awareness campaigns. For this reason, it is important to better understand the factors that influence household preparedness under conditions of relative normalcy (i.e., with no near-term threat, recent disaster history or short-term stepped-up educational efforts) to devise strategies to encourage households to behave proactively.

[1] This list is far from exhaustive. Review articles (see for instance Foley & Edwards, 1999; Fulkerson & Thompson, 2004; Woolcock, 1998; Woolcock & Narayan, 2000) and a quick search of academic journals provide evidence of research on social capital in several other fields.

The purpose of this study is two-fold. First, this study explores the role of social capital in explaining variations in levels of preparedness across households. Social capital is a complex concept and two main theoretical approaches have been proposed to describe the benefits of social structure. In the first view, researchers regard social capital as the resources embedded in personal networks that help people obtain information, knowledge and social support (Bourdieu, 1986; Coleman, 1988; Lin, 2001). In contrast to this relational approach, social capital is regarded by others as a collective asset and defined as the "features of social organization, such as networks, norms and trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995, p. 67). Communities are a particularly appropriate spatial unit to consider collective social capital. While this form of social capital is often considered as a public good and observed at the group level, however, critics have claimed that its effects were not equally spread across members (Fukuyama, 2001; Hall, 1997; Portes & Sensenbrenner, 1993). Because this study is interested in the relationship between community social capital and preparedness at the household level, households' access to community social capital is considered in addition to the levels of social capital in a given community. This study uses a comprehensive framework that encompasses both approaches to social capital to examine how relational and community social capital may operate in the context of household preparedness.

Second, this study seeks to determine the contribution relational and community social capital make to household preparedness relative to other influences that have received more attention in the literature. As indicated earlier, these influences include government representatives and local civil society organizations for disaster

preparedness, household socio-economic characteristics and contextual characteristics (e.g., disaster exposure and history). This study thus asks the following questions:

1. Are collective social capital and relational social capital influential in explaining household disaster preparedness?

2. How influential are relational and collective conceptions of social capital relative to household and community contextual characteristics, government agencies and civil society organizations in explaining household disaster preparedness?

1.5. Implications for the Disaster Field

1.5.1. Practical Implications for Disaster Preparedness

Disaster management can be described as a cycle composed of four stages: mitigation, preparedness, response and recovery (Whittaker, 1979). Mitigation and preparedness are proactive activities, while response and recovery are reactive. Response and recovery have historically received comparatively more resources since it is difficult to ignore human suffering and large-scale destruction once disasters happen (Freeman et al., 2003; Murphy et al., 2005; Perry & Mushkatel, 1986; Tearfund, 2005a). In contrast, it has long been difficult to convince government and donors to invest in mitigation and preparedness (Benson et al., 2001b; La Trobe & Venton, 2003; Tearfund, 2005a; Twigg et al., 2000). Indeed evaluating the cost-effectiveness of mitigation and preparedness activities is difficult because of their preventive logic. The measure of success is that catastrophic losses are not realized when disasters happen (Murphy et al., 2005; Twigg et al., 2000). The benefits of preparedness and mitigation are thus not highly visible and these activities do not allow elected officials and donors to acquire profile (Christoplos et al., 2001; Tearfund, 2005a). As a result, preparedness and mitigation are typically under-

funded and investments tend to be further reduced when resources are scarce (La Trobe & Venton, 2003; Tierney, 1993).

Even simple and relatively inexpensive preparedness measures can save lives and avoid (or at least minimize) the disruption of development processes by enabling a quicker and more efficient response (ECHO, 2005; IFRCS, 2002; Perwaiz et al, n.d.; World Bank, 2004c; Tearfund, 2005b; Twigg, 2002). Yet resources are necessary to provide basic training to households, teach them how to look after themselves, provide a framework to support their efforts, keep them informed and show them how to provide valuable assistance during response efforts (Cottrell et al., 2001; Delica, 2000; ECHO, 2005; IFRCS, 2003; Kokawa, 2003; Rego & Win, 2003; Twigg et al., 2000; Victoria, 2001). Evidence indicates in particular that some groups and individuals are under-informed and under-prepared (Howell, 2003; Pandey & Okazaki, 2003; Tierney et al., 2001). Improving our understanding of the factors that affect household preparedness is essential to devise ways to reach out to those who are left behind and to give them the opportunity to protect themselves and to respond efficiently. There is thus a crucial need on a practical level to better understand the mechanisms that affect levels of household preparedness to identify best practices and maximize the use of the scarce resources devoted to proactive disaster management. It may be in particular that more efforts need to be made to reach out to people through their social networks in addition to media and awareness campaigns, but it is important to first understand the impact of social relationships on preparedness to devise appropriate strategies. This in turn could go a long way towards effectively reducing losses from disasters.

1.5.2. Implications for Disaster Studies

Despite the significant advances that have been made since research on household preparedness began, gaps remain in our understanding of household preparedness in developing countries. These gaps stem from a lack of evidence on the applicability of current findings in developing countries and from a lack of understanding of the factors that may affect the effectiveness of the efforts by government agencies and local civil society organizations to promote household preparedness. Both need to be addressed to reduce disaster losses more effectively.

First, most of existing research is based on evidence derived from industrialized countries and in particular the US. Findings from existing studies may thus not be applicable to developing countries. Indeed, preparedness is more formal and professionalized in industrialized countries and people depend to a large extent on the state for information and personal protection. In developing countries, on the other hand, government-led preparedness activities are comparatively less-developed. Furthermore, lifestyles tend to be less individualized in the developing world and people may thus rely to a greater extent on informal channels of information and support and on traditional knowledge. As a result, the balance of structural, demographic and social factors that affect household preparedness may vary across settings. More evidence is thus needed on the factors that affect household preparedness in developing countries.

Second, a large body of research focuses on the efforts of government agencies and civil society organizations to promote disaster preparedness. Yet, while it has long been recognized that social factors further affected preparedness attitudes and decisions, our theoretical understanding of these factors remains fairly limited. We know, for

instance, relatively little on how human networking and interacting affects levels of preparedness. Research has suggested that pre-existing social relationships significantly affected the success of response and recovery efforts of communities and of the individuals within them (Berke et al., 1993; Buckland & Rahman, 1999; Comfort, 1999; Hurlbert et al., 2000; Jessamy & Turner, 2003; Kartez, 1984; Murphy et al., 2005; Zhao & Dalen, 2006 and others). But on a theoretical level, we don't know enough about the mechanisms that underlie these positive outcomes and whether they apply to the pre-disaster phase as well. Social capital may be at the core of observed differences but empirical evidence remains limited in this respect.

Furthermore, the extent is unclear to which the altruism, solidarity and cooperative behavior observed are a manifestation of pre-existing social capital or result from heightened feelings of dependency and support that reflect behavior under fire in the face of a common threat. Observing disaster-related attitudes and behavior in the absence of imminent presumed disaster threat or recent dramatic events suppresses this problem of causality and allows capturing the underlying normative influences that ultimately determine what households will do when disasters happen (Kirschenbaum, 2004). Looking for evidence on the role of social capital in helping households and communities prepare for disasters before they happen can thus help improve our understanding of the conditions that foster or impede disaster-related social interactions both in the pre- and the post-disaster phase.

1.5.3. Implications for Social Capital Theory and Justification for Using Two Strands of Social Capital Theory

1.5.3.1. Relational and Collective Social Capital

Social capital offers a particularly fruitful approach to investigate in greater details the link between social relationships and household disaster preparedness. Defined by Coleman (1988) as an aspect of social structure that facilitates particular forms of action and cooperation, social capital emphasizes how individuals' interacting and networking contributes to the achievement of a variety of outcomes. While all scholars put interactions among individuals at the core, social capital remains a complex and sometimes elusive concept, whose value has both been praised and criticized. Nearly two decades of research examining social capital at different levels of aggregation and in different contexts have in particular given rise to two strands of social capital theory. These approaches respectively consider social capital as a relational asset whose use resides with actors and as a collective asset, which, although it has consequences at the individual level, inheres in the set of collectively held networks of individuals in a group. Both views overlap but with a different emphasis. Relational social capital is considered in so far as it gives individuals access to more resources (e.g., Lin, 2001). Collective social capital, on the other hand, does not lead to more resources but leads people to cooperate and thereby facilitates the use of existing resources (e.g., Krishna, 2002).

1.5.3.2. Justification for Using Two Strands of Social Capital Theory

Both views of social capital have recently been related to disaster recovery (see, for instance, Hurlbert et al., 2000; Zhao & Dalen, 2006). Looking at a sample of communities affected by natural disaster in the last year in Western China, Zhao and Dalen (2006) in particular suggest that relational and collective social capital (which they

call micro-level and macro-level social capital) make independent contributions to individuals' recovery in terms of social support, psychological health and economic recovery. Relational social capital is particularly useful but impacts vary based on network structure and the type of action considered. For instance, larger networks of lesser density facilitate the circulation of information and resources and are helpful for economic recovery. Smaller networks of dense relationships, on the other hand, are better suited to provide informal support and lead to better psychological health.

Collective social capital also facilitates recovery by helping people make better use of existing resources. Zhao and Dalen (2006) looked at the separate impacts of trust and participation and found that both contributed to better psychological health through better social integration. The effects of trust and participation on economic recovery, however, are distinctive as economic recovery is facilitated by trust but negatively associated with participation.

Indirect evidence suggests that both forms of social capital (relational and collective) may also independently affect household preparedness, as will be discussed at greater length in Chapter 2. Relational social capital may be related to disaster information communication while collective social capital may affect preparedness through the combination of enhanced information flows, a greater sense of attachment to place and others and a culture of directly confronting problems.

1.5.3.3. Empirical Evidence Comparing Relational and Collective Social Capital

A final wider benefit of this study is evidence on the extent to which the two strands of social capital theory presented above have similar or otherwise distinct effects in the context of household preparedness. While there is consensus that the two

approaches are related, it remains unclear to which extent they are complementary or contradictory. One difference is the level at which the utility of social capital is considered but most scholars agree that institutionalized relationships can benefit both individuals and the collective (Coleman, 1988; Lin, 1999a, 2001; Paxton, 1999).

Another deeper debate is the relationship between the norms and trust that underlie the social structure in which individuals evolve and social capital. In the relational view, the focus is on the elements that can be traded and invested among individuals (Adger, 2003). While the social structure in which individuals live shapes these interactions, it is not explicitly considered. In the collective view, on the other hand, this normative structure becomes an integral part of social capital (Krishna, 2002; Ostrom & Ahn, 2001; Uphoff, 2000). For some, however, this additional step has led to conceptual stretching and obfuscated the meaning of social capital (Foley & Edwards, 1998; Lin, 1999a). Norms and trust are collective assets that can be seen as either causes or effects (or both) of social capital but not as one of its forms (Lin, 1999a). In other words, social capital is grounded in time and place and social structure may promote and enhance interactions and at the same time constantly be reinforced and redefined by relationships and transactions among individuals (Adger, 2003; Lyon, 2000; Mohan & Mohan, 2002; Ostrom, 2000). But social capital should not be conflated with its causes and/or effects.

In practice, most scholars emphasize one view over the other depending on what their specific interest is. Very few empirical studies, however, simultaneously use the two approaches so that evidence allowing their comparison is rare. By simultaneously investigating the contribution of relational and collective social capital for household

preparedness, this study thus hopes to provide much needed evidence on the extent to which both approaches are reconcilable or otherwise different.

1.6. Study Overview

Chapter 1 presented an overview of the problems caused by natural disasters, the purpose of this study to assess which factors affect household preparedness as a way to reduce losses from disasters, a justification for using social capital to investigate the so-far understudied influence of networks of social relationships and the wider implications of this study. The research questions presented earlier in this chapter serve to guide the rest of this study.

Chapter 2 examines household knowledge of what to do in a disaster as a passive, yet important, form of preparedness best indicative of household preparedness under conditions of relative normalcy (i.e., in the absence of presumed near-term threat or recent disaster history). Preparedness is unequally distributed throughout any society and this chapter discusses how relational and collective social capital may contribute to explaining these variations. In addition to relational and collective concepts of social capital, other potentially important predictors (capacity and commitment of government representatives, effectiveness of civil society organizations for disaster preparedness and households' socio-economic characteristics) that are hypothesized to influence household disaster preparedness are also considered.

Chapter 3 outlines the methodology that underlies this study. In order to test the hypotheses derived from the framework presented in Chapter 2, I use data from key informant interviews and a household survey in six communities in Dominica in the Caribbean. Chapter 3 first offers some background information on disaster preparedness

in Dominica and lays out the methodology employed to collect and analyze the data. Communities were sampled in two Local Government districts staffed with different representatives in charge of disaster preparedness activities. These representatives were interviewed along with the chairs of local disaster committees. In a second stage, a random sample of households was interviewed in each community. A quantitative analysis was conducted using logistic regression and data from both the household survey and key informant interviews.

Chapter 4 presents an overview of the results focusing on variations in levels of household preparedness across communities. It examines, in particular, how these differences relate to the distribution of key variables at the community level.

Chapter 5 reports the results of logistic regression models at the household level. The discussion focuses on the influence of relational and collective social capital, government representatives, local disaster committees, and household characteristics on household preparedness for three distinct preparedness outcomes: awareness of protective measures around one's home, knowledge of what to take to a shelter when evacuating and familiarity with local disaster committee responsibilities.

CHAPTER 2

Conceptual Framework: Linking Theories of Social Capital to Disaster Preparedness

This chapter presents a conceptual framework to assess whether and how social capital affects household preparedness and to answer the research questions posed in Chapter 1. This framework focuses on a specific form of preparedness: household knowledge of what to do in an emergency. This knowledge encompasses awareness of appropriate protective measures, knowledge of evacuation procedures and familiarity with response agencies. This chapter then emphasizes two main factors that are hypothesized to influence household preparedness: relational social capital and collective social capital. These two categories of dimensions (preparedness and social capital) provide the backbone of the conceptual framework that will guide this study.

This chapter consists of three parts. The first part presents the outcome considered in this study, household preparedness defined as household knowledge of what to do in a disaster. The second part draws on two bodies of literature, the literature on household preparedness and the literature on social capital, to outline the hypothesized links between relational and collective social capital and household preparedness. The third part presents an integrated conceptual framework that specifies the relationships

among the variables discussed in this chapter, together with other important and well-acknowledged influences on household preparedness (institutional actors and household characteristics). A summary concludes this chapter.

2.1. Household Preparedness as Knowledge of What to Do in a Disaster

Disasters are unpredictable and can strike at any time. It is therefore important to maintain a high state of readiness at all times. Yet disasters have relatively low salience in most people's lives in the absence of near-term presumed threat or recent disaster history (Tierney et al., 2001; Twigg et al., 2001). Particularly in developing countries, individuals and households have to deal on a regular basis with other threats that are perceived as more immediate. Since time, energy and attention are not limitless, preparing for natural disasters often has a low priority on people's agenda and preparedness actions are often postponed until the threat of a disaster is perceived as higher.

Knowing what to do in a disaster may be indicated as a first step towards more active forms of preparedness, namely the implementation of specific actions. As such, knowing what to do in a disaster represents a more passive, yet important, form of preparedness (Turner et al., 1986). In addition, preparedness involves both being ready to take self-protective actions and being able to obtain the resources needed for an effective response and recovery (Tierney et al., 2001). While specific actions undertaken by households may be indicative of the former, the latter is more difficult to measure through behavioral acts. Investigating whether households know what to do in a disaster, on the other hand, allows capturing both aspects. The following categories may be included to provide a comprehensive picture of household knowledge of what to do in an

emergency: 1) awareness of appropriate protective measures; 2) knowledge of evacuation procedures; and 3) familiarity with response agencies. Preparations around one's home can include the drafting of a family plan, putting together a survival kit and assembling supplies, performing repairs and yard work and having first-aid skills (Dominica Red Cross, n.d.a; Kirschenbaum, 2004). Evacuation procedures refer, for instance, to the timing of evacuation, evacuation routes, access to physical shelter and knowledge of the contents of an evacuation kit. Response agencies and their procedures vary across places. They typically include a combination of government agencies, local organizations and non-government organizations with assigned functions that are prepared to meet residents' needs (Quarantelli, 1995). These three items refer to different dimensions of preparedness but are all important in their own right.

2.2. Social Capital as a Factor Hypothesized to Influence Household Preparedness

Defined as an aspect of social structure that facilitates particular forms of action and cooperation (Coleman, 1988), social capital has become an increasingly popular concept over the last 25 years. Despite (or maybe because of) this popularity, there is a lack of consensual and established definition of social capital (Grootaert & van Bastelaer, 2002). While scholars agree on the concept on a general level, many empirical and theoretical challenges remain as to what social capital exactly is. The next sections investigate how the two theoretical approaches to social capital presented in Chapter 1, relational and collective social capital, may influence household preparedness.

2.2.1. Relational Social Capital

2.2.1.1. Definition

Relational social capital is defined as the accessible resources embedded in social networks that will bring benefits to actors (Bourdieu, 1986; Lin, 2001). As such, relational social capital may refer to a variety of features in social structure. The focus is on the instrumental utility of social resources but network characteristics in turn influence access to and the use of resources (Hurlbert et al., 2000; Lin, 1999a, 1999b). While the term social capital is used at the theoretical level, therefore, the emphasis at the empirical and research levels is on network resources and the properties of social networks in so far as they implicate these resources (Lin, 1999a, 1999b).

Relational social capital is helpful to obtain information, knowledge and social support (Lin, 1999a; Van der Gaag et al., 2004; Zhao & Dalen, 2006). The factors leading to positive outcomes, however, vary depending on the type of returns sought (Lin, 1999a). The personal resources of network members, for instance, are often useful to achieve instrumental goals. Social relationships with individuals occupying prestigious positions in society are a well-demonstrated asset to advance socially (e.g., to find jobs) because of the information these individuals can provide or the influence they can exert in one's favor (Lin, 1999a). They do not, however, present any particular advantage to cope with stress or provide emotional support in difficult times (Lin, 1999a; Van der Gaag et al., 2004). While both embedded resources and network structure are important, therefore, their specific utility varies across contexts.

2.2.1.2. State of Existing Research on the Relationship of Relational Social Capital to Household Preparedness

While a few studies have recently related various aspects of network resources and structure to patterns of household disaster recovery (see, for instance, Hurlbert et al., 2000; Zhao & Dalen, 2006), there is no direct evidence linking relational social capital to household preparedness. The available evidence, however, suggests that relational social capital affects preparedness attitudes and behaviors because of the information benefits it provides. Furthermore, it provides some indication of whether and how three commonly-emphasized features of interpersonal environments – resource composition, resource diversity and kinship composition– may influence household preparedness. The utility of relational social capital for household preparedness and the potential influence of resource composition, resource diversity and kinship composition are discussed next.

2.2.1.3. Relational Social Capital and Disaster Information Communication

Research on household preparedness indicates that involvement in stable social networks encourages informal disaster information communication and what people eventually do to prepare. People engage in informal discussions on the possibility of natural disasters and on preparedness with others, for instance with family members, friends and neighbors and coworkers. Such discussions are important to filter, legitimate, supplement and in some cases substitute for information received from other sources over time. They serve, for example, to confirm and correct information or to alert people to other sources of information they may not have personally used (NRC, 2006; Tierney et al., 2001; Turner et al., 1986).

These discussions further affect household preparedness attitudes and behaviors. In a study of earthquake preparedness and awareness in California, Turner et al. (1986)

found that informal discussions affected a range of preparedness outcomes. Informal discussions affect awareness of hazards, attention to earthquake predictions, fear, whether predictions are taken seriously and the extent of personal and household preparedness. By contrast, the media only influence hazard awareness and attention to predictions but have no significant effect on levels of fear, whether predictions are taken seriously and preparedness behaviors. Turner et al. found evidence that involvement in stable social networks increases the extent to which people make use of their social relations to discuss earthquakes and preparedness. Stable social networks, therefore, enhance disaster communication and thereby contribute to household preparedness.

In a study of urban households in Israel, Kirschenbaum (2004) provided direct evidence that social networks affected household preparedness. He demonstrated that three types of networks (family networks, neighborhood-based networks and networks based on interactions through community-based services) each influenced household preparedness behavior. This effect, however, is not universal because it varies across preparedness outcomes. Family-based networks, for instance, affect the availability of supplies at home and access to a shelter but do not influence other aspects of preparedness such as survival and first-aid skills and the readiness of an evacuation and family disaster plan. Likewise, the effects of the other two types of networks vary across outcomes. All types of social networks, therefore, do not systematically influence all aspects of preparedness significantly. This echoes the finding that valuable aspects of network resources and structure vary across outcomes.

2.2.1.4. Relevant Aspects of Relational Social Capital for Household Preparedness

Relational social capital provides information benefits through enhanced information flows. Social ties in particular provide access to and enable to process more information than one could handle alone (Burt, 1997; Lin, 2001). Network resources and structure in turn determine the extent of benefits that can be accrued through such connections. This study specifically focuses on three-commonly emphasized features of interpersonal environments: resource composition, resource diversity and kinship composition. The following sections discuss the relationship between these three characteristics and household preparedness.

2.2.1.4.1. Resource Composition

The utility of relational social capital resides in the access and use of resources embedded in social relations. For relational social capital to be useful for household preparedness, however, network members must be able to provide valued resources. The basic assumption in relational social capital studies is that valued resources are attached to certain structural positions in a society. Embedded resources are then assessed by counting positions, rather than people, in personal networks (Lin et al. 1981; Lin 2001; Zhao, 2002). Rankings based on occupations, occupational prestige and/or job-related socioeconomic indices, furthermore, are a widely-used method to measure the resources held by network members in each specific position.

Resource composition refers to average resources within networks. In the context of household preparedness, valued resources can be information or perceived or real expertise to discuss this information and assert its relevance. Studies inside and outside of disaster contexts have in particular shown that education affects both our access to

information and how well we understand it (La Due Lake & Huckfeldt, 1998; Tierney et al., 2001). Occupational rankings are often related to education. As such, they are relevant to reflect levels of information and expertise within networks and assess resource composition.

That the resource composition of personal networks has an impact on preparedness attitudes and behaviors, however, is not empirically supported by existing studies of household preparedness. In the study of household preparedness in Israel mentioned earlier, Kirschenbaum (2004), for instance, found that the educational composition of networks did not explain differences in preparedness behaviors associated with either family, neighborhood or community networks. While the author offers no particular explanation for this somewhat surprising result, it can be hypothesized that people fail to recognize others with special knowledge. In their study of earthquake awareness and preparedness in California mentioned earlier, Turner et al. (1986) indeed found that the majority of people could not identify anyone in their social circle they could turn to for expert counsel on earthquakes. It may be that even if some people are more knowledgeable than others or could play a special role in discussing disaster information, this knowledge may not be passed along, understood and/or remembered. It is therefore predicted that:

H1: *Resource composition, defined as the average resources embedded in personal networks on the basis of the occupational positions of network members, does not affect household preparedness.*

2.2.1.4.2. Resource Diversity

Resource diversity refers to the diversity of the occupational positions of network members and may also prove an important aspect of relational social capital. Occupational diversity has been tied to enhanced access to financial resources, job contacts and general information (Renzulli & Aldrich, 2005). Diverse networks are more wide-ranging and present a structural advantage to be connected to dissimilar persons and in turn to obtain non-redundant information (Burt, 1997; Hurlbert et al., 2000; Renzulli & Aldrich, 2005). As such, they increase the diversity and richness of the information that can be accessed through others and discussed with them (Burt, 1997; Campbell et al., 1986; Granovetter, 1973; La Due Lake & Huckfeldt, 1998; Marsden, 1987). Thereby they increase the likelihood that a person will be exposed to relevant information or have meaningful discussions (La Due Lake & Huckfeldt, 1998). In addition, repeatedly hearing the same information from different sources may in turn reinforce its credibility. Therefore, it is predicted that:

H2: *Resource diversity, defined as the diversity of the occupational positions of network members, has a positive effect on household preparedness.*

2.2.1.4.3. Kinship Composition

Kinship composition refers to the proportion of relatives in personal networks. The distinction between kin and nonkin is particularly useful with respect to the strength of social ties (Lin, 1999b). Kin ties tend to be stronger because they are close and intimate and entail high expectations of reciprocity and support (Fischer, 1982; Kirschenbaum, 2004). People in particular turn to relatives rather than nonkin for critical help and support in routine and crisis situations and for advice when making important

decisions (Fisher, 1982; Hurlbert et al., 2000). Because of this closeness and history of support, relatives are expected to be important discussion partners for household preparedness. Kin-centered networks can further be expected to be dense (i.e., with a high level of linkages among members) because relatives usually build strong relationships among themselves, more so than friends or acquaintances (Zhao, 2002). As a result, kin-centered networks can be extremely robust and relatives are likely to collectively have a strong influence on each other's attitudes and behaviors (Hurlbert et al., 2000; Kirschenbaum, 2004; Marsden, 1987). Thus, the greater the proportion of kin, the greater the influence on household preparedness will be.

Kin composition and density are distinct concepts. Nevertheless, to the extent that kin constitute a dense core network and serve as discussion partners, kin-centered networks can have negative consequences for household preparedness. When network members are strongly connected, they tend to have access to similar information (Burt, 1997; Granovetter, 1973; Lin, 2001). Furthermore, kin ties are inherited and maintained out of a sense of obligation and tradition (Fischer, 1982; Renzulli & Aldrich, 2005). Relatives, therefore, are not selected as discussion partners for their expertise but because of who they are. In addition, kin-centered networks can in some cases limit association with others who would have more valuable information to offer because of the demands (e.g., time, reciprocal services) such networks place on their members (Fisher, 1982; Renzulli & Aldrich, 2005). At the extreme, kin-centered networks can thus lead to the perpetuation of ignorance and misinformation and negatively affect household preparedness.

In his study of household preparedness behavior in Israel, Kirschenbaum (2004) found that family networks, neighborhood networks and networks based on interactions through community-based services had distinctive effects on preparedness. Yet no clear pattern emerges to confirm that kin-based networks lead to better (or worse) outcomes as none of the three networks consistently exerts a dominating influence. Community networks have the most powerful influence for the preparation of supplies and provisions and were the only significant influence on improving survival skills. Friends and neighbors, on the other hand, are the only significant influence on the readiness of family disaster plans and family networks on access to a shelter. These findings thus confirm that 1) kinship composition is relevant for household preparedness; and 2) that the direction of its effect varies depending on the specific aspect of preparedness considered. It is thus hypothesized that:

H3*: Kinship composition, defined as the proportion of relatives in personal networks, affects household preparedness, yet the direction of this effect depends on the specific aspect of preparedness considered.*

2.2.1.5. Summary of the Hypothesized Relationship of Relational Social Capital to Household Preparedness

Three measures of relational social capital are considered: resource composition, resource diversity and kinship composition. Available evidence on household preparedness suggests that households can make use of their relational social capital for disaster information communication. Network resources are defined on the basis of the occupational positions of network members. While resource composition (defined as average resources in personal networks) is not expected to make a difference, it is hypothesized that both resource diversity and kinship composition are influential factors.

Diverse networks are expected to be valuable because they offer access to richer and more diverse information and because repeatedly hearing the same information from different sources increases its credibility. The effect of kinship composition is expected to vary depending on the specific aspect of preparedness considered. Indeed, kin ties are expected to be more influential but also to limit the range of information that can be accessed.

The relationship between kinship composition and diversity may vary. Yet it is important to notice that kin-centered networks may undermine diversity. While both aspects were treated separately, they may thus be related in effect.

2.2.2. Collective Social Capital

2.2.2.1. Definition

In the collective social capital approach, social capital is understood as a collective asset. It relates to well-defined groups and refers to the features of social life that enable members to act together more effectively. Collective social capital consists both of the networks (and the rules and procedures they embody) and the generally accepted attitudes, shared values and norms of reciprocity and trust that characterize the group in which it inheres (Grootaert & van Bastelaer, 2002; Hooghe & Stolle, 2003; Uphoff, 2000).

Collective social capital has essentially been shown to facilitate the achievement of collective outcomes. Yet its consequences can also be felt at the individual or household level. The socio-structural features that create a willingness to cooperate as a group also facilitate individual transactions (Adger, 2003; Coleman, 1988; Grootaert & van Bastelaer, 2002; Narayan & Cassidy, 2001; Stolle & Lewis, 2002). Collective social

capital is, for instance, thought to have an impact on income outcomes and household welfare and to promote confidence in political institutions (Brehm & Rahn, 1997; Narayan & Pritchett, 2000).

2.2.2.2. State of Existing Research on the Relationship of Collective Social Capital to Household Preparedness

Collective social capital has recently been used in a few studies on emergency management (see, for instance, Buckland & Rahman, 1999; Murphy, et al, 2005; Pelling, 1998) but it is virtually absent from the household preparedness lexicon. There is, however, some evidence that community relationships, volunteerism and other similar concepts make a difference before disasters happen. In addition, we know that, in the response phase, collective social capital provides individuals with an effective resource to draw upon both to receive assistance and to help others (Murphy et al., 2005). It provides channels to mobilize people and to assist one another (Buckland & Rahman, 1999) and feelings of belonging and attachment towards people and places that encourage involvement in response and increase the propensity to help others[2] (Paton & Johnston, 2001).

The literature on collective social capital, though, warns us that collective social capital is not always a good thing and may even sometimes have negative effects. Furthermore, it is not equally distributed throughout society. Thus the social capital that inheres in a group may not equally be available to all its members for personal benefits. The sections below review available evidence on collective social capital and household preparedness and discuss how collective social capital may be brought to bear on household preparedness. It is assumed that relational and collective social capital overlap

[2] Paton and Johnston (2001) did not explicitly refer to social capital but suggest that having a sense of community encourages involvement in response.

but are distinct concepts. The discussion therefore focuses on how the effect of collective social capital may differ from that of relational social capital.

2.2.2.3. Collective Social Capital and Household Preparedness

While there is no research that directly links collective social capital to household preparedness, the available evidence on the effects of community relationships, community bondedness, volunteerism and the like indicates that household preparedness may at least partly be a household-level consequence of the presence of collective social capital. Like relational social capital, collective social capital provides information benefits because supportive social networks offer well-oiled channels of communication (Dynes, 2002; Ostrom & Ahn, 2001). Yet there are two fundamental differences between relational and collective social capital that may result in distinctive effects on household preparedness.

First, collective social capital is tied to a specific group, while relational social capital is essentially a property of individuals. Furthermore, if the community serves as reference group, collective social capital is tied to a well-defined geographical area. As a result, the networks supported by community social capital are less widespread spatially than personal networks. In this sense, they may be more relevant because preparedness activities are often organized at the local level. People living in the same community, therefore, may be preferred discussion partners because they are ultimately exposed to the same threats.

Second, structural and cognitive features are two interrelated dimensions of collective social capital. In comparison with relational social capital, the added value of collective social capital for household preparedness in particular lies in the feelings of

attachment to place and the sense of community it generates. As a result, collective social capital is expected not only to facilitate disaster information communication but furthermore to enhance information recall and the likelihood that this information will be used. Evidence supporting this claim is reviewed below.

Using a composite index combining length of residence, subjective identification of community as one's home, organizational involvement and the nearby presence of relatives and friends, Turner et al. (1986) found that community bondedness encouraged active preparedness more than fear of or concern for disasters. Furthermore this effect occurs in addition to involvement in interpersonal discussions on disasters and preparedness and attendance to informational meetings. Turner et al., however, offer no direct explanation for this effect. Rather they primarily focus on the participatory dimension of their index and maintain that involvement reduces passivity and detachment. They see interpersonal discussions, attendance to disaster meetings and community bondedness as three forms of community involvement that "invest life with meaning" (p. 185) and thereby encourage individuals to act. Isolation within the community, on the other hand, leads to passivity and the inability to address problems actively.

According to Turner et al., there is "no obviously rational reason why people who feel strong ties to the local community should be any more concerned about their personal ability to survive a destructive earthquake and its aftermath than people who are less involved locally" (p. 185). Yet that involvement socializes individuals and helps them develop feelings of trust and reciprocity is at the core of Putnam et al.'s quintessential definition of social capital. For Putnam et al. (1993), participation in civil

associations places people in social networks of civic engagement. The experience of regular positive social interactions affects levels of interpersonal trust and results in the development of generalized norms of reciprocity and trust. While Putnam et al. then go on to examine how trust facilitates voluntary cooperation, Portes and Sensenbrenner (1993) have independently argued that the values learned guide individual behavior in two ways: they regulate behavior and support feelings of attachment and loyalty to others like oneself.

Drawing on the cultural psychology literature, Palm (1995) has suggested that risk perception and the subsequent adoption of mitigative behavior were affected by the perception of oneself in relation to others. She argues that in cultures where one is viewed as interconnected to others, rather than as a separate, independent and distinct being, risk-mitigation behavior may be "more related to socially shared rules or norms than to individual-level assessments" (p. 128). In her argument, Palm primarily refers to the contrast between Western and non-Western (particularly Asian) cultures but I argue that a similar distinction can be made across communities sharing a same culture on the basis of their levels of collective social capital. Collective social capital broadens the "sense of self, developing the 'I' into the 'we'" (Putnam, 1995, p. 67). Where collective social capital is high, people are willing to cooperate and as such acknowledge that they are part of a coherent group. Where it is low, on the other hand, individualistic behavior may prevail. The closeness supported by collective social capital, therefore, can make people more socially conscious of disasters and of their impacts. It can, for instance, draw their attention to endangered groups, even if they do not perceive themselves as being directly at risk. Awareness of endangered groups has in turn been found to

increase attention to disaster information (Turner et al., 1986). Furthermore, communities with high social capital typically have a history of collectively confronting problems, which may in turn encourage households to take a proactive stance towards disasters. In other words, collective social capital may affect households' perceptions of self-efficacy and the propensity to prepare before disasters. High collective social capital may promote a culture of disaster prevention, while households in communities with low social capital may be more likely to deny threats or believe they have no control over them[3]. In some communities with extensive disaster experience, it has, for instance, been suggested that collective social capital could explain the emergence of a disaster subculture, whereby norms of appropriate behavior are developed and shared (Dynes, 2002). Hence I predict that:

H4: *Collective social capital enhances household knowledge of what to do in a disaster.*

2.2.2.4. The Dark Side of Collective Social Capital

Collective social capital, however, can also have negative effects. As already noted by Durkheim (1951) in his work on social inclusion, excessive attachment can undermine personal autonomy and hold people back. Such negative implications have not, to my knowledge, been emphasized in the context of disaster preparedness – even indirectly - but they have been discussed elsewhere (e.g., Portes & Sensenbrenner, 1993; Woolcock, 1998). Portes and Sensenbrenner (1993), for instance, observe that loyalty to their community can sometimes hold immigrants back and prevent the most successful members of the group to advance socially. Similarly, collective social capital could exert pressures working against a culture of disaster prevention, instead of promoting it.

[3] This argument is inspired from the perception-risk reduction behavior process model proposed by Bennett and Murphy (1997) and discussed by Paton and Johnston (2001) but adapted to collective social capital.

Communities with high social capital have been observed to self-organize to face collective problems or threats. As was mentioned above, this may in turn promote a culture of directly confronting problems and encourage households to prepare for disasters. Yet communities can face many economic and social issues, particularly in developing countries. Time and energy, however, are in limited supply. In communities with high social capital, repeated demands may already be placed on individuals to contribute to the collective resolution of many pressing problems. As a result, households may have less time and less inclination to address other issues that are not collectively considered as priorities, such as, for instance, to prepare for disasters.

Even if households are concerned about disasters and committed to behave proactively, collective social capital can still hinder household preparedness by creating conflict on what appropriate actions may be. Looking at flood response in three Canadian communities, Buckland and Rahman (1999) found that the community with the highest level of social capital had the highest level of voluntary assistance but also the most conflicts during the flood. Social capital, it thus seems, results in greater cooperation but also delays or sometimes even blocks decision-making because it results in a flatter social structure. The evidence from Buckland and Rahman's study is that collective social capital can be both beneficial and detrimental to decision-making and action under conditions of emergency. While this is certainly important to keep in mind, there is no clear evidence of such effects in the preparedness literature. Therefore, my main hypothesis remains that collective social capital facilitates household preparedness.

H5: *Collective social capital can both help and hinder household preparedness but its effects are primarily expected to be positive.*

2.2.2.5. Unequal Access to Collective Social Capital

Although many view collective social capital as a public good, others uphold the view that it is in fact a club good (i.e., that it differs from a public good because it is excludable) and as such is not available to all (Fukuyama, 2001; Hall, 1997). Social capital inheres in the structure of relationships and only exists when it is shared (Narayan & Cassidy, 2001; Portes, 1998). The implicit assumption in many studies is that collective social capital is based on completely dense networks within which individuals interact and reinforce shared norms and values. In reality, however, collective social capital is porous. Someone who just moves in a new community, for instance, is not connected to other residents and included in the relations that constitute collective social capital. As such, while this person may benefit from the achievement of collective goals enabled by the presence of social capital (e.g., the provision of infrastructure), he or she will not enjoy the individual or household-level consequences of social capital. A newcomer or a socially isolated individual will not develop right away the sense of attachment to others and to place that others may have. The presence of collective social capital may even at the extreme reinforce feelings of isolation and detachment of relative outsiders and thus, as was argued earlier, their passivity. Indeed, social capital sometimes can work as a barrier to inclusion when in-group solidarity is achieved at the expense of others or prevents or limits interactions with non-group members (Fukuyama, 2001). It is thus important to consider that even when collective social capital is high in a community, all residents may not benefit equally from it. For this reason, it is hypothesized that:

H6: *It is not only the presence of high levels of collective social capital, but furthermore household access to this asset, that result in better knowledge of what to do in a disaster.*

2.2.2.6. Summary of the Hypothesized Relationship of Collective Social Capital to Household Preparedness

In summary, this section has outlined key findings on household preparedness, social capital and to a lesser extent cultural psychology and other areas of the disaster literature. Even though only indirect evidence is available in this respect, existing research suggests that the presence of collective social capital affects household preparedness. The effect of collective social capital is expected to be distinct from that of relational social capital because both forms of social capital rely on different types of networks and support different kinds of interactions. The impacts of disasters are primarily felt locally and most preparedness activities are carried out at the household or at the community level. Collective social capital provides well-oiled channels of communication that connect the people who are exposed to similar threats and benefit from the same preparedness arrangements. As such, it may prove highly relevant to facilitate disaster information communication. Furthermore, collective social capital is expected to promote a culture of confronting problems. In addition, households who develop feelings of attachment to others and to place are more socially conscious of disasters and seeing their community through the eyes of others may encourage them to behave proactively. They are thus more likely to pay attention to information on what to do in a disaster and to remember it. Collective social capital, therefore, is expected to facilitate both disaster information communication and recall. Negative consequences of collective social capital have also been documented but there is no evidence of such effects in the preparedness literature. Finally, the household-level consequences of

collective social capital are not equally distributed throughout communities. It is the combination of high levels of collective social capital and of household's access to this asset, therefore, that matters and can enhance knowledge of what to do in a disaster.

The term collective social capital was used throughout this section because collective social capital can be considered in relation to a variety of groups. Communities are a critical unit for disaster preparedness in developing countries and the community is thus used as a reference group in this research. The term collective social capital will therefore be replaced by community social capital in the remainder of this study.

2.3. Conceptual Framework

Preparedness has been inconsistently defined across studies but generally has two aims: 1) to help people avoid threats and protect themselves and 2) to build capacity to facilitate an effective response and recovery (Tierney et al., 2001; Twigg, 2004). The outcome in this study is preparedness defined as household knowledge of what to do in a disaster. Three dimensions of preparedness are considered: 1) awareness of appropriate protective measures; 2) knowledge of evacuation procedures; and 3) familiarity with response agencies.

Figure 2.1 presents the conceptual framework to guide this study. It consists of five conceptual dimensions that are hypothesized to affect household preparedness: relational social capital, community social capital, government representatives, civil society organizations and community and household contextual factors. Households with access to high levels of community social capital are more aware of what to do in a disaster. Relational social capital further affects household preparedness. Three aspects

of network resources and structure are considered: resource composition (i.e., average resources), resource diversity and kinship composition. While resource composition is not expected to make a difference, access to more diverse resources is expected to enhance preparedness. Kinship composition also matters but its effects may vary across aspects of preparedness.

Social capital captures how the quality of relationships among people affects levels of household preparedness. Other factors further influence household awareness of what to do in a disaster. While specific arrangements may vary across countries, government agencies and local civil society organizations for disaster preparedness (for instance, local disaster committees) work to keep residents informed about disasters and preparedness and to build households' capacity to protect themselves and to respond and recover efficiently from disasters. The capacity and commitment of government representatives and the effectiveness of local civil society organizations can be expected to make a difference in the quality and outreach of their efforts and thus to have an effect on household preparedness. Government aid agencies and private non-profit international donor organizations also occasionally fund specific community-based preparedness programs. These programs for the most part seek to build the capacity of government agencies and of local civil society organizations but they may also entail awareness campaigns. They are, however, generally short-lived and represent brief stepped-up educational efforts rather than a normative influence on household preparedness. For this reason, they are not included in the framework.

Finally, household characteristics and community context variables are included as controls. Attention to media (broadcast and print), age, gender, ethnicity, education,

the occupational category of the breadwinner, income, the presence of school-age children in the household, religion, location (in relation to disaster exposure), previous disaster experience, home ownership and length of residence in the community have all been related to preparedness in previous studies (see, for instance, Drabek, 1986; Howell, 2003; Tierney, 1993; Tierney et al., 2001). These factors shape households' access and receptivity to preparedness information from various sources and how information is perceived, interpreted and remembered. It should be noted, moreover, that socio-economic factors are important controls to distinguish between the influence of relational social capital and access to collective social capital and social position (Hurlbert et al., 2000; Lin, 2001). Community contextual factors are also important because they may affect disaster exposure (e.g., location) and in some cases, cultural attitudes towards disasters as well as social capital (e.g., population size). The specific hypotheses associated with each of these control variables are too many for elaboration here but significant effects will be discussed with the results in subsequent chapters.

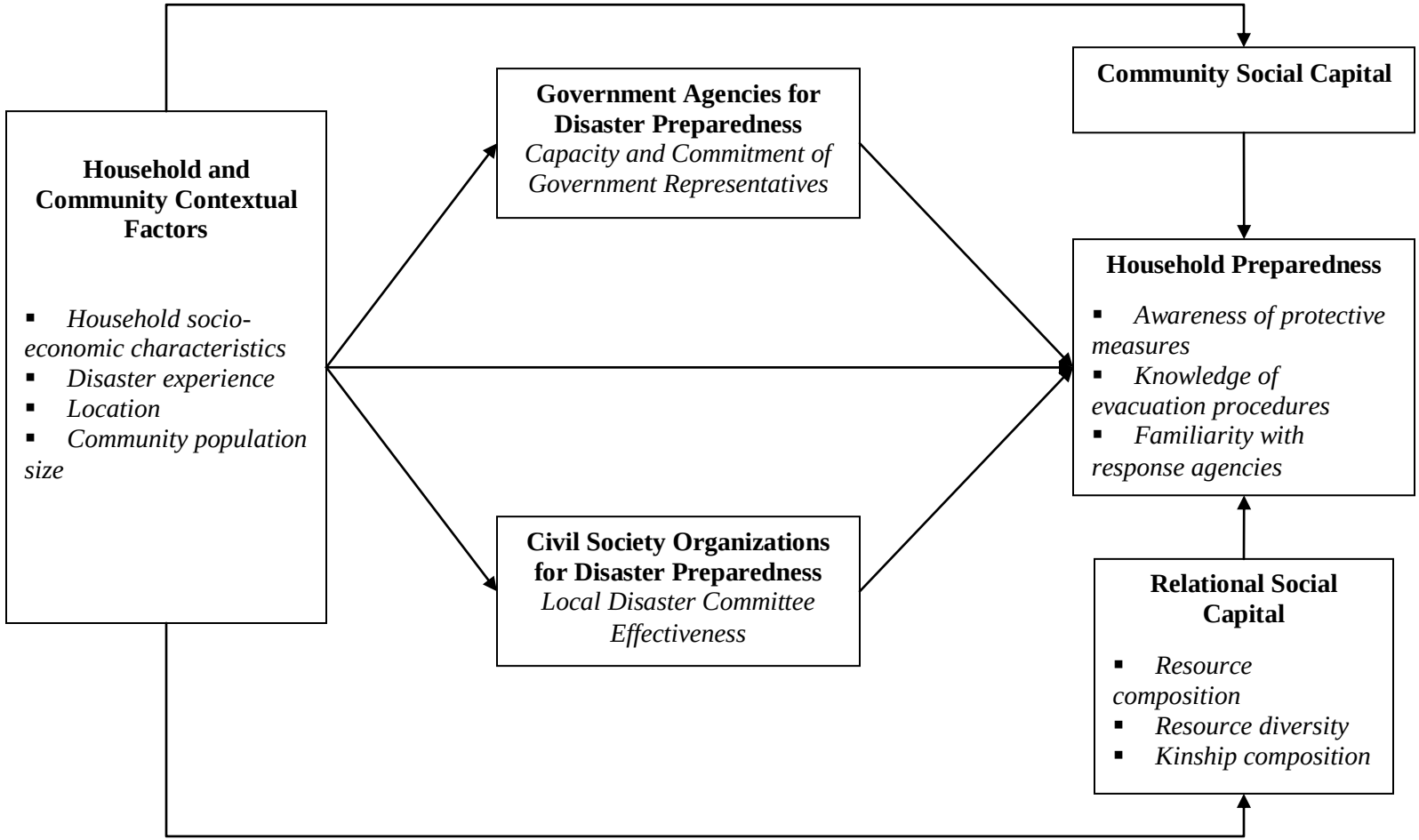

Figure 2.1. Conceptual framework for household preparedness (defined as awareness of what to do in a disaster)

2.4. Summary

This chapter drew on the existing literature to develop a conceptual framework to explain household preparedness. Household preparedness is defined as awareness of what to do in a disaster. The possession of relational social capital (through resource composition, resource diversity and kinship composition) and community social capital are hypothesized to be important influences on household preparedness. The capacity and commitment of government representatives, the effectiveness of local civil society organizations for disaster preparedness (e.g., local disaster committees) and household and community contextual characteristics are further expected to affect household awareness of what to do in a disaster.

The relationship between relational and community social capital and household preparedness was assessed and compared to the influence of the other factors described above. The research design and methods used to test the hypotheses presented in this chapter and answer the research questions posed in Chapter 1 are discussed in the next chapter.

CHAPTER 3

Research Design and Methods

This chapter presents the research design and methods used for this research. This study is primarily based on a quantitative analysis using survey data. Households were randomly sampled within a study area covering six villages in Dominica in the Caribbean. The chairs of local disaster committees in these villages and government representatives in charge of disaster preparedness at the district level were also interviewed. Data were analyzed using logistic regression models to test the hypotheses derived from the conceptual framework presented in Chapter 2. Additional information was obtained from documentary evidence and interviews of key informants at the national level to better interpret the results.

This chapter first provides some background information on Dominica and organization for disaster preparedness on this island. The following sections present the design, data collection, measurement, and analytical strategies used for this study. The main points are summarized to conclude this chapter.

3.1. Overview of Dominica

3.1.1. Dominica: A Brief Profile of the Nature Isle of the Caribbean

Dominica is a rugged island with luxuriant forests located in the Northern part of the Lesser Antilles in the Caribbean (see Figures 3.1 and 3.2). It is approximately

754 sq km, hence slightly smaller than New York City, and has a population of roughly 70,000 people that primarily descend from African slaves brought in by colonial planters in the 18th century (CIA, 2006; Myers 1987). English is the official language, but many Dominicans, in particular when they are older or live in more remote areas, speak a Creole patois as their first language (Quinlan, 2004).

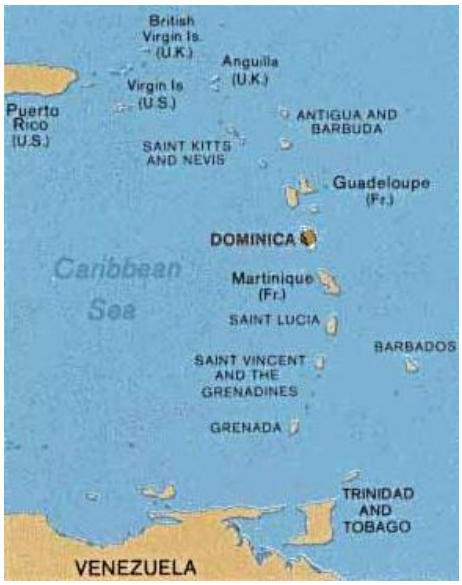

Figure 3.1. Lesser Antilles (http://en.wikipedia.org/wiki/Geography_of_Dominica)

A British colony for over 200 years, Dominica has achieved independence in 1978 and has since then struggled to restructure an economy essentially based on agriculture and tourism. In 1995, Honychurch, a local historian, described Dominica as the most mountainous, most rural and least developed country in the Caribbean. With a Human Development Index of 0.743 and a GDP per capita of 5,640 PPP[4]-dollars in 2002, Dominica confirmed this status as it ranked 72nd in terms of its Human Development Index and 74th for its GDP per capita in the UN database, behind all other Caribbean islands (Globalis, 2006).

[4] Purchasing Power Parity

Figure 3.2. Dominica (http://en.wikipedia.org/wiki/Geography_of_Dominica)

3.1.2. Vulnerability to Natural Disasters

As many other small island states with limited resources, Dominica is particularly vulnerable to natural disasters. Most of the population and of the road network are concentrated along the coastline, principally on the West Coast, where the capital city, Roseau, is located. As a result, people and roads are particularly exposed to sea surges

and flooding. Dominica is prone to earthquakes, volcanic activity, and landslides, but hurricanes remain the most frequent and damaging hazard. Between 1886 and 1996, the island experienced 40 tropical storms and 19 category 1-3 hurricanes and 13 years witnessed multiple storms (CDERA, 2003).

In 1979, Hurricane David devastated the island, causing 56 deaths and leaving 75 percent of the population homeless (Hebert, 1980). David remains the most devastating and most remembered disaster in recent times and has marked a turn-around point in Dominica's disaster management history. Following this destructive event, commitment to disaster management increased in Dominica, first through discrete grassroots efforts in some communities and progressively as institutional arrangements were set up and continued to evolve over time to their present state (Benson et al., 2001b; USAID, n.d.).

3.1.3. Disaster Preparedness in Dominica

Disaster management in Dominica essentially focuses on disaster preparedness and disaster preparedness in turn revolves to a large extent around the establishment and sustained activities of disaster committees at the community level (for more details on disaster management in Dominica, see Appendix A).

Community disaster committees are staffed with local volunteers and typically consist of a chairperson, an assistant chairperson, a secretary, a treasurer and a variable number of members organized in subcommittees or action groups (e.g., damage and needs assessment, shelter management, first aid, relief distribution, mitigation, transportation, road clearance, communication, rehabilitation, and public education). Disaster committees are responsible for recruiting volunteers, organizing training for

their members, preparing, updating and regularly testing a community disaster plan, informing and educating residents and carrying out appropriate response activities.

Historically, the success of many community development programs in Dominica has rested on the implementation of self-help initiatives and the interaction of grassroots groups and representatives of the Local Government Department of the Ministry of Community Development and Gender Affairs. The Local Government Department is fully decentralized with district teams made up of a District Development Officer (DDO) and his/her Assistant (DDA) working in each of seven administrative areas or districts. Their primary mission is to liaise with village councils, support their administration, foster development initiatives and assist with their implementation, and act as a link with Central Government (Harrison & Simons, 1982). This same well-oiled relationship between DDO/DDAs and communities is at the core of community-based disaster preparedness. DDO/DDAs are in charge of identifying shelters and suitable shelter managers every year, of organizing disaster committees, of arranging for the training of their members and of working with these committees to educate residents and to conduct rapid damage and needs assessments following disasters.

3.2. Research Design

3.2.1. Study Population

This study uses the Dominican case to explore the extent to which social capital affects household preparedness. One of the aims of this study is to compare the effects of relational and community social capital to those of household and community contextual characteristics and to the influence of civil society organizations for disaster preparedness (i.e., local disaster committees in Dominica) and government representatives (i.e.,

DDO/DDAs). While households are the appropriate unit of analysis, it is thus necessary to collect information on households in different communities and in different districts.

In the absence of secondary data on household preparedness and social capital, testing the hypotheses laid out in Chapter 2 requires conducting a household survey. Ideally, the aim of this study would be to generalize findings to all Dominican households. Available funding, however, limited the number of households that could be surveyed to 185. Clearly such a sample size is insufficient to make valid inferences about the Dominican population at large. Rather the survey was administered to a sample of households in a small number of communities (six). The population is defined as all households living in these communities and inferences are not sought beyond these villages. This study thus purports to make a statement about the impact of social capital on household knowledge of what to do in a disaster in the six study communities.

3.2.2. Study Sample

This study uses a stratified random sample of 182 households. Households were sampled in six communities located in two Local Government districts. This choice reflects two concerns. The first is to introduce variations in communities and districts. The second is to survey enough households in each community to seek inferences about the study population.

3.2.2.1. Selection Criteria for Communities

The small number of communities does not allow a large number of selection criteria. Efforts were made to select communities that are as similar as possible in terms of disaster exposure and disaster history, within the constraints imposed by the characteristics of the available pool of Dominican communities. Communities in the two

more commercialized areas surrounding the two urban centers of the capital city, Roseau, and Portsmouth were also left out from the selection process. Many residents in these communities commute to one of these two towns and in some cases spend relatively little time in their community and do not interact much with other residents. Priority was then given to 1) choosing communities from two different Local Government districts and 2) introducing variations in levels of community social capital.

The first criterion is necessary to obtain variations in the level of capacity and commitment of government representatives and capture their influence on household preparedness. Three communities were selected in the Western Local Government district and three in the Southern district. Both districts share similar institutional arrangements but have different DDOs and DDAs.

The choice of communities further determines two variables: the effectiveness of community preparedness arrangements and community social capital. Although households' access to community social capital is ultimately of interest, this variable in turn depends on the level of community social capital available in the community. Because household access to community social capital is a key independent variable, community social capital was used as a second selection criterion. Levels of social capital, though, are a priori unknown and need to be measured. According to social capital theory, however, communities with high levels of social capital are able to overcome collective action dilemmas and to better organize to achieve collective goals (Krishna, 2002; Ostrom & Ahn, 2001). It was thus assumed that communities with high social capital would generally demonstrate a more successful history of collective action for a variety of outcomes than communities lacking social capital. Based on this

assumption, two reportedly dynamic communities were chosen in the Western district and one in the Southern district. These communities were described by key informants in Central and Local Government as “dynamic”, “getting a lot of work done”, “planning their own projects and ensuring they come through”, “close-knit” and having “high levels of voluntarism”. Dublanc and Colihaut are located in the Western district and Petite Savanne in the Southern district. By contrast the other three selected communities “have low to medium levels of activity”, are “quiet”, “slow in participating in activities” or need “to be pressured to get things done.” These three communities are Mero in the Western district and Dubique and Fond Saint Jean in the Southern district. Table 3.1 summarizes the selection criteria for each of the six study communities and Figure 3.3 situates the communities on a map.

Table 3.1. Selection criteria for the six study communities

	District	Reported Success of History of Collective Action
Dublanc	West	High
Colihaut	West	High
Mero	West	Low
Dubique	South	Medium
Fond Saint Jean	South	Medium
Petite Savanne	South	High

Figure 3.3. Location of the six study communities
(http://www.glpinc.org/Graphics/Project%20Sites/Caribbean/Dominica/Dominica-big%20map.gif)

3.2.2.2. Household Sample

A random proportionate sample of 20 percent of households was selected in each community using the 2001 Dominican Census as a sampling frame. This sampling

scheme has the advantage that the residents of each village are represented in proportion to their appearance in the population. This approach is in particular recommended when subpopulation characteristics are included in the variables (Black, 1999). It is useful here since some of the variables (e.g., effectiveness of community preparedness arrangements and, at least partly, access to community social capital) are determined at the community level. The smallest community – Dubique -, however, was over-sampled (42% of households) because the initial sample size for this village was very small (only 10 households). Even when the population is small, very small samples are open to wide variations when they are reproduced and as such are unreliable. Oversampling of small subpopulations is thus necessary to obtain good estimates of their characteristics. Sampling weights were subsequently used in the analyses to adjust for this oversampling.

Table 3.2. Sample size per community

Community	Number of Households (2001 Census)	Number of Households Interviewed	Percent of Households Interviewed
Dublanc	138	29	21
Colihaut	279	56	20
Mero	115	20	17
Dubique	48	20	42
Fond Saint Jean	107	20	19
Petite Savanne	185	37	20

Table 3.2 indicates the number of households interviewed in each village. The sample sizes for each community range between 29 and 56 households. Larger absolute sample sizes would have been preferable to represent the population of each village more accurately. Given the available funding, however, a trade-off had to be made between the number of communities and the number of households interviewed in each village. With the aforementioned exception of Dubique, the desired number of questionnaires corresponds to 20% of each village's population. There are three discrepancies between

this number and the number of households interviewed. Two of them (in Dublanc and Fond Saint Jean) are minor and due to errors on interviewers' behalf. The third one, in Mero, is essentially linked to migration and death. As mentioned above, the 2001 Dominican Census served as a sampling frame for this survey. For confidentiality reasons, only a limited pre-determined number of names had been obtained from the Central Statistical Office for each village. Although more names than necessary had been requested in anticipation of such situations, problems in finding the households named on the list persisted in Mero and three questionnaires were still missing by the time the list of names ran out.

3.3. Data Collection

The data used for this research were collected both through a household survey and a survey of key informants. The household survey was administered to a proportionate random sample of households in each of the six study communities. Key informants include the chairs of local disaster committees in each of these communities and DDOs and DDAs in the Southern and Western districts. Other key informants were interviewed at the community and national level to obtain contextual information on the six villages and disaster preparedness in Dominica.

3.3.1. Household Survey

3.3.1.1. Household Survey Design and Implementation

The household survey (see Appendix B) asked respondents questions pertaining to four main topics: 1) household preparedness; 2) social capital both in its relational and community form; 3) persons in key leadership positions (village council chair; disaster

committee chair and District Development Officers) and 4) personal information about the respondent and his/her family.

The construction of the survey was guided by the conceptual framework presented in Chapter 2, as well as by preliminary information collected during a reconnaissance trip made to Dominica in June 2005. To the extent possible, the survey was modeled after questions from past surveys conducted in Dominica by local agencies[5] to ensure the wording would be appropriate and locally-relevant. These examples in particular guided the flow of questions and instructions provided for the administration of the survey by local interviewers.

A local consultant was recruited to supervise the administration of the household survey and assist with the recruiting of local interviewers. Relying on local interviewers facilitates access to local people and increases the likelihood that they will consent to participate in the survey. Yet it is preferable that respondents do not know the interviewer personally as they may then hesitate to answer some sensitive questions or as this could otherwise introduce some bias. Attention was paid, therefore, to avoid such situations by ensuring that interviewers did not have ties to the communities in which they administered the survey.

Six interviewers were initially recruited and trained in January 2005 while I was present. Training included an ethics training component; mock-interviews during which interviewers took turns asking questions to the same respondent to check for the consistency of their notes and thus inter-rater reliability; and a pre-test of the

[5] Two local sources proved particularly useful: a couple of surveys on household preparedness implemented by volunteers for the Dominica Red Cross to assess the short-term impact of the USAID-funded Community Disaster Preparedness, Education and Mitigation Program in 2002, and guidelines for interviewers for a section on quality of life in the 2002 National Poverty Assessment.

questionnaire on a focus group in a community that was not part of the study communities. Interviewers were debriefed after the pre-test to see if there was any confusion or problems from the survey and the questionnaire was slightly modified to improve the wording and intelligibility of some questions. Three interviewers were retained at the end of the training to administer the final survey. The final version of the questionnaire was administered between February 8 and April 10, 2006. The survey was purposefully carried out outside of the hurricane season (June to November) to reproduce the conditions of relative normalcy (no near-term presumed threat or recent disaster history or any possible stepped-up educational efforts on behalf of local disaster committees and/or DDO/DDAs) discussed in Chapter 1 and thus to capture normative influences on household knowledge of what to do in a disaster.

3.3.1.2. Questionnaire Eligibility

Upon reception of the questionnaires, data were entered twice in two separate computer files following a pre-established coding guide. The two entries were compared using SAS. Data were further checked for outlandish values and to verify that the built-in skip pattern of the questionnaire was respected. Entries were assigned an ID number and not linked to individual names to maintain confidentiality.

The total number of items non-response[6] was calculated for each questionnaire and two questionnaires were discarded that had respectively six and nine unacceptable non-responses on theoretically important questions. A third questionnaire was discarded

[6] There are several ways to handle "Don't Know" answers (DK) based on the theoretical expectations that underlie the design of the questionnaire. In some cases, DK can be an informative answer. For instance, a respondent indicating that he or she does not know who the District Development Officer is in his/her district provides a useful piece of information. In other questions, however, the respondent can reasonably be expected to provide an answer and DKs were then counted as non-responses.

because the respondent had been living in Dominica less than five years, which proved a unique case in the sample.

3.3.1.3. Minimum Response Rate and Minimum Cooperation Rate

Out of the 182 administered questionnaires, 179 were retained for analysis. Based on the standard definitions proposed by the American Association for Public Opinion Research (AAPOR, 2005), the minimum response rate was defined as the number of complete questionnaires divided by the number of interviews plus the number of non-interviews[7]. The number of non-interviews, however, is difficult to compute because interviewers failed to record the number of persons who were systematically unavailable whenever they attempted to interview them. The minimum cooperation rate, on the other hand, can be reported (see Table 3.3). The minimum cooperation rate is defined as the number of complete interviews divided by the number of interviews plus the number of non-interviews that involve the identification and contact with an eligible respondent. It therefore accounts for discarded interviews and for cases for which no interview was obtainable because of death, physical or mental inability and migration. The cooperation rate for this survey is 86.1%.

Table 3.3. Data collection information summary

	Frequency	Percent
Useable completed questionnaires	179	86.1
Discarded questionnaires	3	1.4
Non-contacts	N\A	N\A
Other non-response	26	12.5
Total	208	100

[7] For the response rate, non-interviews consist of refusals, break-offs, non-contacts and others (e.g., when no interview is obtainable because of death, mental or physical disability, language problems etc.). Non-contacts are not included in the calculation of the cooperation rate (AAPOR, 2005).

3.3.2. Key Informant Interviews

I interviewed disaster committee chairs and District Development Officers and Assistants in each of the six communities and two districts in January 2006[8]. In each case, a series of specific questions (see Appendices C and D) was prepared to inform the theoretical framework based on the information collected during the reconnaissance trip. Beyond this specific information, however, interviews followed a semi-structured format aimed at getting a better sense of the processes at hand in each of the districts and communities.

Other persons were interviewed to obtain contextual information on each of the study villages and on disaster preparedness in Dominica. These informants in particular include the village council chairs in each community and representatives of other key organizations involved in disaster management and community development in Dominica.

3.4. Measurement

This section introduces the constructs used to measure the concepts in the framework presented in Chapter 2, as well as the indicators used to measure them. The indicators are taken directly or constructed from responses to questions in the household survey or key informant interviews of the chairs of local disaster committees and DDO/DDAs.

[8] All Disaster Committee Chairs have been in position for several years or since the disaster committee was last reactivated in their village. District Development Officers and Assistants hold permanent positions and have all worked in their district for many years. The DDO in the Western District was replaced for a year in 2005, when he stepped in for the Local Government Commissioner but since he had been in position for many years before that, he is still well-known in and knowledgeable about his district.

3.4.1. Measuring Household Preparedness

Household preparedness is represented by three separate constructs that reflect the three dimensions presented in Chapter 2: 1) awareness of appropriate protective measures; 2) knowledge of evacuation procedures; and 3) familiarity with response agencies. Together, they provide a comprehensive picture of household knowledge of what to do in an emergency. Yet it is possible for households to be well-informed in one respect but not in others. Each construct is represented by one indicator that corresponds to households' answers to a survey question (see Table 3.4). These indicators were selected with the help of key informants members of the key organizations involved in disaster preparedness at the national level. While they are not the only possible indicators, they are the most relevant ones in this context and capture the three most emphasized aspects of household preparedness in Dominica.

Table 3.4. Constructs for household knowledge of what to do in a disaster

Construct	Indicator	Survey Question	Range	Level of Measurement	Variable Type
Awareness of appropriate protective measures	Knowledge of appropriate actions to take around one's home if a hurricane was to hit Dominica	A7	0-3	All indicators measured at the household level	All indicators are ordinal
Knowledge of evacuation procedures	Knowledge of the contents of a shelter kit	A5	0-3		
Familiarity with response agencies	Awareness of areas of responsibility of local disaster committees	A4	0-3		

Awareness of appropriate protective actions is measured through households' knowledge of appropriate actions to take around their home if a hurricane was expected to hit Dominica. Respondents were asked to name up to three actions. Answers were checked against a list of possible actions derived from documents prepared by the

Dominica Red Cross. They then received a score between 0 and 3 corresponding to the number of correct and non-redundant actions cited by the respondent.

Knowledge of evacuation procedures is measured through households' knowledge of the items they should bring along when evacuating to a shelter. Following a process similar to the one described above, respondents were asked to name up to three items and answers were assigned a score ranging from 0 to 3.

Familiarity with response agencies was assessed based on respondents' ability to name three areas of responsibility of the disaster committee in their community. Answers were scored between 0 and 3[9].

3.4.2. Measuring Relational Social Capital

Relational social capital is defined by three constructs that correspond to the three dimensions discussed in Chapter 2: resource composition (i.e., average resources), resource quality and kinship composition. Indicators for each of these constructs were derived from Position Generator data obtained from the household survey. The indicator for resource composition is average accessed prestige. Extensity serves as an indicator for resource diversity. The proportion of relatives is used for kinship composition.

3.4.2.1. The Position Generator Method

The Position Generator is a popular and consistently applied method for the measurement of relational social capital that was developed by Lin and Dumin in 1986 (Lin, 1999a; Van der Gaag et al., 2004). The basic hypothesis underlying this method is that valued social resources are reflected by people's position in society (Lin 1999a, 2001; Lin et al. 1981; Zhao, 2002). A sample of valued positions is used and the

[9] Although they may not systematically and regularly be carried out, these responsibilities are standardized throughout the island.

counting of social positions included in a respondent's personal network and respondent's type of relations to them allows estimating the relational social capital embedded in this network.

The logic and rigor behind the Position Generator make it possible to use this instrument in every society in which occupations, occupational prestige and/or job-related socioeconomic indices have been catalogued (Van der Gaag et al., 2004). No such listing could be found in Dominica. Instead, a set of fourteen relatively common occupational positions of various levels of occupational prestige was selected based on interviews with local people and key informants from the National Development Foundation of Dominica[10]. These positions were ranked in order of increasing prestige. Prestige scores were attributed to each position using the Standard International Occupational Prestige Scale[11] (SIOPS) compiled by Ganzeboom and Treiman (1996). These fourteen positions are: office cleaner (SIOPS score of 19), house help (22), messenger (22), fisher or farmer (23), policeman (40), secretary (45), nurse (54), teacher (57), police commissioner (60), school principal (60), bank manager (60), accountant (62), permanent secretary (64) and medical doctor (78)[12].

[10] NDFD is a non-profit organization that provides credit for small enterprise development.

[11] Prestige scales such as the SIOPS reflect evaluative judgments on the desirability of occupations. The SIOPS was initially constructed by Treiman in 1977. He used the International Standard Classification of Occupations (ISCO)-68 and matched average prestige scores derived from prestige studies in 60 countries to each occupational group. Ganzeboom and Treiman updated this scale using ISCO-88 and data on 16 countries from the International Stratification and Mobility File. The scale was then validated using pooled data from 14 countries from the International Social Justice Project 1991 (Ganzeboom & Treiman, 1996). ISCO-08 will be released at the end of 2007 (ILO, 2004) and Ganzeboom and Treiman's SIOPS is thus the most recent available version.

[12] Note that some occupations have the same prestige scores. These occupations were kept, however, because they have distinct occupational status scores (see section 3.4.2.3).

3.4.2.2. Indicator Construction

Three indicators were derived from Position Generator data to measure resource composition, resource quality and kinship composition: average accessed prestige, extensity and proportion of relatives. Table 3.5 summarizes the constructs and indicators used for relational social capital.

Table 3.5. Constructs for relational social capital

Construct	Indicator	Survey Question	Range[13]	Level of Measurement	Variable Type
Network Resources	Average accessed prestige	B15	0-52.36	All indicators measured at the household level	All indicators are continuous
Network density	Proportion of relatives	B15	0-100		
Network size and diversity	Extensity	B15	0-14		

Resource composition refers to average resources in personal networks and was measured by average accessed prestige. Average accessed prestige was introduced by Campbell et al. (1986) and is calculated as the mean of the prestige of all occupations in which the respondent knows anyone (Van der Gaag et al., 2004).

Extensity was used as an indicator of resource diversity (see Lin, 2001; Van der Gaag et al., 2004). Extensity refers to the number of different positions in which the respondent indicates to know someone. Extensity is independent of the prestige scores attached to various positions. It is thus a particularly interesting indicator given that there is uncertainty as to whether social relations in more prestigious positions prove more valuable for disaster preparedness.

The proportion of relatives was used to measure kinship composition (Marsden, 1987). When respondents indicated they knew someone in a given social position, they

[13] Using ISEI scores (see 3.4.2.3).

were further asked what their relationship to this person was (family, friend or acquaintance). If they knew more than one person in this position, only the strongest relationship was noted. Like extensity, the proportion of relatives is independent of the scores attached to occupational positions. This indicator is somewhat weak, however, because it only allows for a maximum of one relative in each sampled social position. As such, it reflects the proportion of sampled positions accessed through relatives rather than the proportion of relatives included in a respondent's personal network. Yet this is the only measure of kinship composition that could be derived from the Position Generator.

3.4.2.3. Comparison of Indicators based on Occupational Status and Prestige

Previous studies using the Position Generator have relied on either prestige or occupational status scores. These two measures vary slightly in their interpretation. Prestige measures refer to the social rewards embedded in interactions, while socio-economic status emphasizes human resources and economic rewards in interactions (Ganzeboom & Treiman, 1996; Van der Gaag et al., 2004). Proportion of relatives and extensity are independent of the scores attached to each position and thus do not change when prestige or status scores are used. An alternative indicator was created for resource composition using the same definition as for average accessed prestige and Ganzeboom and Treiman's International Socio-Economic Index of Occupational Status[14] (ISEI). Both indicators (using ISEI and SIOPS) were extremely highly correlated (r=0.95 and

[14] ISEI is a socio-economic scale that measures the attributes of occupations that convert education into income (Ganzeboom & Treiman, 1996). It is calculated as the weighted sum of the socio-economic characteristics (education and income) of persons with a given occupation. It was developed by Ganzeboom et al. (1992) using ISCO-68 and the International Stratification and Mobility file mentioned earlier. It was updated by Ganzeboom and Treiman (1996) based on ISCO-88 using the same approach as for SIOPS.

$p<0.0001$). Since both measures yield equivalent results, only the indicator based on ISEI scores was kept for the rest of the analysis. ISEI scores were preferred because there were fewer positions with similar scores[15]. Three measures of relational social capital were thus used[16]: average accessed status, extensity and proportion of relatives.

3.4.3. Measuring Household Access to Community Social Capital

An index[17] reflecting households' perception of the social capital available in their community was used to measure their access to community social capital. The index is comprised of three sub-constructs that reflect the structural and cognitive dimensions of community social capital and collective action as an output measure. Each sub-construct consists of indicators that were taken directly from answers to the household survey. Confirmatory factor analysis was used to validate the household-level community social capital index.

3.4.3.1. Households' Perception of Community Social Capital

A household's access to community social capital results from the combination of the community social capital available in the village where the household lives and of the

[15] Prestige was initially used in discussions with informants to select a list of social positions because it is an evaluative judgment, whereas occupational status requires more complex calculations and did not lend itself easily to the selection process.

[16] Two other indicators are commonly derived from Position Generator data: highest accessed prestige and range in accessed prestige. Including all five indicators, however, poses problems of sample size (see section 3.5.2.2) and collinearity. While different, highest accessed prestige and average accessed prestige both reflect the quality of accessed resources. Extensity and range in accessed prestige both measure resource diversity. Average accessed prestige and extensity were preferred because they provide a better sense of the *distribution* of resources. They are also less correlated among themselves and with household characteristics and thus provide more independent indicators of relational social capital.

[17] A single-indicator measure is neither reliable nor valid to measure a hypothetical underlying construct (such as collective social capital) for two reasons. First, scores on most measures are not completely free of random error. Second, all portions of the indicator may not reflect the construct of interest (Kline, 1998). Using multiple indicators combined in an index or several indexes is therefore the preferred method to measure collective social capital. This approach has been used repeatedly to measure social capital at the individual or household level (see for instance Brehm & Rahn, 1997; Narayan & Cassidy, 2001), at the community level (see for instance Krishna, 2002; Krishna & Uphoff, 1999) or at the regional level (see for instance Putnam et al., 1993).

household's access to this asset. Because community social capital entails a cognitive dimension, it primarily exists inside people's heads. As such, it is not directly observable and can only be measured through its manifestations in collective activities[18]. Furthermore, community social capital only exists when it is shared (Portes, 1998). A given household perception of community social capital in their village thus reflects not only existing levels of social capital at the community level but also the extent to which this household has access to it. Households' perception of social capital in their community was therefore used as a basis for the measure of their access to community social capital.

3.4.3.2. Collecting Data on Community Social Capital

Not every form of collective action reflects the presence of community social capital because some forms of cooperation can, for instance, be government-initiated (Grootaert & van Bastelaer, 2002). Because the types of activities in which people engage collectively vary contextually, locally relevant indicators must further be used to measure community social capital (Krishna, 2003b). The World Bank Social Capital Development Tool (SOCAT) offers a standardized methodology to collect locally-relevant data on community social capital (Krishna & Shrader, 2002). Yet the community profile, household survey and organizational profile on which the SOCAT is based were too comprehensive for the time and budget available for this study and only data from the household survey were used. This simplified approach is similar to the one

[18] The distinction between the consequences (or causes depending on the specific strand of social theory adopted) of social capital and what it actually is can thus not be made empirically (Lyon, 2000). Furthermore, using the manifestations of social capital in one domain as a measure for social capital to observe its effects in another domain rests on the assumption that collective social capital is fungible across issue areas. This property, however, has not been rigorously demonstrated (Krishna, 2003a). The quasi-impossibility to measure collective social capital (at various levels of aggregation including community, region, state etc.) independently of its effects remains one of the main sources of criticism of its practical usefulness.

used by Krishna and Uphoff (1999) for a study conducted in Rajasthan, India and subsequently revised and applied by Krishna (2002) in 69 North Indian villages.

Field inquiries were conducted during the reconnaissance trip effectuated to Dominica in June 2005 to determine what types of activities people regarded as appropriate to carry out collectively rather than individually in rural villages. Questions were then designed to encompass three types of indicators that offer different perspectives on community social capital: structural features (2 indicators), cognitive features (2) and collective action (1) (Grootaert & van Bastelaer, 2002). Table 3.6 summarizes the sub-constructs and indicators used to represent access to community social capital. Appendix E offers a more detailed presentation of the indicators and the survey questions from which they were derived.

Table 3.6. Constructs for household access to community social capital

Construct	Indicator	Survey Question	Range[19]	Level of Measurement	Variable Type
Structural Features	Membership in groups	B1	0-1	All indicators measured at the household level	Continuous
	Expectations of mutual support (extent of volunteering to clear debris after a hurricane)	B4	1-5		Ordinal
Cognitive Features	Expectations of solidarity (perceived levels of assisting in building or repairing homes)	B2	0-3		Ordinal
	Personal willingness to lend personal items	B10	0-3		Ordinal
Collective Action	Koud-mai[20]	B3	1-4		Ordinal

[19] Answers were recoded based on the distribution of responses to the original questions (see appendix E).

[20] Koud-mai is a long-standing tradition of self-help in Dominica whereby residents contribute free labor to projects in their communities.

3.4.3.3. Confirmatory Factor Analysis

The key dimensions postulated above only served as a point of departure to design the questionnaire[21]. Confirmatory Factor Analysis (CFA) was used to evaluate whether all five indicators measured the same underlying construct and thus validate the social capital index. A one-factor model was tested based on the raw data and using maximum likelihood estimation as implemented in LISREL[22]. Table 3.7 presents the standardized parameter estimates and Table 3.8 the fit statistics[23] for the one-factor model.

Table 3.7. Completely standardized parameter estimates for the one-factor model (CFA) (n=172)

	Standardized Factor Loadings (t value)	R^2
Membership in Groups	0.30 (3.07)	0.09
Expectations of Solidarity	0.49 (4.47)	0.24
Koud-mai	0.59 (5.08)	0.34
Expectations of Mutual Support	0.42 (3.54)	0.18
Lending of Personal Items	0.16 (1.29)	0.03

Table 3.8. Fit statistics for the one-factor model (CFA) (n=172)

Model	χ^2	df	RMSEA
One-Factor Model	3.87	5	0.00

The squared multiple correlations for each variable indicate that the model only explains a relatively small amount of variance in some of the observed variables, particularly for membership in groups and lending of personal items, which also have

[21] The distinction between these three categories is somewhat arbitrary as all aspects are intrinsically linked and assumed to interact. Since it is assumed that all indicators refer to a same underlying factor, collective social capital, this distinction is not important in itself. Rather its purpose is to ensure a valid measure that grasps the concept in its entirety rather than solely focuses on its most structural (e.g., membership in associations) or attitudinal (e.g., trust) components at the expense of the others.

[22] With the variance of the factor set to 1, the one-factor model has 12 remaining parameters including 5 factor loadings and 5 variances, and 15 observations. With five indicators loading on a single factor and independent measurement errors, it is therefore identified with 5 degrees of freedom.

[23] Commonly reported fit indices such as GFI, AFI and PNFI are not available from LISREL when weights are used in the analysis.

smaller loadings. This is somehow surprising because membership in groups has historically been one of the core indicators of community social capital across contexts, given an appropriate selection of locally relevant groups. Yet the fit statistics show a good fit of the data.

CFA was used in this analysis because the intent was to validate a single index of community social capital. An alternate approach based on exploratory factor analysis (EFA) was tested to determine whether more than one factor would emerge from the set of indicators. EFA has been used more commonly than CFA in the social capital field (see, for instance, Krishna, 2002; Narayan & Cassidy, 2001) and in some cases models of social capital have been proposed that are based on several factors (see Narayan & Cassidy, 2001). The results of the EFA are presented in Appendix E. Two factors emerged from the EFA. Yet because the fit of the two-factor model is not significantly better, a single social capital index was constructed. Household responses for each of the five questions on community social capital were standardized and averaged[24] into a household-level index of community social capital.

3.4.4. Measuring the Effectiveness of Local Disaster Committees

The disaster committee effectiveness index is comprised of three sub-constructs: disaster planning, current activity level and long-term activity level.

Disaster planning is comprised of two indicators that reflect the degree to which preparedness and response activities are planned in each community. The first indicator measures whether the disaster committee has compiled a disaster plan. Scores range from 1 to 3 with 1 indicating that the disaster plan exists but is not completed, 2 that it is

[24] Each item was given an equal weight in the index. An alternative index was created in which each item was given a weight equal to its factor loading in the CFA. The two social capital indexes are highly correlated ($r=0.96$, $p<0.0001$) and the simplest formula was therefore used.

completed but is not kept handy and not regularly consulted by the disaster committee and 3 that the disaster plan is completed and regularly consulted. The second indicator reflects whether action teams are in place to carry out the activities defined in the plan. A score of 1 was assigned if only a few action teams were identified and a score of 2 when action teams were in place for all the responsibilities defined in the plan. Scores were converted on a scale of 0 to 1 and combined in the disaster planning index. A weighted average was used with a weight of 1 for the plan and 0.5 for the organization of action teams because the usefulness of action teams is contingent on the existence of the plan.

Current activity level is a multiplicative index based on two indicators: the number of active volunteers[25] that constitute the core group of the disaster committee and the frequency of meetings. The number of active volunteers was calculated as the product of the number of core volunteers times the percentage of these volunteers who regularly attend disaster committee meetings. Meeting frequency was rated on a scale of 1 to 3 according to whether disaster committees meet only during the hurricane season, immediately before and during the season, or throughout the year. Scores for these two indicators were then converted on a scale from 0 to 1 and multiplied to obtain the current activity level index.

Some committees, however, have been in place longer than others and this can be interpreted to reflect a greater level of activity over the long-term. Long-term activity

[25] The number of volunteers was not expressed as a function of the population because these volunteers only represent the organizational core of the disaster committee. Residents are then mobilized to carry out activities. The number of core volunteers is important in absolute terms because small committees have less capacity to carry out a large number of tasks as their members quickly become overwhelmed, while in larger committees each member is assigned a more manageable number of responsibilities.

level was thus measured as the number of years the disaster committee had been in place. This number was then converted on a scale from 0 to 1.

Since there are three sub-constructs whose scores range between 0 and 1, possible scores for the construct for disaster committee effectiveness range between 0 and 3 (see Table 3.9). Appendix F provides additional information about the disaster committees and the evidence that was used to derive these scores.

Table 3.9. Constructs for disaster committee effectiveness

Construct	Indicator	Range of Possible Values	Level of Measurement	Variable Type
Disaster planning	Disaster plan	1-3	All variables measured at the community level	Ordinal
	Action teams in place	1-2		Ordinal
	Sub-construct	**0-1**		
Current activity level	Number of active volunteers	6-20		Continuous
	Percentage of volunteers attending meetings	0-100		Continuous
	Frequency of meetings	1-3		Ordinal
	Sub-construct	**0-1**		
Long-term activity level	Disaster committee age	1-8		Continuous
	Sub-construct	**0-1**		
Construct score		**0-1**		

3.4.5. Measuring the Capacity and Commitment of Government Representatives

The influence of District Development Officers and Assistants was measured using a dummy variable reflecting household awareness of DDO/DDAs' involvement in disaster preparedness.

DDO/DDAs primarily work with disaster committees, although they are also responsible for keeping the public informed about disaster prevention and preparedness. DDO/DDAs' influence may not be felt equally by all households within the same district or even within the same village. For this reason, a district dummy variable aiming at

reflecting differences in the capacity and commitment of each pair of DDO/DDAs would not be precise and a household-level measure was preferred[26].

There are two possible paths of influence at the household level. First, DDO/DDAs' work with disaster committees may be very visible thus sending the message to households that preparedness is important. Second, DDO/DDAs have direct contacts with households during their community visits, primarily through informal discussions, and these interactions may be used to discuss preparedness. Households' ability to name disaster preparedness as one of DDO/DDAs' responsibilities was taken to reflect their influence in one of these two forms. Additional information is presented on each pair of DDO/DDA in Appendix G.

3.4.6. Household and Community Context Controls

Household and community context controls were measured using indicators taken from answers to the household survey. Table 3.10 shows the variables that were measured.

[26] It was initially planned to capture DDO/DDAs' influence as the interaction of two dummy variables: a district one and the awareness variable presented here. The district dummy was to account for differences in capacity and commitment to disaster preparedness of each pair of DDO/DDA. This measure, however, proved problematic both theoretically and empirically. Theoretically, the district dummy did not allow differentiating between differences in capacity and commitment, and more importantly may also have picked up other systematic unmeasured differences between districts. Empirically, the two dummy variables (district and awareness of DDO/DDAs' responsibilities) are highly correlated ($r=0.45$, $p<0.0001$) and pose problems if they are included together in the models. The household-level measure was preferred because it is more refined.

Table 3.10. Measured variables for household and community context controls

Variables	Survey Question/Source	Level of Measurement	Variable Type
Population	Census data	Community level	Continuous
Gender[a]	D3	All variables measured at	Bivariate
Age[a]	D1	the household level	Categorical
Religion	D5		Categorical
Number of school-age children	D7		Continuous
Regular attention to newspapers for news and information	D9		Bivariate
Education	D11		Ordinal
Occupational category of breadwinner	D12		Categorical
Home ownership	D10		Bivariate
Income	D13		Ordinal

[a] Age and gender are those of the respondent. Interviewers were asked to talk to the head of the household.

Only one control, population size, was considered at the community level. Nine indicators were considered at the household level: the gender and age of the household head, religion, the number of school-age children, regular consultation of the print media for news and information, education, the occupational category of the breadwinner, home ownership and income. Additional questions were asked regarding ethnicity, length of residence in the community and regular consultation of the broadcast media (i.e., radio and TV) for news and information. The corresponding variables, however, were all dichotomous and had to be dropped because the overwhelming majority of households fell in the same response category. As a result, the number of households in the other category was not large enough to provide useful information to generalize findings to the study population. Almost all households (97.8%), for instance, reported watching TV or listening to the radio frequently for news and information. Only 4 households said they did not. Findings based on these 4 households would not be reliable. Finally, note that disaster experience was excluded from the list of variables cited in Chapter 2. This is

because the six communities selected for this study (and most communities across Dominica) share a similar recent disaster history. Likewise, location was not included because communities were selected with a comparable level of disaster exposure.

3.5. Data Analysis

3.5.1. Logistic Regression

Logistic regression was used to estimate the direct effects of relational and community social capital and control variables on household disaster preparedness. Logistic regression was used because each of the three outcomes can be assumed to follow a multinomial distribution. Indeed, respondents were asked to name three items for each of the three aspects of preparedness. The value of the dependent variable is the number of correct answers and can be thought of as the number of successes in a sequence of three independent yes/no experiments according to whether the answer is accurate or not.

Separate models were fitted for each of the three preparedness dimensions considered: knowledge of appropriate protective measures to take around one's home if a hurricane was to hit Dominica, awareness of what to take to a shelter when evacuating and familiarity with disaster committee responsibilities. Weights were used to adjust for the oversampling of households in Dubique[27]. Proportional odds models (see Appendix H) were fitted using proc surveylogistic in SAS for protective measures and disaster committee responsibilities. The sample size requirements for the proportional odds model, however, were violated for the third outcome because all respondents were able to

[27] The overall sample contains proportionately more households from Dubique than there are in the population. Sampling weights allow taking this disproportional representation into account to obtain an appropriate estimation of the population parameters and make valid inferences. Sampling weights were calculated for each village as the number of households living in the village divided by the number of households sampled in this village and assigned to each household in the corresponding village.

name two or three items to take to a shelter with an outlier at zero. The outlier was excluded from the analysis and a binomial logistic regression model (for dichotomous answers) was used.

3.5.2. Explanatory Variables

3.5.2.1. Community-level Variables

The models include household-level and community-level variables. Community-level variables were treated as fixed effects because no attempt is made to generalize the results obtained to a larger population of villages[28]. In order to account for the non-independence of households within the same village and proceed with logistic regression, all in-between village variance needs to be accounted for. In a fixed effect model with six groups (the villages), this can be achieved by including five dummy variables or by using five predictors defined at the group level. Because only two community-level predictors were identified in the conceptual framework (disaster committee effectiveness and village population), three village-level dummy variables were added to the models. These three variables were created to be orthogonal to the two community-level predictors so that they would not mask their effects in the models. These three village dummy variables are nuisances (i.e., we are not interested in their effect) but they are necessary to fully account for in-between village variance.

[28] The values of a fixed variable are assumed to be the same as the values of the fixed variable in another study. Treating community-level variables as random effects would imply that the six communities are conceptualized as villages randomly selected from a larger universe of possible villages and representative of this population. Different villages may be drawn in another study, which is why community-level effects are considered random. A random effect (or mixed-effect since household-level variables are considered fixed) model should be used if inferences were sought beyond the particular values of the community-level variables used in the study (Snijders & Bosker, 1999). In this study, however, the number of communities is too small for them to be considered representative of a larger population. Thus community-level variables are treated as fixed and inferences are sought for the population of households living in these six villages.

3.5.2.2. Household-Level Variables

The models include all the variables that correspond to the following key factors considered to potentially predict household preparedness based on the conceptual framework presented in Chapter 2: relational and community social capital, local disaster committees and government representatives.

As a rule of thumb, ten observations are recommended per parameter (Long, 1997). The sample size, particularly when income is included, did not allow entering all key variables and all controls simultaneously into the models while meeting this requirement. For each outcome, a base model was fitted containing only the set of household and community contextual factors. Key explanatory variables were included in the final models along with any control that proved significant at the 0.1 level in the base model for the corresponding outcome.

The sample sizes were adequate for the final models for awareness of protective measures and knowledge of shelter items, exceeding ten observations per parameter (Long, 1997). There are 7 observations per parameter for familiarity with disaster committee responsibilities.

3.5.3. Model Evaluation and Diagnostics

Several statistics were used to evaluate the logistic regression models. Because continuous independent variables are included in the models, the methods traditionally used to evaluate the overall models are problematic and alternative methods need to be considered (O'Connell, 2006; Stokes et al., 2000). The Nagelkerke R^2 was used for informing about strength of association between independent variables and the outcomes and supplemented by Somers'D as a measure of ordinal association. Predictive

efficiency was assessed using τ_P (O'Connell, 2006). Next, the Wald statistic was used to assess the statistical significance of individual predictors. An alpha value of 0.1 was used, providing 90% confidence that conclusions about the significance of parameters are correct. Finally, the assumptions of logistic regression were tested by evaluating nonlinearity and collinearity. Appendix H provides more detailed information about logistic models and the model evaluation statistics used.

3.6. Summary

In this chapter, the design, data collection, measurement, and analytical strategies used for this study were reviewed and possible remaining threats to validity were outlined. The hypotheses laid out in Chapter 2 are tested using a sample of 179[29] households living in six communities in Dominica in the Caribbean. Three aspects of household preparedness are considered that are relevant for the Dominican context: awareness of protective measures, knowledge of what to take to a shelter and familiarity with the responsibilities of local disaster committees. Data were obtained from a household survey and key informant interviews and analyzed using fixed effects logistic regression models.

Efforts were made to minimize threats to validity during the design stage and such attempts are mentioned throughout this chapter. Within the practical constraints encountered in this study, priority was given to maximizing internal validity, followed by external validity and construct and statistical validity. The use of qualitative information obtained from interviews of key actors at the national level and documentary evidence in particular provide a more in-depth understanding of the factors that impact awareness of

[29] This represents the number of useable questionnaires. A total of 182 households were surveyed.

what to do in a disaster and serve to corroborate and interpret statistical model findings. More will be said on possible remaining threats and limitations in the final chapter.

The next chapter presents descriptive results at the community level for the variables presented in this chapter to operationalize the concepts introduced in Chapter 2. The results of logistic regression models are discussed in Chapter 5.

CHAPTER 4

Which Aspects of Community Context Appear to Make a Difference?

This chapter examines variations in levels of household preparedness across communities and further describes the distribution of key explanatory variables and controls. The three aspects of preparedness considered in this study correspond to activities that are ultimately implemented locally or individually. Variations in the effectiveness of local disaster committees, in the capacity and commitment of the DDO/DDDAs that serve the two districts in which the communities are located and in local conditions form different community contexts in which households interact and inform themselves about preparedness. This chapter explores the diversity of community contexts by presenting a description of the distribution of key independent variables at the community level.

This chapter first examines the distribution of household knowledge of protective measures, of awareness of what to take to a shelter and of familiarity with disaster committee responsibilities across communities. The means of household responses are reported for each outcome in each community. ANOVA is used to compare means

across villages as a whole and pairwise t-tests[30]serve to further examine which communities stand out from others with significantly higher or lower average household scores.

Next, the same approach is used to describe the distribution of the variables associated with each of the factors hypothesized to influence household preparedness in Chapter 2: relational social capital, community social capital, local disaster committees, DDO/DDAs and community and household characteristics. For each variable, a brief discussion examines the correspondence between the pattern of variation of the variable and the pattern of variation observed for each aspect of household preparedness across communities. The results are summarized at the end of the chapter.

4.1. Distribution of Household Preparedness Variables

Household preparedness is reflected by household awareness of three items: 1) appropriate protective measures to take when a hurricane is imminent; 2) what to bring to a shelter when evacuating; and 3) the responsibilities of local disaster committees.

4.1.1. Awareness of Appropriate Protective Measures

The first item considered regards households' ability to name three appropriate protective actions they would take around their home if a hurricane was approaching. As can be seen in Table 4.1, the two most commonly named actions are boarding up the house (79.33%) and trimming trees (40.22%). This result is stable across communities but there is more variation regarding other possible answers. Clearing drains comes third in three communities, assembling supplies in two other villages and clearing the yard of loose objects is the third most frequent answer in one village.

[30] Contrastwise tests and unadjusted p-values were used with an alpha of 0.1 to contrast each community with the others.

Table 4.1. Frequency table and means and standard deviations for awareness of protective measures

	Dublanc		Colihaut		Mero		Dubique		Fond Saint Jean		Petite Savanne		All		ANOVA
Items	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Boarding up the house	23	79.31	41	73.21	14	77.78	15	75.00	16	84.21	33	89.19	142	79.33	
Trimming trees	5	17.24	18	32.14	4	22.22	11	55.00	7	36.84	27	72.97	72	40.22	
Assembling supplies	4	13.79	5	8.93	2	11.11	4	20.00	3	15.79	8	21.62	26	14.53	
Clearing drains	2	6.90	7	12.50	1	5.56	3	15.00	6	31.58	6	16.22	25	13.97	
Clearing yard of loose objects	3	10.34	6	10.71	0	0	5	25.00	3	15.79	5	13.51	22	12.29	
Securing animals	0	0	1	1.79	2	11.11	1	5.00	3	15.79	5	13.51	12	6.70	
Turning off electricity	1	3.45	1	1.79	1	5.56	0	0	1	5.26	2	5.41	6	3.35	
Supporting the house	0	0	2	3.57	0	0	0	0	0	0	4	10.81	6	3.35	
Number of correct answers															
Zero	5	17.24	9	16.07	2	11.11	3	15.00	3	15.79	1	2.70	23	12.85	
One	15	51.72	22	39.29	11	61.11	3	15.00	3	15.79	3	8.11	57	31.84	
Two	4	13.79	16	28.57	2	11.11	6	30.00	3	15.79	12	32.43	43	24.02	
Three	5	17.24	9	16.07	3	16.67	8	40.00	10	52.63	21	56.76	56	31.28	
Mean number of correct answers per household (SD)	1.31 (0.95)		1.45 (0.94)		1.33 (0.88)		1.95 (1.07)		2.05 (1.15)		2.43 (0.75)		1.72 (1.03)		7.68***
n	29		56		18		20		19		37		179		

*p<0.1 **p<0.05 ***p<0.01

Out of a maximum possible score of 3, the average score for all communities is 1.72, indicating moderate levels of awareness of protective measures. Of particular concern is the fact that nearly half of surveyed households (44.69%) were not able to name more than one appropriate action, including 12.85% of households who couldn't name any suitable protective measure. Wide variations can further be observed in average household scores for knowledge of protective measures across communities (see Table 4.1). Average household scores range between 1.31 in Dublanc, where 51.72% of respondents could name one appropriate action, and 2.43 in Petite Savanne, where 56.76% could name three. Pairwise comparisons further indicate that awareness of protective measures is higher in Petite Savanne and Fond Saint Jean and to some extent in Dubique than in other communities. Conversely, it is lower in Mero and Dublanc, and to a lesser extent in Colihaut. This partition in fact corresponds to the separation of communities in two districts: average household scores for awareness of protective measures prove overall higher in the three Southern communities than in the three Western ones.

4.1.2. Knowledge of What to Bring to a Shelter When Evacuating

The second dimension considered pertains to households' ability to name three appropriate items to take to a shelter when evacuating. Table 4.2 indicates that the most commonly named items are non-perishable food (87.15%) and water (58.10%), followed by a change of clothes (45.81%), light (43.58%) and important documents and/or money (37.99%). These items are the five most frequent answers in all communities with the exception of Dubique, where 35% of respondents indicated they would bring sleeping gear (i.e., blankets and/or pillows). Overall, the breakdown of answers is fairly stable

Table 4.2. Frequency table and means and standard deviations for knowledge of what to take to a shelter

	Dublanc		Colihaut		Mero		Dubique		Fond Saint Jean		Petite Savanne		All		ANOVA
Items	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Food	24	82.76	48	85.71	12	66.67	19	95.00	18	94.74	35	94.59	156	87.15	
Water	12	41.38	27	48.21	10	55.56	11	55.00	12	63.16	32	86.49	104	58.10	
Clothes	18	62.07	28	50.00	14	77.78	5	25.00	8	42.11	9	24.32	82	45.81	
Light	8	27.59	19	33.93	8	44.44	14	70.00	11	57.89	18	48.65	78	43.58	
Documents	14	48.28	23	41.07	8	44.44	5	25.00	6	31.58	12	32.43	68	37.99	
Sleeping gear	3	10.34	16	28.57	1	5.56	7	35.00	1	5.26	1	2.70	29	16.20	
Medication	2	6.90	5	8.93	1	5.56	4	20.00	5	26.32	8	21.62	25	13.97	
Radio	0	0	9	16.07	2	11.11	5	25.00	3	15.79	3	8.11	22	12.29	
Toiletries	1	3.45	0	0	0	0	0	0	0	0	0	0	1	0.56	
Number of correct answers															
Zero	1	3.45	0	0	0	0	0	0	0	0	0	0	1	0.56	
One	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Two	4	13.79	11	19.64	5	27.78	1	5.00	0	0	1	2.70	22	12.29	
Three	24	82.76	45	80.36	13	72.22	19	95.00	19	100	36	97.30	156	87.15	
Mean number of correct answers per household (SD)	2.76 (0.62)		2.80 (0.40)		2.72 (0.45)		2.95 (0.22)		3.00 (0.00)		2.97 (0.16)		2.85 (0.40)		2.51**
n	29		56		18		20		19		37		179		

*p<0.1 **p<0.05 ***p<0.01

across communities.

Out of a maximum possible score of 3, the average household score for all communities is 2.85, which reflects high levels of awareness of what to bring to a shelter when evacuating. The large majority of households (87.15%) accurately named three items and everyone, with the exception of one household, was able to give at least two correct answers. Average household scores are high across villages. They range between 2.72 in Mero and 3 in Fond Saint Jean. ANOVA indicates variations across communities and pairwise comparisons reveal a pattern similar to the one observed for awareness of protective measures. Knowledge of shelter items is higher in Fond Saint Jean and Petite Savanne, and to some extent in Dubique, than in the three Western communities of Dublanc, Colihaut and Mero.

4.1.3. Familiarity with the Responsibilities of Local Disaster Committees

The third aspect considered relates to households' familiarity with local response agencies through their ability to name three responsibilities of community disaster committees. As shown in Table 4.3, the responsibilities identified by respondents fall into ten categories. Shelter management and evacuation (including the transportation and care of elderly people) are in particular well-known (by 35.75% and 34.08% of respondents respectively) but other tasks go relatively unnoticed, both globally and individually in each community. Furthermore, residents are totally unaware of other responsibilities such as hazard mapping, social surveys to identify vulnerable persons and preparing a communication deployment plan. This is somehow surprising since hazard mapping, for instance, should involve discussions with residents about past disasters in the community and about vulnerable areas. It seems, overall, that residents tend to be

Table 4.3. Frequency table and means and standard deviations for familiarity with the responsibilities of local disaster committees

	Dublanc		Colihaut		Mero		Dubique		Fond Saint Jean		Petite Savanne		All		ANOVA
Items	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Shelter management	9	31.03	18	32.14	5	27.78	6	30.00	6	31.58	20	54.05	64	35.75	
Evacuation	12	41.38	11	19.64	5	27.78	7	35.00	7	36.84	19	51.35	61	34.08	
Public information and education	5	17.24	2	3.57	3	16.67	2	10.00	2	10.53	7	18.92	21	11.73	
Alert	0	0	3	5.36	1	5.56	2	10.00	1	5.26	3	8.11	10	5.59	
Clean-up	2	6.90	1	1.79	0	0	0	0	1	5.26	6	16.22	10	5.59	
Relief distribution	1	3.45	2	3.57	1	5.56	1	5.00	2	10.53	2	5.41	9	5.03	
First-aid	0	0	3	5.36	0	0	1	5.00	0	0	1	8.11	7	3.91	
Mitigation	0	0	0	0	0	0	1	5.00	0	0	0	0	1	0.56	
Damage and needs assessment	0	0	0	0	0	0	0	0	1	5.26	0	0	1	0.56	
Preparing a disaster plan	0	0	1	1.79	0	0	0	0	0	0	0	0	1	0.56	
Number of correct answers															
Zero	10	34.48	32	57.14	10	55.56	11	55.00	10	52.63	11	29.73	84	46.93	
One	10	34.48	11	19.64	3	16.67	1	5.00	2	10.53	3	8.11	30	16.76	
Two	8	27.59	9	16.07	3	16.67	5	25.00	3	15.79	12	32.43	40	22.35	
Three	1	3.45	4	7.14	2	11.11	3	15.00	4	21.05	11	29.73	25	13.97	
Mean number of correct answers per household (SD)	1.00 (0.87)		0.73 (0.97)		0.83 (1.07)		1.00 (1.18)		1.05 (1.23)		1.62 (1.19)		1.03 (1.12)		3.28***
n	29		56		18		20		19		37		179		

*p<0.1 **p<0.05 ***p<0.01

more aware of the responsibilities that may directly affect their welfare or survival and less so of other responsibilities.

Overall, awareness of community preparedness arrangements is fairly low with an average score for all communities of 1.03 out of a possible 3. Almost half of respondents (46.93%) were unable to name any actual responsibility of disaster committees and only 13.97% were able to name three. Community scores range between 0.73 in Colihaut and 1.62 in Petite Savanne. Petite Savanne is the only community that stands out with an average household score significantly higher than in any other community. Indeed, 62.16% of residents were able to accurately name at least two disaster committee responsibilities, while no more than 40% of residents could name more than one in any of the other communities.

4.1.4. Summary of Variations in Household Preparedness

Household knowledge of appropriate protective measures, of what to take to a shelter and of the responsibilities of local disaster committees are all significantly and positively correlated[31]. Yet households are more knowledgeable about some aspects of preparedness than others. Awareness of what to bring to a shelter is consistently high, while familiarity with the responsibilities of disaster committees is relatively limited. Knowledge of protective measures stands somewhere in between.

Moreover, household awareness of what to do in a disaster is not evenly distributed across communities for any of three aspects of preparedness considered. Although variations across communities follow a more distinctive pattern for some

[31] The correlations for each pair of variables are all positive and significant at the 0.01 level. The correlation coefficients for protective measures and shelter kit contents, protective measures and disaster committee responsibilities and shelter kit contents and disaster committee responsibilities are 0.21, 0.39 and 0.26 respectively.

outcomes than others, average household scores are generally higher in Petite Savanne and Fond Saint Jean, and to some extent in Dubique, than in other communities, and lower in Dublanc and Mero. The next sections examine how the factors postulated in the conceptual framework presented in Chapter 2 can help us understand what is causing these variations.

4.2. Distribution of the Variables Hypothesized to Influence Household Preparedness

4.2.1. Relational Social Capital

Relational social capital is one of the main factors hypothesized to influence household preparedness. Three aspects of network resources and structure are considered and measured using Position Generator data: resource composition, resource diversity and kinship composition.

The distribution of initial responses[32] to the Position Generator is shown in Table 4.4. Averaged over the 14 occupations, about 63% of respondents know at least one person in this occupation through any relationship. The occupations accessed by the most respondents are fisher/farmer (99.44%), teacher (97.75%), nurse (95.48%) and policeman (92.70%). The least popular occupations are bank manager (15.17%) and Permanent Secretary in government departments (26.40%). There is no relation between the occupational status attached to the positions and their overall popularity[33] ($r=-0.27$; $p=0.34$).

[32] The report of results regarding the distribution of initial responses is modeled after Van der Gaag et al (2004).

[33] Likewise, there is no relation between the prestige of the occupations and their overall popularity ($r=-0.15$; $p=0.63$).

Table 4.4. Position generator items, associated ISEI and SIOPS values and item responses (n=179)

Do you know anyone who is[34]	Score		% yes	Relationship if yes (%)		
	SIOPS[35]	ISEI[36]		Acq.	Friend	Relative
House help	22	16	57.30	27.45	40.20	32.35
Fisher/farmer	23	16	99.44	1.12	14.61	84.27
Office cleaner	19	23	60.23	41.51	43.40	15.09
Messenger	22	25	38.64	39.71	41.18	19.12
Nurse	54	43	95.48	16.57	52.66	30.77
Policeman	40	50	92.70	20.61	31.52	47.88
Secretary	45	51	69.10	26.02	37.40	36.59
Police commissioner	60	55	32.39	61.40	26.32	12.28
Teacher	57	66	97.75	12.64	43.10	44.25
School principal	60	67	77.40	31.39	51.09	17.52
Accountant	62	69	46.33	20.73	41.46	37.80
Permanent Secretary	64	77	26.40	29.79	51.06	19.15
Bank manager	60	87	15.17	22.22	62.96	14.81
Medical doctor	78	88	75.98	27.94	49.26	22.79
Average	48	52	63.22	23.55	40.10	36.35

As indicated in Chapter 3, three indicators were derived from answers to the Position Generator. Average accessed status reflects resource composition, extensity (i.e., the number of different accessed positions) pertains to resource diversity and the proportion of positions accessed through relatives is a measure of kinship composition. Table 4.5 summarizes the distribution characteristics of these indicators across communities. Resource composition, resource diversity and kinship composition vary across communities but the extent and pattern of these variations differ.

[34] As a criterion of knowing a person, respondents were asked if they knew someone on a first-name basis in each of the occupations.

[35] Standard International Occupational Prestige Scale (Ganzeboom and Treiman, 1996).

[36] International Socio-Economic Index of Occupational Status (Ganzeboom and Treiman, 1996).

Table 4.5. Means and standard deviations (in parentheses) for relational social capital indicators[37]

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	All	ANOVA
Resource composition	50.18 (5.52)	46.64 (4.76)	51.41 (4.89)	49.12 (4.31)	50.14 (3.29)	50.78 (4.60)	49.27 (5.06)	5.52***
Resource diversity	8.03 (2.71)	9.25 (2.49)	7.61 (2.83)	8.45 (2.91)	8.95 (2.61)	9.30 (2.04)	8.77 (2.61)	2.19*
Kin composition	36.64 (18.74)	25.78 (16.94)	36.07 (18.86)	28.86 (15.80)	46.00 (22.52)	54.32 (21.51)	37.56 (22.04)	11.02***
n	29	56	18	20	19	37	179	

*p<0.1 **p<0.05 ***p<0.01

Pairwise comparisons indicate that the community score for resource composition (i.e., average accessed status) is significantly lower in Colihaut than in all other communities, with the exception of Dubique. Colihaut, however, stands out along with Petite Savanne in terms of resource diversity. Conversely, networks are less diverse in Mero and Dublanc. Finally, the number of positions accessed through relatives is significantly higher in Petite Savanne and Fond Saint Jean than in other communities. In Petite Savanne, in particular, more than half of accessed positions are accessed through relatives. This percentage, on the other hand, is lower in Colihaut, and to some extent in Dubique, than in other communities. This latter result, however, may be explained differently in each community. In Colihaut, about 26% of positions are on average accessed through relatives, which is the lowest percentage. This may partly be due to the fact that many people born in Colihaut live outside the village, sometimes in other parts of Dominica but also in the rest of the Caribbean region or even in the UK, the USA and Canada. In Dubique, however, the situation is different. Dubique is a small village that has long struggled with low levels of literacy and was identified as one of Dominica's

[37] Indicators are based on ISEI (socio-economic status) scores.

poorest villages in 1995. Although the situation has somewhat improved, there are still very few economic opportunities for households. The comparatively lower percentage of positions accessed through relatives may thus in this case not indicate that households have few relatives to count on but that when they do, these relatives tend to occupy similar positions in society.

In summary, there are wide variations in average household scores for resource composition, resource density and kinship composition across communities. All three aspects, however, do not systematically vary hand in hand. In Dublanc and Mero, for instance, average resources in personal networks are high on average. About a third of accessed positions are accessed through relatives, but personal networks are less diverse than in other communities. In Colihaut, on the other hand, personal networks are more diverse but fewer positions are accessed through relatives and the average resources in personal networks are low relative to other communities. In Dubique, the resource composition and the proportion of positions accessed through relatives are fairly limited; yet personal networks remain relatively diverse. Average household scores are comparatively high regarding resource composition, resource diversity and kinship composition, however, in Fond Saint Jean and even more so in Petite Savanne. As pointed out earlier, these two communities are also the ones where households are on average best aware of what to do in a disaster for each of the three aspects of preparedness considered.

4.2.2. Community Social Capital

Community social capital is the second key factor hypothesized to influence household preparedness. The community social capital index measures household access

to community social capital through their perception of the community social capital available in their village. Table 4.6 presents average household scores for community social capital across communities. Wide variations appear across villages. Pairwise comparisons indicate in particular that household access to community social capital is significantly higher in Dublanc and to some extent in Petite Savanne, than in other communities and significantly lower in Mero. Appendix E provides some historical information on the study communities that helps better understand these variations.

Table 4.6. Means and standard deviations for community social capital

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	All	ANOVA
Mean	1.55	0.12	-2.66	-0.41	-0.80	0.66	-0.06	7.64***
(SD)	(3.52)	(2.84)	(2.30)	(2.14)	(1.51)	(1.92)	(2.85)	
n	28	56	18	19	17	34	172	

*p<0.1 **p<0.05 ***p<0.01

It is argued in this study that relational social capital and community social capital are two distinct quantities. Empirical results appear to support this claim. At the household level, perceptions of community social capital are not significantly correlated with any of the three measures of relational social capital[38]. At the community level, there is no clear relation between either resource composition, resource diversity or kinship composition and community social capital. There are, for instance, no significant differences on any of the relational social capital measures between Dublanc and Mero, yet these communities are at the two extremes of the community social capital spectrum. Petite Savanne, on the other hand, scores relatively high in all regards.

[38] The correlations between community social capital and resource composition, resource diversity and kinship composition are 0.03, 0.10 and -0.09 respectively. None of these is significant at the 0.1 level. These results are based on relational social capital indicators derived using ISEI scores. Similar results were obtained with SIOPS scores.

The relationship between community social capital and household preparedness appears dubious at first glance. First and foremost, Dublanc is endowed with high levels of community social capital. Yet households in Dublanc have on average a limited knowledge of how to protect themselves, of what to take to a shelter and to some extent of disaster committee responsibilities relative to other villages. Second, average household scores for knowledge of what to do in a disaster are consistently significantly higher in Petite Savanne and, with the exception of familiarity with disaster committee responsibilities, in Fond Saint Jean than in other communities. While the community score for community social capital is relatively high in Petite Savanne, it is lower in Fond Saint Jean, or at least not significantly higher than in most other communities. Arguably a quantitative measure of community social capital may be appropriate to compare levels of this asset across villages but less useful to determine whether these levels are objectively high, medium or low. Yet the qualitative evidence presented in Appendix E confirms that stocks of community social capital are limited in Fond Saint Jean. In summary, high community social capital does not seem to be systematically associated with household preparedness at the community level. Conversely, low community social capital does not seem to preclude positive outcomes.

4.2.3. Community Preparedness Arrangements: Local Disaster Committees

In addition to social capital, household preparedness may be affected by the effectiveness of local disaster committees. Table 4.7 summarizes the values of the disaster committee effectiveness index presented in Chapter 3 and of the sub-constructs comprising it (disaster planning, current level of activity and long-term level of activity).

Appendix F presents more detailed information about the disaster committees in each community.

Table 4.7. Disaster committee effectiveness index and sub-constructs

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne
Disaster planning	0.78	0.61	0.56	0.56	1.00	0.56
Current level of activity	0.43	0.30	0.13	0.20	1.00	0.60
Long-term level of activity	1.00	1.00	0.13	0.13	0.50	0.13
Disaster committee effectiveness index	2.21	1.91	0.81	0.88	2.50	1.28

There is no clear evidence of a link between the effectiveness of local disaster committees and household preparedness. Disaster preparedness activities in Fond Saint Jean are supervised by the disaster committee in Bagatelle, a larger adjacent community on which Fond Saint Jean is administratively dependent. The disaster committee in Bagatelle/Fond Saint Jean is the most effective of all and has been in place since 2002. Knowledge of what to do in a disaster is also high in Fond Saint Jean, for all three dimensions of preparedness. Even though the disaster committee in Dublanc has also been in place for many years and is reasonably active, the community scores for household preparedness are considerably lower in Dublanc. The presence of a long-standing, organized and active disaster committee thus does not seem sufficient to explain high levels of household preparedness.

At the same time, lower scores on the disaster committee effectiveness index are not systematically associated with lower levels of preparedness. Petite Savanne, Dubique and Mero have the least effective disaster committees, partly because these committees have been dormant for many years and only recently reactivated in 2005. As a result, they are not fully organized (for instance, they have not completed their disaster plans) and do not carry educational activities on a regular basis. Yet households in Petite

Savanne are on average well-aware of protective measures, of what to take to a shelter and of the responsibilities of disaster committees. The influence of disaster committees, therefore, is not evident from these results.

4.2.4. Government Representatives: District Development Officers and Assistants

District Development Officers and Assistants represent another potential source of influence on household preparedness. As indicated in Chapter 3, a dummy variable reflecting household awareness of DDO/DDAs' involvement in disaster preparedness was used to measure this factor. Table 4.8 shows the distribution of this variable across communities. Awareness of DDO/DDAs' involvement in disaster preparedness is not distributed equally across communities. It is significantly higher in Petite Savanne (67.57% of respondents) and lower in Colihaut and Mero (5.36% and 0% of respondents respectively). Community scores are also fairly high and not significantly different from one another in Fond Saint Jean, Dubique and Dublanc.

Table 4.8. Household awareness of District Development Officers and Assistants' involvement in disaster management activities

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	All	ANOVA
Mean	0.35	0.05	0	0.35	0.37	0.68	0.28	15.34***
(SD)	(0.48)	(0.23)	(0)	(0.48)	(0.49)	(0.47)	(0.45)	
n	29	56	18	20	19	37	179	

*p<0.1 **p<0.05 ***p<0.01

This pattern of results provides some support to the hypothesis that DDO/DDAs exert an influence on household preparedness. Indeed, average household preparedness scores are generally higher in the Southern communities (Petite Savanne, Fond Saint Jean and Dublanc). Along with Dublanc, these three communities are the ones where awareness of DDO/DDAs' involvement in disaster preparedness is the highest. In addition to this result, the comparison of DDO/DDAs' action plans, key informant

interviews and results from other questions on DDOs and DDAs in the household survey all support the view that the DDO/DDA pair in the Southern district is more committed to disaster preparedness and also generally works more closely with communities (detailed results supporting this claim are presented in Appendix G). While the DDO and DDA in the Western district conscientiously carry out their basic responsibilities and work with disaster committees, they are generally less engaged in disaster preparedness. This may in turn explain why, while awareness of DDO/DDAs' involvement in disaster preparedness is high in all three Southern communities and in Dublanc, it does not translate into high community scores for household preparedness in Dublanc the way it does in Southern communities.

4.2.5. Contextual Community and Household Variables

The final group of variables considered in the conceptual framework relates to community and household characteristics. In addition to the population size of each community, nine household characteristics are of concern: the gender and age of the household head, religion, the number of school-age children, whether a household regularly consults the print media for news and information, the highest level of education in the household, the occupational category of the breadwinner (more specifically whether the breadwinner is a fisher or farmer), home ownership and income. Table 4.9 presents the distribution of these characteristics across communities.

Table 4.9. Characteristics of communities and survey respondents

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	All	ANOVA or Rao-Scott Chi-square
Population[a]	138	279	115	48	107	185		
Gender								
% female	37.93	39.29	38.89	45.00	42.11	37.84	39.66	0.27
% male	62.07	60.71	61.11	55.00	57.89	62.16	60.34	
Age[b]								
% over 65	17.24	25.45	38.89	30.00	21.05	18.92	24.16	4.50
Religion (%)								
Catholic	89.66	58.93	77.78	70.00	73.68	81.08	73.18	11.53*
Protestant	6.90	28.57	11.11	15.00	21.05	18.92	18.99	7.26
Other or no religion	3.45	12.50	11.11	15.00	5.26	0	7.82	N\A[c]
Number of school-age children								
Mean	1.34	0.82	1.33	0.70	0.95	1.46	1.09	1.75
(SD)	(2.75)	(2.52)	(1.64)	(1.75)	(2.43)	(3.19)	(1.28)	
Regular consultation of print media[d]	44.83	33.93	44.44	50.00	52.63	78.38	49.72	19.01***
Education[e]	72.41	42.86	50.00	40.00	42.11	54.29	50.28	8.13
Fisher or farmer[f]	37.93	28.57	44.44	30.00	15.79	29.73	30.73	5.28
Home ownership	79.31	82.14	88.89	85.00	89.47	89.19	84.90	2.27
Income[g](%)								
Very low income	66.67	46.88	91.67	80.00	77.78	70.27	68.57	12.61***
Low income	23.81	21.88	0	10.00	5.56	16.22	15.00	N\A[c]
Medium or high income	9.52	31.25	8.33	10.00	16.67	13.51	16.43	7.17

Note: n=179

[a] As of the 2001 Census

[b] Because of missing values, n=178.

[c] Because of the zero count for one of the villages, SAS does not provide the Rao-Scott chi-square.

[d] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.

[e] Dummy variable indicating that the highest level of education in the household is secondary or tertiary education. The reference category is no or only primary education. Because of missing values, n=177.

[f] Dummy variable indicating that the breadwinner is a fisher or farmer.

[g] As a percent of respondents for whom income values are available (n=140).

*p<0.1 **p<0.05 ***p<0.01

There are no significant differences across villages for six out of these nine characteristics: gender and age, the number of school-age children, the highest level of education in the household, whether the breadwinner is a fisher or a farmer and home ownership. Elderly people typically are no longer employed and therefore they tend to be more isolated socially. Furthermore, they are generally less able and, according to preliminary interviews, sometimes less willing, to take preventive actions or leave their house when a disaster is imminent. As such, elderly people can be expected to be less prepared. There are, however, no significant differences in the proportion of elderly across villages. Most respondents were male in all communities and between 17.24 and 38.89% of respondents were elderly. The average number of children per household is 1.09 across communities. Many surveyed households (46.93%) had no children and only 5% had 4 children or more. The average percentage of surveyed households with secondary or tertiary education is 50.28%. The occupational category of the breadwinner is primarily of interest in relation to respondents' dependency on the environment for their livelihood. Fishers and farmers are thus distinguished from other categories. In Dominica, a large part of the population has historically been dependent on the banana industry which has repeatedly been severely damaged by storms and hurricanes. Farmers and fishers are thus expected to be more concerned about disasters and more likely to seek and retain information related to preparedness. The proportion of fishers and farmers is not significantly different across communities and averages 30.73%. Finally, households typically own their house (84.90%).

Differences appear across communities with respect to the three remaining variables: religion, regular consultation of the print media for news and information and

income. Religion is very important in Dominica and church groups are common and active. Catholicism is the dominant religion on the island but a non-negligible percentage of surveyed households are Protestants as well. While there are no significant differences in the proportion of Protestant households across communities, the proportion of Catholics is higher in Dublanc and Petite Savanne, and to some extent in Mero, and lower in Colihaut. Three categories of income were created based on the distribution of answers: very low income (less than XCD $11,999 or approximately US $4,450 before taxes), low income (between XCD $12,000 and XCD $17,999, ca. US $4,450-6,700), and medium and high[39] income (XCD $18,000 and higher). Very low income is the dominant category in each village; however, the proportion of households with very low income is lower in Colihaut than in any other village. This finding, though, should be taken cautiously because of the large number of missing values for income, notably in Colihaut.

None of these three variables (religion, consultation of the print media and income), however, shows variations clearly consistent with the pattern of variation observed for community scores for household preparedness. The only exception is that of the proportion of households who regularly consult newspapers for news and information. It is significantly higher in Petite Savanne (78.38%), which is also the community where households are on average the most knowledgeable about disaster committee responsibilities. Residents of Petite Savanne are also aware of protective measures and of what to take to a shelter, but not significantly more so than in all other communities. Consulting newspapers may thus be associated with awareness of what to do in a disaster but not necessarily for all aspects of preparedness.

[39] Medium income is defined as XCD $18,000-35,999 (US $6,700-13,400) and high income as higher than XCD $36,000 (US $13,400). The currency is the Eastern Caribbean Dollar (XCD).

4.3. Conclusion

Average household scores for awareness of what to do in a disaster are significantly different across communities for each of the three dimensions of preparedness considered. Households in Petite Savanne are on average significantly more aware of disaster committee responsibilities than households in other communities. Residents of Petite Savanne and Fond Saint Jean, and to some extent Dubique, stand out with respect to their knowledge of what to take to a shelter. Households in these three Southern communities are also more aware of how to protect themselves and their property if a hurricane was approaching.

Wide variations also appear across communities with respect to the factors that were hypothesized to influence household preparedness in Chapter 2. These variations, however, are not always consistent with those observed in average levels of preparedness. On the basis of community scores, only three factors appear to be possibly related to knowledge of what to do in a disaster: relational social capital, DDO/DDAs and regular consultation of the newspapers for news and information. The potential influence of newspapers, however, is only apparent for one of the three outcomes considered: awareness of disaster committee responsibilities.

In this chapter, we have reviewed average household scores at the community level for the three aspects of preparedness considered in this study and for the variables hypothesized to influence household preparedness in the conceptual framework in Chapter 2. We have further examined the pattern of variation of these variables across communities to detect which factors may indeed influence household preparedness. The following chapter tests the relationships between relational social capital, community

social capital, government representatives, local disaster committees and community and household characteristics and household awareness of what to do in a disaster at the household level for each of the three aspects of preparedness using logistic regression modeling.

CHAPTER 5

Predicting Household Preparedness

This chapter presents the results of the logistic regression models used to assess the relationship between household disaster preparedness and relational and community social capital, government representatives, local disaster committees and household and community controls. The purpose is to test the hypotheses laid out in Chapter 2 regarding the nature and significance of the direct effects of relational and community social capital to answer the first research question. The direct effects of relational and community social capital are also compared to those of government representatives, local disaster committees and household and community contextual factors to answer the second research question and determine how influential relational and community social capital are relative to other factors[40].

Following the approach presented in Chapter 3, this chapter provides the results of the analyses for three aspects of household preparedness: 1) awareness of protective measures; 2) knowledge of what to take to a shelter when evacuating; and 3) familiarity with the responsibilities of local disaster committees. The estimates of the effects of each

[40] Another option would be to compare the total effects of these variables. Based on the conceptual framework, the direct effects of relational and community social capital, DDO/DDAs and local disaster committees are also their total effects. The total effects of community and household contextual factors can be obtained from the base models presented in Appendix J. The results based on the comparison of direct effects and those based on total effects are very similar and only direct effects are discussed here. More details are provided in Appendix J.

predictor on the dependent variable are provided, along with odds ratio estimates. A significance level of 0.1 was used to assess the significance of a variable's effect. For sample size reasons, only the household controls that achieved significance in the base model containing only the set of household and community contextual factors were retained for the analysis. The overall fit of the model is provided in the lower left corner of each table with the R^2 Nagelkerke[41] value, Somers' D and τ_P. A discussion of how the models address each research question is presented for each outcome. A review of significant predictors across models concludes this chapter.

5.1. Awareness of Protective Measures

5.1.1. Overview of Results

The first dimension of preparedness considered is household awareness of appropriate protective actions to take around their home if a hurricane was approaching. The ordered logistic regression results are presented in Table 5.1. The model shows the direct effects of predictors on household awareness of protective measures. The evidence indicates that community social capital does not significantly affect awareness of protective measures, but relational social capital, more specifically through resource diversity and kinship composition, has a significant, positive direct effect. The effectiveness of local disaster committees and household awareness of DDO/DDAs' involvement in disaster preparedness are nonsignificant. Finally, not one of the household and community controls is significant in the final model.

According to the R^2_N value, the model explains 88% of the variation in the dependent variable. Somers' D for this analysis is 0.52, which indicates moderate to

[41] R^2_N is a pseudo R-square that attempts to quantify the proportion of explained 'variation' in the logistic regression model.

strong concordance for the ordinal direction of the predicted probabilities among pairs of households, i.e., there is strong concordance between observed and predicted awareness of protective measures. τ_P is 0.27, indicating that after adjustment for the base rate classification error is reduced by approximately 27% using the fitted model. Together these measures support the reasonableness of the model.

Table 5.1. Ordered logistic regression analysis results for awareness of protective measures

Predictor	Estimate of Effect (S.E.)	Odds Ratio Estimates	Standardized Estimates
Intercept 3	-2.88 (1.77)		
Intercept 2	-1.50 (1.77)		
Intercept 1	0.80 (1.72)		
Village-level dummy variables[a]			
Dummy 1	-0.16 (0.22)	0.86	-0.17
Dummy 2	0.51*** (0.20)	1.67	0.65
Dummy 3	0.06 (0.18)	1.06	0.07
Relational social capital variables			
Resource composition	-0.005 (0.03)	1.00	-0.03
Resource diversity	0.28*** (0.07)	1.32	0.90
Kinship composition	0.02** (0.008)	1.02	0.51
Community social capital	0.07 (0.06)	1.07	0.24
Disaster committee effectiveness index	-0.33 (0.31)	0.72	-0.23
Awareness of DDO/DDA's involvement in disaster preparedness	0.33 (0.47)	1.38	0.19
Community controls			
Population	-0.003 (0.002)	1.00	-0.30
Household controls			
Age[b]	-0.53 (0.42)	0.60	-0.28
n	169		
R^2_N	0.88		
Somers'D	0.52		
τ_P	0.27		

Note: Numbers in parentheses are standard errors.
[a] The three dummy variables were added to population and the disaster committee effectiveness index to form a set of five village-level variables and account for all the in-between village variance (see Chapter 3).
[b] Dummy variable indicating that the respondent is over 65 years old.
*p<0.1 **p<0.05 ***p<0.01

5.1.2. Social Capital and Awareness of Protective Measures

Based on these results, household awareness of protective measures is significantly driven by relational social capital. Three measures of relational social capital are considered: resource composition, resource diversity and kinship composition. While resource composition does not make a difference for this particular outcome, resource diversity and kinship composition have a significant, positive direct effect on awareness of protective measures. Resource diversity is measured by extensity, the number of different positions accessed. Access to one more social position increases the odds of a household being able to name one more protective action 1.3 times under the assumption of proportional odds, i.e., regardless of the numbers of measures already cited. Kinship composition reflects the proportion of these positions accessed through relatives. The direct effect of kinship composition is more limited, as ten more social positions would need to be accessed through relatives to increase the odds of naming one more protective measure 1.2 times.

Both kinship composition and resource diversity are independent of the scores attached to each position. Resource composition measures average resources on the basis of the occupations of network members and is nonsignificant. Contacts in higher-ranked positions, therefore, are no more valuable informants or discussants than people in positions of lesser status. What matters instead is the diversity of discussion partners and one's relation to them. Having diverse discussion partners is useful, maybe because it increases the diversity and richness of the information obtained and because hearing concurrent information from different sources contributes to reinforcing its personal relevance. Although the direct effect of kinship composition is limited, kin ties are

valuable. Kin ties are expected to be stronger than ties to friends and acquaintances and relatives may thus have a greater influence on opinions and attitudes. Both the extensity and strength of social ties are important, therefore, but which specific positions respondents have access to does not matter.

Contrary to what was hypothesized in Chapter 2, community social capital does not enhance awareness of protective measures. This may have to do with the fact that the protective actions people take around their home are a personal responsibility rather than a collective one. They are carried out individually and seek to protect personal property and household members. As such, they do not pertain directly to the survival of community members as a group or to their collective assets and fellow residents may thus not be valuable discussion partners. Nonetheless, where social capital is high, residents could be expected to share a common sense of attachment to place and imperative for safety that would motivate them to seek and discuss relevant information or increase their likelihood to remember what they hear and/or to behave proactively. Yet this does not appear to be the case, maybe because under conditions of relative normalcy, it is hard for residents to visualize in imagination the consequences disasters may have on them and others or to measure the need to behave proactively. A perceived threat, on the other hand, may provide a focal point to bring people together and heighten feelings of concern and thus stimulate preparedness information communication and the learning of simple rules for the protection of lives and property.

5.1.3. Other Findings on Awareness of Protective Measures

Among the other potential influences on awareness of protective measures considered, neither the effectiveness of local disaster committees, household awareness

of DDO/DDAs' involvement in disaster preparedness or any of the household controls has a significant direct effect. These findings are in themselves interesting and are discussed next.

5.1.3.1. Disaster Committees and DDO/DDAs

Both disaster committees and DDO/DDAs are together in charge of educating households on the hazards they face and on how to protect lives and property. Neither the index measuring the effectiveness of local disaster committees nor household awareness of DDO/DDAs' involvement in disaster preparedness, however, is significant. This finding is somewhat surprising and may indicate one of two things: 1) that local disaster committees and/or DDO/DDAs essentially emphasize other aspects of disaster preparedness (e.g. shelter management as some key informant interviews seemed to suggest) and comparatively fail to disseminate information on protective measures; or 2) that local disaster committees and/or DDO/DDAs generally have a limited influence on households, for instance because they lack the means to conduct regular educational efforts or because they use their resources inefficiently. Results pertaining to the two other preparedness outcomes considered in this study may provide additional insights on the exact nature of the problem.

5.1.3.2. Household Characteristics

Age is the only household characteristic that achieved significance in the base model containing only the full set of household and community contextual factors (see Appendix I). Age (i.e., being over 65 years old), however, has no significant direct effect on awareness of protective measures[42].

[42] In other words, age (i.e., being over 65) has a negative, significant total effect on awareness of protective measures but a nonsignificant direct effect (see Appendix I and J).

Since the socio-economic correlates of household preparedness have regularly been emphasized in the disaster literature, this result is somewhat surprising. A potential explanation comes from variations in study context. As mentioned in Chapter 1, studies of household preparedness in developing countries and under conditions of relative normalcy (i.e., in the absence of perceived threat, recent disaster history or stepped-up educational efforts) are rare. It is thus possible that socio-economic characteristics are less influential in developing countries and/or that they primarily determine the propensity or ability to act but not necessarily knowledge of what to do in an emergency.

5.1.4. Summary of Findings for Awareness of Protective Measures

Ordered logistic regression analysis results provide evidence to answer the two research questions posed in Chapter 1 for the first aspect of preparedness considered. In answer to the first question, the results confirm that social capital has a direct effect on awareness of protective measures. Both forms of social capital are not relevant however: only relational social capital matters. Furthermore, as was hypothesized in Chapter 2, resource composition (i.e., average resources) does not make a difference. Resource diversity and kinship composition, however, are influential: both the extensity (i.e., access to different social positions) and strength (i.e., accessing social positions through relatives) of social ties are valuable for awareness of protective measures.

Regarding the second research question, resource diversity and kinship composition are the only variables that have a significant direct effect on household awareness of protective measures of all the factors initially considered in the conceptual framework[43]. There is some uncertainty, however, concerning the extent to which local

[43] Regarding total effects, three variables have a significant total effect on awareness of protective measures: resource diversity, kinship composition and age (see Appendix J). The comparison of

disaster committees and/or DDO/DDAs emphasize protective measures in their educational efforts. Evidence on other aspects of preparedness may provide more insight on the relative influence of these institutional actors and of social capital.

5.2. Knowledge of What to Take to a Shelter When Evacuating

5.2.1. Overview of Results

The second outcome of interest is household knowledge of what to take to a shelter when evacuating. As indicated in Chapter 4, levels of knowledge are consistently high regarding this aspect of preparedness. Yet variation remains as nearly 88% of surveyed households were able to name three appropriate items and the remaining 12% named two. The binary logistic results are presented in Table 5.2. Relational social capital once again has a positive direct effect on levels of knowledge but this time only through resource diversity. Community social capital is again not significant. The effectiveness of local disaster committees and household awareness of DDO/DDAs' involvement in disaster preparedness are both positively associated with knowledge of what to take to a shelter. Only one household characteristic has a significant direct effect: the gender of the respondent. Finally, population size is negatively associated with knowledge of what to take to a shelter.

The model explains 65% of the variation in the dependent variable. The value of Somers'D is 0.67, which is moderately strong, and τ_P indicates a 43% reduction in classification error from using the fitted model. Overall, the model is reasonable.

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standardized coefficients indicates that the influence of resource diversity remains the strongest, followed by age and kinship composition.

Table 5.2. Binary logistic regression analysis results for knowledge of what to take to a shelter when evacuating

Predictor	Estimate of Effect (S.E.)	Odds Ratio Estimates	Standardized Estimates
Intercept	0.70 (3.26)		
Village-level dummy variables[a]			
Dummy 1	-1.18*** (0.41)	0.31	-1.45
Dummy 2	-3.32*** (0.27)	0.04	-4.03
Dummy 3	0.98*** (0.33)	2.67	1.05
Relational social capital variables			
Resource composition	-0.02 (0.05)	0.98	-0.14
Resource diversity	0.27** (0.12)	1.32	0.89
Kinship composition	0.006 (0.02)	1.01	0.18
Community social capital	0.14 (0.11)	1.15	0.49
Disaster committee effectiveness index	*5.61*** (0.50)*	*273.24*	*3.93*
Awareness of DDO/DDA's involvement in disaster preparedness	1.45* (0.86)	4.26	0.82
Community controls			
Population	*-0.04 (0.003)***	*0.96*	-3.76
Household controls			
Gender[b]	-1.37** (0.64)	0.26	-0.84
Fisher or farmer[c]	-0.62 (0.69)	0.54	-0.36
n	170		
R^2_N	0.65		
Somers'D	0.67		
τ_P	0.43		

Note: Numbers in parentheses are standard errors.
Italicized estimates are not reliable because of numerical problems.
[a] The three dummy variables were added to population and the disaster committee effectiveness index to form a set of five village-level variables and account for all the in-between village variance (see Chapter 3).
[b] Dummy variable indicating that the respondent is a female.
[c] Dummy variable indicating that the breadwinner is a fisher or farmer.
*p<0.1 **p<0.05 ***p<0.01

5.2.2. Social Capital and Knowledge of What to Take to a Shelter

The findings on social capital are similar to those for awareness of protective measures in the sense that only relational social capital matters. Of the three measures considered for relational social capital, only resource diversity (i.e., the number of accessed positions) has a significant direct effect. Access to one more social position

increases the odds of naming three items rather than two approximately 1.3 times. Resource composition and kinship composition are not relevant. Neither average accessed status nor the type of relationship through which positions are accessed, therefore, appears to make a difference.

Community social capital is once again not significant. Even though shelters are public community buildings, the community at large is not involved in their identification and maintenance. Shelters are designated by the local disaster committee in conjunction with the DDO/DDA and approved by engineers from the Ministry of Public Works and Public Utilities. Their management is the responsibility of a volunteer shelter warden and assistant who are members of the disaster committee. Moreover, whether to evacuate to a shelter or not is ultimately a personal decision. Because shelters are not managed collectively in practice and because evacuating is not a collective decision, community social capital may not be an appropriate channel to spread and reinforce information regarding shelter items. Regarding the hypothesis that community social capital would provide a greater sense of attachment to place and others and thereby increase the relevance of preparedness-related information and/or promote a culture of prevention that would encourage proactive behavior, the explanation proposed earlier for awareness of protective measures may still be valid. In the absence of perceived imminent threat, it is possible that these feelings of dependency and concern and this culture of confronting problems do not manifest themselves.

5.2.3. Other Influences on Knowledge of What to Take to a Shelter

Four other factors influence knowledge of what to take to a shelter: the effectiveness of local disaster committees, awareness of DDO/DDAs' involvement in disaster preparedness, population size, and the gender of the respondent.

5.2.3.1. Influence of DDO/DDAs and Local Disaster Committees

Based on the results, both government representatives (DDO/DDAs) and local disaster committees have a significant, positive direct effect on household knowledge of what to take to a shelter. Household awareness of DDO/DDAs' involvement in disaster preparedness increases the likelihood that they will name three appropriate items rather than two approximately 4.3 times. The odds of being able to name three appropriate items rather than two are also higher for households living in communities with comparatively more effective disaster committees.

Unfortunately it is not possible to obtain a precise estimate of the index's effect because of a zero count for the observation of "failure" (i.e., two items) within the effectiveness index category[44] for Fond Saint Jean. In other words, all households in Fond Saint Jean were able to name three appropriate items to take to a shelter, which results in a very high estimated odds ratio[45]. While uncertainty thus remains about the

[44] A different value of the disaster committee effectiveness index was obtained for each community.

[45] Zero cell count occurs when the dependent variable is invariant for one or more values of an independent variable. This is typically not a problem for continuous or ordinal variables because the model assumes a certain pattern to the relationship between the outcome and the predictor and uses it to fill in the blanks. For categorical variables, however, the pattern cannot be assumed and the model essentially tries to estimate a zero (if the zero count occurs for success) or infinite (if the zero count occurs for failure) odds ratio so that the logit is either infinitely small or large (Menard, 1995). While the effectiveness index was treated as a continuous variable, problems occur because it is a community-level variable and each value of the index is repeated for an entire group of cases. There are several ways to deal with a zero cell count: 1) accepting the uncertainty about the values of the coefficient; 2) recoding the independent variable to eliminate the zero count; or 3) adding a constant to each cell to eliminate zero cells (Menard, 1995). The second option was rejected because there was no obvious rationale to group several committees together

magnitude of the effect of local disaster committees, it is nonetheless clear that disaster committees have a positive influence on household knowledge of what to bring to a shelter.

5.2.3.2. Household and Community Characteristics

In addition to resource diversity, the effectiveness of local disaster committees and awareness of DDO/DDAs' involvement in disaster preparedness, two other variables have a significant direct effect on knowledge of what to bring to a shelter: population size and the gender of the respondent. Because of numerical problems, it is here again impossible to obtain a precise estimate of the effect of population size[46]. Yet the results indicate that households in smaller communities have higher odds of naming three items rather than two.

Two household characteristics achieved significance in the base models containing the full set of household and community contextual factors: gender (i.e., being a female) and whether the breadwinner is a fisher or a farmer (see Appendix I). Of these two variables, only gender has a significant direct effect on knowledge of what to take to a shelter[47]. Female respondents were almost four times less likely than men to give three appropriate answers rather than two. Interviewers were asked to interview the head of the household and this result thus seems to suggest that female-headed households are comparatively less aware of what to take to a shelter. This finding should be interpreted

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without losing important information. The third option was eliminated because it may not be adequate for complex analyses (Menard, 1995). The first option was thus selected. It is acceptable to assess the overall relationship between a set of predictors and a dependent variable but does not allow estimating the effects of the variable with a zero count (Menard, 1995).

[46] Both population size and disaster committee effectiveness are community-level variables and the problem is the same as was described above for disaster committee effectiveness.

[47] Likewise, only gender has a significant, positive total effect on knowledge of what to take to a shelter.

cautiously, however, as there is some doubt that interviewers systematically followed this recommendation. They may have interviewed an adult female in some cases when the (male) head of the household was repeatedly away from home. Nevertheless, this suggests that male respondents were generally more aware than female respondents of what to take to a shelter.

5.2.4. Summary of Findings for Knowledge of What to Take to a Shelter

Overall, knowledge of what to take to a shelter is high. Nonetheless, differences appear across households and logistic regression results provide evidence to tie these variations to the two research questions posed in Chapter 1. As for awareness of protective measures, social capital has a significant, positive direct effect but only in its relational form. Furthermore, only resource diversity matters and positively affects knowledge of shelter items through the extensity of personal networks. Community social capital is not relevant.

In addition to resource diversity, the effectiveness of local disaster committees, awareness of DDO/DDAs' involvement in disaster preparedness, population size and the gender of the respondent all have significant direct effects on knowledge of shelter items. Because of numerical problems, however, it is difficult to precisely estimate the effects of local disaster committees and population size and thus to answer the second research question. Among the influences that can be more accurately assessed (resource diversity, awareness of DDO/DDAs' involvement in disaster preparedness and gender), resource diversity is slightly more influential[48] (i.e., it has the strongest direct effect).

[48] The results obtained by comparing the total effects of these variables are similar.

5.3. Familiarity with Disaster Committee Responsibilities

5.3.1. Overview of Results

The final aspect of preparedness considered is familiarity with the responsibilities of disaster committees. Table 5.3 shows the ordered logistic regression results. Social capital is once again influential, but the observed pattern of effect is different from the one observed for the previous two outcomes. Relational social capital once again has a significant, positive direct effect through resource diversity. This time, however, community social capital is also highly significant and has a positive direct effect. The effectiveness of local disaster committees makes a difference, but contrary to what could have been expected, it is negatively related to households' ability to identify disaster committee responsibilities. Household awareness of DDO/DDAs' involvement in disaster preparedness is irrelevant. Finally, four household characteristics have significant direct effects. Religion (being a Catholic or Protestant) and regularly consulting the print media increase the odds of being aware of disaster committee responsibilities. The breadwinner being a fisher or farmer and having medium or high income, on the other hand, are negatively associated with this outcome.

The model evaluation statistics globally support the reasonableness of the model. The model explains 99% of the variation in the dependent variable and Somers' D is moderately strong with a value of 0.65. Finally, τ_p indicates that the model yields better predictions than would be expected by chance with a 37% reduction in classification error.

Table 5.3. Ordered logistic regression analysis results for familiarity with disaster committee responsibilities

Predictor	Estimate of Effect (S.E.)	Odds Ratio Estimates	Standardized Estimates
Intercept 3	-4.00 (3.39)		
Intercept 2	-2.20 (3.40)		
Intercept 1	-0.82 (3.43)		
Village-level dummy variables[a]			
Dummy 1	0.33 (0.33)	1.40	0.40
Dummy 2	-0.26 (0.26)	0.77	-0.31
Dummy 3	0.08 (0.24)	1.08	0.10
Relational social capital variables			
Resource composition	-0.01 (0.06)	0.99	-0.09
Resource diversity	0.22* (0.11)	1.25	0.86
Kinship composition	0.001 (0.01)	1.00	0.04
Community social capital	0.31*** (0.09)	1.37	1.23
Disaster committee effectiveness index	-1.03*** (0.38)	0.36	-0.82
Awareness of DDO/DDA's involvement in disaster preparedness	0.27 (0.58)	1.31	0.18
Community controls			
Population	-0.004 (0.003)	1.00	-0.42
Household controls			
Catholic[b]	2.93*** (1.08)	18.64	1.84
Protestant[b]	3.50*** (1.10)	32.96	1.85
Regular consultation of print media[c]	1.41*** (0.52)	4.12	1.01
Fisher or farmer[d]	-1.36** (0.53)	0.26	-0.88
Very low income[e]	*-1.06 (0.65)*	*0.35*	*-0.71*
Medium or high income[e]	*-1.64** (0.75)*	*0.20*	*-0.88*
n	131		
R^2_N	0.99		
Somers'D	0.65		
τ_P	0.37		

Note: Numbers in parentheses are standard errors. Italicized estimates may not be reliable.
[a] The three dummy variables were added to form a set of five village-level variables and account for all the in-between village variance.
[b] Dummy variable: the reference category is other or no religion.
[c] Dummy variable indicating that the respondent consults newspapers at least once a month.
[d] Dummy variable indicating that the breadwinner is a fisher or farmer.
[e] Dummy variable: the reference category is low income (see Chapter 4).
*p<0.1 **p<0.05 ***p<0.01

5.3.2. Social Capital and Familiarity with Disaster Committee Responsibilities

Both relational and community social capital have significant direct effects on familiarity with disaster committee responsibilities. As for the other two aspects of preparedness considered earlier, resource diversity has a significant, positive direct effect. Access to one more social position increases the odds of being able to name one additional responsibility 1.2 times regardless of the number of responsibilities already cited. Neither resource composition nor kinship composition matters.

As opposed to the results for the other two outcomes, community social capital is also highly significant this time. Household access to community social capital increases the odds of their being able to name an additional responsibility. While the magnitude of this effect is difficult to interpret, its standardized value is fairly large compared to other significant direct effects, indicating that community social capital plays an important role in explaining variations in levels of familiarity with disaster committee responsibilities across households.

While the pattern of effects for social capital was overall similar for awareness of protective measures and knowledge of shelter items (i.e., only relational social capital matters), it is markedly different this time. Three factors may help explain why community social capital has become relevant. First, disaster committees are tied to the community, as is community social capital. Conversely, protective measures and the decision to evacuate to a shelter are ultimately more personal and pertain to individual decisions and responsibilities. It may therefore be more natural to discuss the activities and responsibilities of disaster committees with other residents than to talk about other aspects of preparedness with them. Second, disaster committees are public goods in the

sense that once they are set up, the benefits accrued from their activities are non-rival and non-excludable. Since community social capital is traditionally linked to collective action and the provision of public goods, there is some logic to the fact that community social capital would be put into play to disseminate and/or reinforce information pertaining to disaster committee responsibilities. Third, the lack of focal point to mobilize the feelings of inter-dependency and concern associated with community social capital was offered as an explanation for the lack of significance of community social capital for the first two outcomes. Community social capital may still be associated with a greater sense of attachment to place and others and foster a culture of prevention but in the absence of imminent threats or of a recent disaster history, these feelings do not translate into higher levels of awareness of what to do in an emergency. This may be the case for protective measures and shelter items, as the two scenarios of having to protect one's property or to evacuate can seem remote and unlikely under conditions of relative normalcy. Disaster committees, on the other hand, are tangible as they are already in place. As such, they may provide a catalyst to mobilize feelings of attachment and concern and foster discussions on disaster committees and the learning of their responsibilities.

5.3.3. Influence of DDO/DDAs and Local Disaster Committees

Awareness of DDO/DDAs' involvement in disaster preparedness is nonsignificant. DDO/DDAs work with disaster committees. Yet in spite of the connection between DDO/DDAs and disaster committees, household awareness of DDO/DDAs' involvement in disaster preparedness does not appear to bring greater attention to the specific responsibilities of disaster committees. The effectiveness of local

disaster committees, on the other hand, is significant. Yet surprisingly the odds of being able to name an additional responsibility are lower in those communities where disaster committees are more effective.

Recent disaster committees are also the least effective (i.e., with the lowest values on the effectiveness index). It is possible that the creation and subsequent organization of activities of the three recent disaster committees have brought attention to what their responsibilities are, even though these committees were not yet fully operational at the time the survey was conducted. This attention may decrease over time, particularly if disaster committees are not called upon to act in the absence of disaster events. Disaster committees may progressively become perceived as routine institutions. Residents may be fully aware of their existence but unclear as to their specific responsibilities. All in all, however, these results tell us disaster committees fail at informing residents of what their responsibilities are. This may be because local disaster committees essentially emphasize some aspects of disaster preparedness over others (e.g., shelter management as some key informant interviews and the results presented in Chapter 4 and above seem to suggest). This is worrisome because residents need to be aware of what disaster committees do to receive assistance when they need it and to contribute efficiently to community disaster response and recovery.

5.3.4. Relevant Household Characteristics

Four household characteristics achieved significance in the base model with the full set of household and community contextual characteristics: religion (i.e., being Catholic or being Protestant as opposed to having another or no religion), regular attention to the print media, whether the breadwinner is a fisher or farmer and income

(having very low income or medium or high income as opposed to low income) (see Appendix I). These four characteristics have a significant direct effect on familiarity with disaster committee responsibilities.

Religion can be thought of as a deterrent for protective behavior, a fact that was confirmed by interviews conducted during the reconnaissance trip. A number of religious persons referred to disasters as God's will and expressed some doubts towards the utility of doing anything "if their time had come". This attitude may conceivably extend to interest in and therefore awareness of community preparedness arrangements. The reverse, however, appears to be true as both Catholicism and Protestantism have a strong significant, positive effect on familiarity with disaster committee responsibilities. Catholics have odds approximately 19 times higher than those who are neither Catholic nor Protestant to be able to name an additional responsibility of disaster committees. The odds for Protestants are about 33 times higher in reference to this same group. The influence of religion may essentially be due to the fact that church is an important forum of socialization and that disaster committees also make announcements at church. Church attendees are therefore exposed to this information, and consequently may be more aware of disaster committees' actions.

Newspapers contain inserts with information on preparedness arrangements in communities and are thus logically found to be an important source of information. Households who regularly consult newspapers for news and information are indeed 5 times more likely to be able to name an additional responsibility of disaster committees.

Whether the breadwinner is a fisher or a farmer, on the other hand, has a highly significant, negative effect on awareness of disaster committee responsibilities.

Households in which the breadwinner is a fisher or farmer have odds approximately 4 times lower than others to be able to name an additional responsibility of disaster committees. Fishers and farmers are highly dependent on the environment for their livelihood and could thus be expected to be more concerned about natural disasters and therefore more likely to seek, discuss and remember information related to these events. Yet fishing or farming goes against awareness of disaster committee responsibilities. Indeed, as mentioned in Chapter 4, fishers and farmers spend considerable time at sea or in the fields, which in most of the study communities are often located quite far away from the village itself. As a result, fishers and farmers spend less time in their community and are less likely to follow on community affairs or to take part in community activities. Their work, in fact, can keep them quite isolated from community life and therefore may make them less likely to be aware of disaster committees and their activities.

Income[49] is the final significant household characteristic. As already indicated in Chapter 4, households were separated in three groups based on their income: very low income, low income and medium or high income. Households with medium or high income have odds approximately 5 times lower than households with low income to be able to name an additional responsibility of disaster committees. Very low income has no significant direct effect on familiarity with disaster committee responsibilities[50].

[49] The model estimates are provided under the assumption of proportional odds. There is some indication, however, that this assumption may be violated for income. While the effects of both very low income and medium or high income appear to be negative, the magnitude of the coefficients should be interpreted cautiously (see appendix H).

[50] Very low income has a significant, negative total effect on familiarity with disaster committee responsibilities (see Appendix I and J). Households with very low income have odds approximately 5 times lower than households with low income to be able to name an additional responsibility of disaster committees. Households with lower socioeconomic status have repeatedly been found to be both less

These results are unusual because households with lower socioeconomic status have repeatedly been found to be both less informed and less prepared than better-off ones. That households with medium or high incomes would be less informed than households with lower income, therefore, is surprising. The large majority of wealthier households, however, hold jobs with the government (34.78%) or in other services (43.48%). These jobs are typically located in Roseau, the capital city, and although they still live in their village, people spend considerably less time there. As a result, they spend less time socializing with other residents and may therefore be comparatively less aware of community arrangements for disaster preparedness, which may in turn explain the observed pattern of effect of income.

5.3.5. Summary of Findings for Familiarity with Disaster Committee Responsibilities

The results indicate that social capital is influential for familiarity with disaster committee responsibilities. Relational social capital once again has a significant, positive direct effect through resource diversity. As opposed to the other two outcomes, community social capital also matters. Access to community social capital increases the odds of naming one more responsibility, regardless of how many have already been identified.

In addition to resource diversity and community social capital, religion and consulting newspapers regularly have a significant, positive direct effect. The effectiveness of local disaster committees, whether the breadwinner is a fisher or farmer and medium or high income all have a significant, negative direct effect on familiarity

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informed and less prepared than better-off households and this result is therefore not surprising. This effect, however, does not hold when social capital, government representatives and local disaster committees are controlled for.

with disaster committee responsibilities. DDO/DDAs do not have a significant influence. With the exception of religion, community social capital is the most influential factor (i.e., with the strongest direct effect). The influence of resource diversity is more moderate but remains fairly strong relative to other predictors[51].

5.4. Conclusions

Together, the results for the three models provide evidence to answer the two research questions posed in Chapter 1. The findings first confirm that social capital has a significant, positive direct effect on household disaster preparedness. The relevant form of social capital, however, varies across outcomes.

Relational social capital is relevant for all three aspects of preparedness considered. In all three cases, resource diversity has a significant, positive direct effect thereby confirming the value of diverse personal networks. Being connected to individuals in dissimilar positions in society thus increases awareness of what to do in a disaster for all three outcomes. Kinship composition also matters, but only for awareness of protective measures. Having relatives in different positions in society is an asset for this particular aspect of preparedness but does not make a difference regarding knowledge of shelter items and familiarity with disaster committee responsibilities. Finally, as was initially hypothesized, resource composition (i.e., average resources within networks) is not influential. Being connected to people in high social positions does not enhance awareness of what to do in a disaster.

Community social capital is nonsignificant for awareness of protective measures and knowledge of shelter items but matters for familiarity with disaster committee

[51] The comparison of total effects yields similar results.

responsibilities. If a household has access to community social capital, then the odds of being able to name an additional responsibility are higher.

In addition to social capital, the models test the significance of the other factors hypothesized to affect household preparedness in Chapter 2. DDO/DDAs have a significant, positive direct effect on knowledge of what to take to a shelter but they are not influential at the household level for awareness of protective measures and familiarity with disaster committee responsibilities. Local disaster committees affect household preparedness but their influence also varies across outcomes. Like DDO/DDAs, the effectiveness of local disaster committees is nonsignificant for protective measures and it has a significant, positive direct effect on knowledge of shelter items. Disaster committees, however, do not appear to be as effective when it comes to keeping the public informed of their various responsibilities. In fact, awareness of responsibilities is negatively associated with disaster committee effectiveness. Various additional controls have significant direct effects but relevant controls vary across models. None of the household or community controls has a significant direct effect on protective measures. A smaller population size is positively associated with knowledge of shelter items and male respondents are more likely than female respondents to be able to name three items to take to a shelter rather than two. Finally, familiarity with disaster committee responsibilities is negatively affected by the breadwinner being a fisher or farmer and by medium or high income but it is positively affected by Catholicism or Protestantism and by regularly consulting the newspapers for news and information.

The influence of social capital relative to other significant predictors brings a final point to conclude this discussion. Table 5.4 presents the evidence pertaining to the

second research question and provides a summary of the standardized direct effects of relational and collective social capital relative to other factors for each model. Household controls vary because only the household controls that were significant in the base models with only the full set of household and community contextual factors were included in the final models due to sample size limitations.

Table 5.4. Comparison of standardized effects of the variables hypothesized to influence household preparedness in the conceptual framework across models

Independent Variables	Models		
	Protective Measures	Shelter Items	Disaster Committee Responsibilities
Relational social capital variables			
Resource composition	-0.03	-0.14	-0.09
Resource diversity	0.90***	0.89**	0.86*
Kinship composition	0.51**	0.18	0.04
Community social capital	0.24	0.49	1.23***
Disaster committee effectiveness index	-0.23	*3.93***	-0.82***
Awareness of DDO/DDA's involvement in disaster preparedness	0.19	0.82*	0.18
Community controls			
Population	-0.30	*-3.76***	-0.42
Household controls			
Age[a]	-0.28	-	-
Regular consultation of print media[b]	-	-	1.01***
Gender[c]	-	-0.84**	-
Catholic[d]	-	-	1.84***
Protestant[d]	-	-	1.85***
Fisher or farmer[e]	-	-0.36	-0.88**
Very low income[f]	-	-	*-0.71*
High or medium income[f]	-	-	*-0.88***
n	169	170	131

Note: Italicized estimates are not reliable.
[a] Dummy variable indicating that the respondent is over 65 years old.
[b] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[c] Dummy variable indicating that the respondent is a female.
[d] Dummy variable: the reference category is other or no religion.
[e] Dummy variable indicating that the breadwinner is a fisher or farmer.
[f] Dummy variable: the reference category is low income (see Chapter 4).
*p<0.1 **p<0.05 ***p<0.01

Although the relevant form of social capital varies across outcomes, social capital appears to have a relatively strong direct effect on household awareness of what to do in a disaster across models. Resource diversity is the most influential predictor of awareness of protective measures and has a moderately strong influence on familiarity with disaster committee responsibilities in comparison to the direct effects of other predictors. It also has the strongest direct effect on awareness of protective measures but the direct effects of two other significant predictors, local disaster committees and population size, could not be accurately assessed for this outcome. Community social capital is very influential for familiarity with disaster committee responsibilities.

Together these results indicate that social capital is an important factor to consider to better understand variations in household preparedness. The study findings are summarized and their implications for policy and future research discussed in the next and final chapter.

CHAPTER 6

Conclusions and Recommendations for Future Research

Having reviewed evidence regarding three aspects of household preparedness in Dominica, this chapter evaluates the hypotheses put forth in Chapter 2 and summarizes findings to answer the two research questions posed in Chapter 1. Are collective social capital and relational social capital influential in explaining household preparedness? How influential are relational and collective social capital relative to household and community contextual characteristics, government agencies and civil society organizations in explaining household disaster preparedness?

This chapter first revisits the study findings regarding the direct effects of relational and community social capital on awareness of what to do in a disaster across the three aspects of preparedness considered. The impact of other factors on preparedness is also considered and the direct effects of relational and community social capital and of other factors are compared[52]. Next, possible strategies are proposed for policymakers to increase awareness of what to do in a disaster in Dominica based on the study's results. Finally, the two key implications of the study's findings regarding the relationship between social capital and household preparedness on the one hand and the

[52] The comparison of the total effects of these variables yields similar results.

relationship between relational and community social capital on the other are summarized. Suggestions are offered for future research, including the use of larger samples to confirm results and enhance their internal validity, extension to other geographical areas and addressing further questions raised by the differential pattern of effects of relational and community social capital.

6.1. Summary of Findings

6.1.1. Study Overview

Household awareness of what to do during a disaster was examined regarding three aspects of preparedness: awareness of protective measures, knowledge of items to take to a shelter when evacuating and familiarity with local disaster committee responsibilities. Household preparedness was assessed for each of these dimensions for a sample of 179[53] households in six villages in Dominica. Significant variations were observed in levels of household preparedness across villages for each outcome. Logistic regression analysis was used to evaluate a series of specific hypotheses regarding the relationship between household disaster preparedness and relational and community social capital and to assess the influence of additional factors including government representatives in charge of disaster preparedness, local disaster committees and community and household contextual factors. Social capital matters significantly for household disaster preparedness and the direct effect of social capital is moderate to strong relative to that of other factors. The pattern of effect of relational and community social capital, however, varies across specific outcomes. The results are summarized in Figure 6.1 and discussed next.

[53] This represents the number of useable questionnaires.

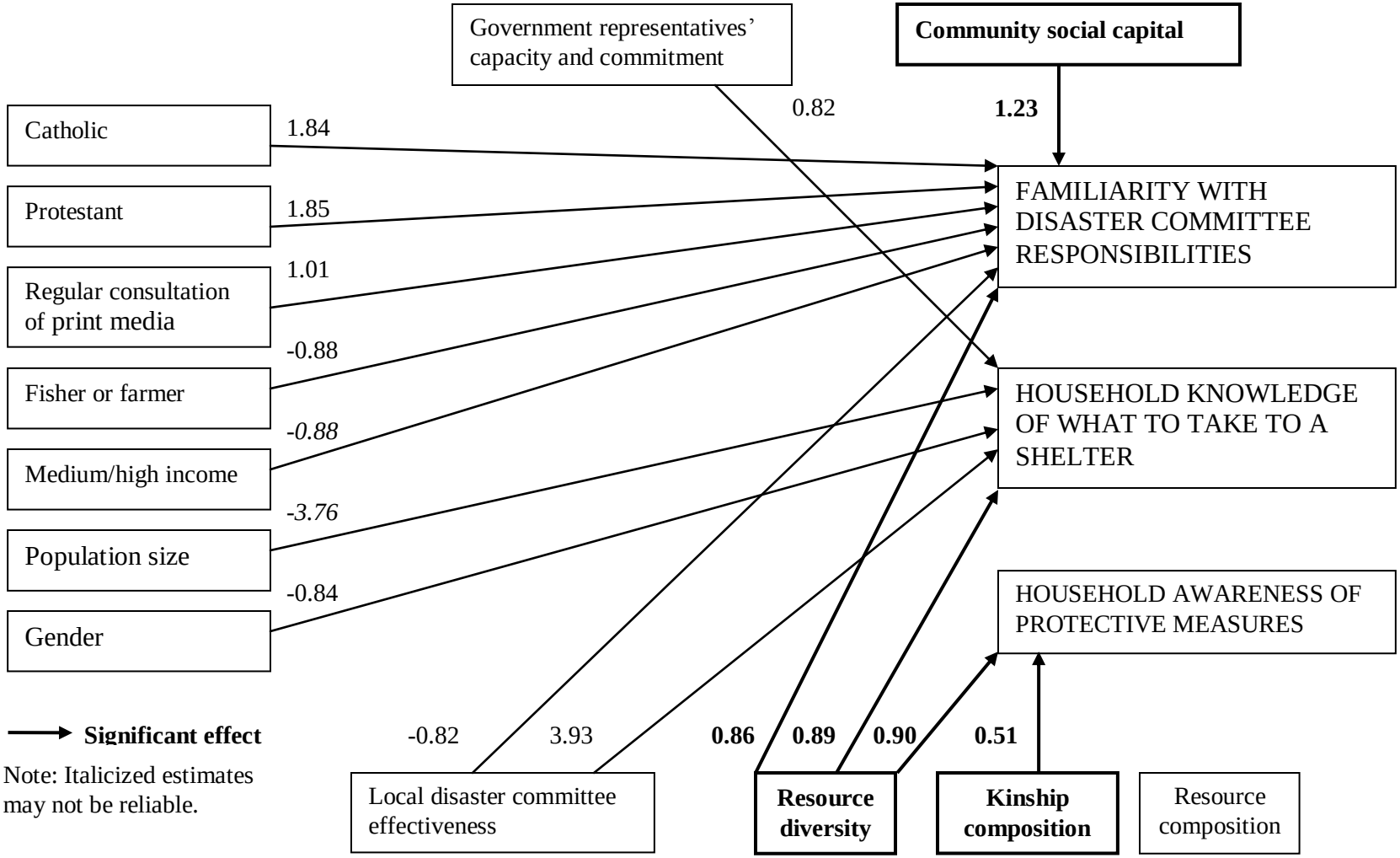

Figure 6.1. Comparison of the standardized direct effects of predictors on awareness of what to do in a disaster

6.1.2. Effect of Relational Social Capital on Household Preparedness

The available evidence provides considerable support for the proposition that relational social capital affects household preparedness. In this sense, the results corroborate findings from earlier research regarding the importance of peers in accessing and discussing preparedness-related information. Moreover, this study provides some additional evidence on which aspects of personal networks are particularly influential. Involvement in social networks enhances preparedness-related knowledge, yet not all aspects of network resources and structure matter: only resource diversity (i.e., the number of accessed positions) has a significant, positive direct effect on all aspects of preparedness. Kinship composition (represented by the proportion of positions accessed through relatives) is also brought to bear on household preparedness, but only for knowledge of protective actions. Resource composition (represented by the average social position of network members) does not make a difference.

This evidence first confirms that the resources of network members do not systematically provide an advantage. Being connected to people in high-ranked social positions has been found to be advantageous to pursue instrumental goals and access valued resources, including information, but to be less valuable to cope with stress and receive emotional support (Lin, 1999a; Van der Gaag et al., 2004). The study results further indicate that access to status- or prestige-rich - positions does not enhance awareness of what to do in a disaster in the study sample. The type of preparedness information considered in this study is publicly available and it is usually simple in nature. In other words, there is no reason to believe that network members in valued social occupations have access to privileged information because of their position or that

because of their typically high level of education they process this information and/or understand its relevance better.

Like resource composition, findings on kinship composition vary across contexts. Relatives are generally more influential and provide better support than other social relations (Hurlbert et al., 2000; Kirschenbaum, 2004). Yet they may be less helpful in providing access to new resources and information (Renzulli & Aldrich, 2005). In this study, kin-centered networks are an asset for awareness of protective measures but do not make a difference for other aspects of preparedness. This result is consistent with Kirschenbaum's study of household preparedness in Israel as he found that family-based networks influenced some aspects of preparedness but not others. Further research is needed, however, to better understand the circumstances under which relatives become helpful. In this study, kinship composition only matters for awareness of protective measures. Protective actions are distinguished from other aspects of preparedness by two features. It is the aspect of preparedness that is the most directly tied to the family as a unit and that requires them to be the most proactive. By contrast, households may benefit from shelters or disaster committee activities but they do not have to directly contribute to their provision. For these two reasons, households may be more likely to seek advice regarding protective measures than other aspects of preparedness and to turn to relatives to do so. It should be noted, however, that kinship composition as it is operationalized here represents the extent to which access to various social positions is secured through relatives. This finding thus reflects whether it matters that sampled social positions are accessed through relatives or through other types of relationships. In other words, it indicates whether the average strength of the ties through which access to social positions

is gained is important. But available evidence does not tell us whether the number of relatives as a proportion of all network members (not being limited to one per position and to certain positions) makes a difference.

The most influential aspect of personal networks ultimately is their diversity. The extensity of personal networks has a significant, positive direct effect on awareness of protective measures, knowledge of shelter items and familiarity with disaster committee responsibilities. Extensity reflects the total number of positions accessed and is independent of any evaluative score that may be attached to these positions.

In summary, therefore, there are no network members that are better discussion partners than others on the basis of their position in society regarding awareness of what to do in a disaster. Relatives are valuable discussion partners, but only for protective measures. Being connected to dissimilar people, on the other hand, enhances awareness of what to do in a disaster for all three aspects of preparedness possibly because it increases the diversity and richness of information and perspectives exchanged. As such, it may bring attention to additional information of which households may have previously been unaware and/or make already known information seem more credible and relevant as it is heard repeatedly from independent sources.

6.1.3. Effect of Community Social Capital on Household Preparedness

Households with better access to community social capital are more familiar with the responsibilities of the disaster committee in their community. However, the analysis also revealed that community social capital is not relevant either for awareness of protective measures or knowledge of what to take to a shelter. Earlier research on household preparedness had already brought forth the importance of community

relationships, community bondedness or attachment to community, but findings were inconsistent across studies (NRC, 2006). In addition to proposing the use of community social capital as a rigorous and systematic approach to enhance cross-study comparisons, this research further indicates that inconsistencies may not only be due to differences in study contexts and are worth exploring in their own right. What appears is that community social capital can play a role in explaining variations in levels of awareness of what to do in a disaster but that this effect is not consistent across aspects of preparedness.

Collective social capital is often understood at the group level. It is generally used to reflect how relatively stable patterns of social interaction enable group members to engage collectively in a variety of activities and to achieve mutually beneficial goals (Krishna, 2003b, 2007; Ostrom, 2000). Yet it has been theorized and to some extent empirically demonstrated that social capital is a latent resource that does not in and of itself systematically lead to the achievement of positive collective outcomes (Berman, 1997; Evans, 1997; Krishna, 2002; Ostrom, 1997). Rather social capital provides the basis for collective action but additional mechanisms are needed to mobilize this resource towards specific ends. Social capital in itself is a neutral multiplier that can be mobilized towards a variety of goals but its effects depend to a large extent on the nature of the environment in which groups evolve (Berman, 1997; Evans, 1997; Krishna, 2002).

The objective in this study is not to relate community social capital to collective action but rather to examine whether community social capital creates a stronger sense of attachment to place and interdependence with others, promotes a culture of prevention and/or facilitates the circulation and retention of preparedness information. Yet it may

still be the case that certain conditions are needed for the mobilization of community social capital. A first observation based on the study results is linked to the nature of the information exchanged and how well it relates to the more traditional goals and forms of actions associated with community social capital. As mentioned above, community social capital is tied to a specific group and is generally associated with collective achievements in the face of a common threat or problem. Disaster committees are collective arrangements provided at the community level and serve all community residents, whether or not they have contributed to their creation. As such, they are public goods and it is thus relatively logical that community social capital would support discussions related to them. By contrast, protective measures and evacuation to a shelter are ultimately related to individuals rather than to the community as a whole. Protective measures are a personal responsibility. While shelters are available to all, whether to take advantage of them and evacuate is a personal decision. Because protective actions and evacuation to a shelter are ultimately carried out individually, it may be more difficult to mobilize community social capital to discuss these two aspects of preparedness.

A second observation is that disaster committees are already in place and it is thus relatively easy for residents to imagine the consequences of the committees' actions in a disaster. There is, on the other hand, nothing directly tangible to focus residents' attention on the consequences of others' correct and incorrect actions or on the need to be proactive regarding protective measures and evacuation. In other words, because disasters have relatively low salience in people's lives in the absence of specific events or threats, residents may not translate their feelings of attachment to each other and their culture of confronting problems into heightened levels of awareness of what to do in a

disaster in the context of protective measures and evacuation to a shelter. There is, however, no solid evidence that either one of these two observations explains the pattern of effects of community social capital and further research is needed in this respect.

6.1.4. Influence of Relational and Community Social Capital Relative to Other Factors

Studies of household preparedness often emphasize institutional efforts to increase the adoption of hazard adjustments and the socio-economic correlates of household preparedness. Findings from this study further indicate that relationships among individuals within and outside their community of residence play an important role in the preparedness process.

Although numerical problems do not allow obtaining precise estimates of some effects and even though the forms of social capital that are relevant vary across outcomes, it is clear from the comparison of the direct effects of significant predictors that social capital consistently exerts a moderate to strong direct influence on preparedness relative to other factors. Relational social capital is the only influential factor for awareness of protective measures. The effect of resource diversity is the strongest but kinship composition also has a significant, positive effect. Community social capital is strongly influential regarding familiarity with disaster committee responsibilities and resource diversity also has a significant, positive influence, albeit more moderate. Knowledge of shelter items is the only outcome for which the influence of social capital could not clearly be compared to that of other factors because the direct effects of local disaster committees and population size could not be estimated accurately. Yet the influence of resource diversity is non-negligible for this outcome.

By contrast, government representatives do not consistently affect awareness of what to do in a disaster across the three aspects of preparedness considered. As shown in Figure 6.1, household awareness of DDO/DDAs' involvement in disaster preparedness has a significant, positive direct effect on knowledge of what to take to a shelter but is nonsignificant for other outcomes. While interesting, this finding is not necessarily surprising because DDO/DDAs primarily work with disaster committees and in turn rely on them to keep the public informed. Furthermore, shelter management is the aspect of preparedness in which DDO/DDAs are the most routinely involved through the designation of shelter and the identification of shelter wardens. Nonetheless the extent to which DDO/DDAs and their work with disaster committees is visible at the household level could have been expected to enhance concern for disasters and interest in preparedness-related information and thus to have consequences for other aspects of preparedness. The results, however, indicate that this is not the case.

"Informing residents of disaster preparedness activities and of their roles and responsibilities" is a clearly specified responsibility of disaster committees across Dominica (Dominica Red Cross, n.d.b, p. 2). Yet the expected influence of disaster committees does not systematically show through in the results. Positive results are only observed in the area of shelter management. Quite surprisingly, awareness of disaster committee responsibilities is higher where disaster committees are less effective, perhaps because less effective committees are also the most recent. Their creation may have generated interest, while older committees may somehow fade in the background in the absence of any event that would require their mobilization, particularly when they function smoothly. Disaster committees are not influential regarding awareness of

protective measures. Taken together, the results for DDO/DDAs and local disaster committees confirm – as was indicated by key informants - that shelter management is the most emphasized aspect of preparedness in Dominica at the institutional level. It is strongly emphasized in the training of disaster committees and is one of their main and most regular activities. It is also the aspect of preparedness in which government officials are the most involved.

The household controls that have significant direct effects on household awareness of what to do in a disaster vary across outcomes. Interestingly enough, very few household controls matter for awareness of protective measures and of shelter items, the two outcomes for which relational social capital is the only important form of social capital. Neither education nor income in particular achieves significance. This confirms to some extent that all persons in society appear to be equally valuable discussion partners and/or informants since the parameters that typically define one's social position are not influential. By contrast, religion, regularly consulting the print media, whether the breadwinner is a fisher or farmer and income (more specifically medium or high income) all have significant direct effects on awareness of disaster committee responsibilities, for which community social capital is the most influential form of social capital. Religion and regularly consulting the newspapers have a significant, positive direct effect and the breadwinner being a fisher or farmer and medium or high income have a significant, negative direct effect. With the exception of consulting newspapers, all these variables can be taken to represent community attachment, as can community social capital. Churches are very active in Dominica and important centers of socialization. Fisher or farmers often work long hours far from the community and spend

less time with other residents, as do people with medium or high income as they often commute to the capital city.

In summary, therefore, the influence of social capital should not be underestimated, both practically and in future research on household preparedness. Relationships among people matter in explaining their awareness of what to do in a disaster. Moreover, while community social capital is tied to the community, relational social capital is not spatially bound. In other words, even though most preparedness activities are organized and carried out locally, it is not only interactions with fellow residents that influence awareness of what to do in a disaster. While interactions within communities are important only for familiarity with disaster committee responsibilities, links to others who are (potentially) geographically more dispersed are relevant for all aspects of preparedness. The practical implications of these results are discussed next.

6.2. Practical Implications for Disaster Preparedness

6.2.1. Levels of Household Awareness of What to Do in a Disaster

Natural disasters, and in particular hurricanes, pose a serious threat to lives, property and development in Dominica. Even though there has not been any major disaster since 1979 Hurricane David, a hurricane could strike at any time and cause severe damage. Some areas, particularly in the South, are also at high risk for volcanic eruptions. For these reasons, the government of Dominica has made disaster preparedness a priority in its national disaster plan. Knowing how to protect one's house, what to take to a shelter when evacuating and being familiar with local disaster committees and their responsibilities are three important dimensions of preparedness, and it is essential to maintain high levels of awareness regarding these items at all times. Yet

survey results indicate wide variations in levels of awareness of what to do in a disaster across households in six Dominican villages. Furthermore, surveyed households appear to be better informed regarding some aspects of preparedness than others. While awareness of what to take to a shelter is fairly high across households, knowledge of protective measures and even more so familiarity with local disaster committee responsibilities are relatively low. The former is problematic because protective measures need to be implemented individually. The latter is a concern because residents need to know what types of measures are in place to assist them in the event of an emergency to benefit from these measures. In addition, the manpower of disaster committees is limited so that it is important that residents know how they can contribute to facilitate response and recovery activities in their community. The survey results and information collected on the study villages and preparedness in Dominica provide some insight on the factors that influence household preparedness in the six study villages. Based on this evidence, the three strategies discussed below may be useful to enhance levels of awareness of what to do in a disaster.

6.2.2. Possible Strategies to Enhance Awareness of What to Do in a Disaster

Strategy 1: Providing more guidance and structure regarding the activities of local disaster committees at the district level.

The operational responsibility to keep residents informed on disaster prevention and preparedness primarily rests with local disaster committees. Yet the benefits of the educational activities they conduct are only visible in the area of shelter management. In fact, this imbalance is further reflected in the regular activities of disaster committees, as shelter management is their most emphasized task.

Local disaster committees have very few resources of their own and further encounter difficulties in keeping volunteers engaged in the absence of any disaster threat or event. Sustained efforts are observed, however, in the area of shelter management where the involvement of other institutional actors provides access to resources, a source of motivation and continuing support. From the designation of shelters by DDO/DDAs and communities and their approval by engineers from the Ministry of Public Works and Public Utilities to the training provided by facilitators of the Office of Disaster Management to local shelter wardens and assistants, shelter management mobilizes a wide range of actors. This high level of cooperation in turn provides a structure for shelter management activities at the local level.

By contrast, there is relatively little guidance regarding other aspects of preparedness. Together the national disaster plan and community disaster plans clearly define disaster committee responsibilities. Neither one, however, indicates how these responsibilities are to be carried out. DDO/DDAs work with disaster committees and this partnership provides some structure for the activities of disaster committees. Yet DDO/DDAs are tasked with many other responsibilities beyond disaster preparedness and in practice they only emphasize some aspects of preparedness in their work with local disaster committees. The two priorities are to ensure the creation of a disaster plan and the regular training of local volunteers. Once a plan is created, though, there is little interaction regarding the specific activities conducted by disaster committees, with the exception of shelter management.

There are, however, other resources in place that could be utilized to provide a framework for local activities regarding other aspects of preparedness. Regular training

workshops that deal with other areas of preparedness besides disaster management could be held on an annual basis before the beginning of the hurricane season with the help of facilitators from the Dominica Red Cross and the Office of Disaster Management (see Appendix A). Because both organizations have limited resources and personnel, workshops could not realistically be held individually in each community. Furthermore, many topics would need to be covered and volunteers may not have the time and energy to attend long and intensive workshops. As a more manageable alternative, separate workshops could be held at the district level that would cover only one area of disaster preparedness at a time. Only the volunteers in charge of the corresponding activity in their community would attend so as to avoid placing repeated demands on the same individuals. Detailed guidelines to implement specific activities throughout the hurricane season and keep residents informed could be provided, for example in the form of a checklist. These workshops would provide a structure for local activities, as well as annually reiterate the importance of each activity in its own right without increasing the workload of DDO/DDAs.

Strategy 2: Reaching people through personal networks.

There is considerable evidence in this study that personal networks enhance awareness of what to do in a disaster. Having diverse discussion partners proves relevant for awareness of protective measures, of shelter items and of the responsibilities of disaster committees. Having relatives in different occupational positions is also helpful for protective measures. A fruitful strategy may thus be to reach people through their social networks. In order to do so, educational activities should target centers of socialization to foster inter-personal discussions on preparedness activities in different

areas of people's lives, including family life. Flyers could for instance be posted or local government officials and/or disaster committee volunteers invited to speak in schools, at the workplace or at church.

Strategy 3: Building community social capital.

Familiarity with disaster committee responsibilities is the aspect of preparedness for which levels of awareness are the lowest. Yet it is extremely important to ensure an efficient and timely response to disasters and a successful recovery. Community social capital, however, enhances awareness of disaster committee responsibilities and building community social capital and increasing households' access to it could provide a way to make the activities of disaster committees better known.

Whether community social capital can actually be built over the relatively short-term is a fairly controversial topic. Some claim that social capital is a stable asset whose levels are determined over relatively long periods of time (Putnam et al., 1993). For others, levels of social capital can be modified in the short-term given the right institutional framework (Hall, 1997; Schneider et al., 1997). Yet another group of scholars sees social capital as a by-product of other activities that is developed and reinforced by the experience of social interactions but harder to build through external interventions (Ostrom, 2000). All agree to a certain extent, however, that stocks of social capital can be enhanced by providing opportunities for social interactions and self-organization.

There are already many opportunities for socialization and for the development of community social capital in Dominica. These for instance include church services that are regularly attended by a majority of the population and Community Day of Service,

during which residents contribute free labor to community projects and work together. Yet additional steps can be taken to revalorize some collective activities and create more opportunities for interaction, particularly in the three following areas: informal gatherings and everyday sociability; volunteering; and socialization through children. The ideas presented next for each area are largely inspired from the Saguaro Seminar (2000) recommendations to build social capital.

First, socialization among neighbors can be an important source of social capital. In order to promote such interactions, events could be organized between neighborhoods (e.g., sport competitions), with each event ending in a community party. Organizing and participating in such events would bind people together.

Second, as discussed at greater length in Appendix E, koud-mai has historically been a tradition of mutual help and support among the residents of a community. Yet the extent of koud-mai has declined over the years and koud-mai is nowadays essentially restricted to Community Day of Service. On the other hand, community organizations have flourished over the years and represent an important vehicle for socialization and engagement in the community. In addition to church groups, two of the study communities have developed unique and extremely successful groups. In Dublanc, Men in Development is an association made exclusively of men who contribute labor to community projects and have for instance raised funds to buy books for children in the village. In Dubique, a cultural dance group has provided employment and installed a sense of pride in the community thanks to its repeated successes in national competitions. These examples show that community groups can be extremely valuable in bringing people together and enhancing community spirit and pride. But it is also important to

have a variety of groups in place to reach out to a large number of people and engage them. A possible strategy would thus be for the government to encourage the creation of community groups in a variety of areas (e.g., cultural dance groups, sports groups, community gardening groups) by providing subventions or organizing national competitions to valorize the achievements of these groups.

Third, getting parents involved in the activities of their children provides an easy way to reinforce the relations between parents and their children, as well as for parents to get to know each other. Efforts could for instance be made to organize athletic contests, plays and recitals and get parents to attend; to develop the activities of PTAs; to organize field trips and to require parents to serve as chaperons; to ask parents to volunteer in the classroom or to hold talks on their activities; and to ask parents to help coach youth sports team and to run a snack bar during events.

6.3. Key Theoretical Findings and Future Research

6.3.1. Main Lessons Learned

In addition to its practical implications, this research represents an important first step from a theoretical standpoint towards 1) assessing the relationship between social capital and disaster preparedness and 2) empirically determining the extent to which relational and collective conceptions of social capital are reconcilable or otherwise different.

The first key theoretical implication of this study's findings is that social capital does matter for awareness of what to do in a disaster. Furthermore, the direct effects of relational and community social capital are relatively strong relative to the direct effects of other factors such as government representatives, civil society organizations and

household characteristics. Hence the importance of relationships among people should not be underestimated in future research on disaster preparedness. In addition, both relational and community social capital make a difference. While community social capital pertains to the quality of relationships between the residents of the same community, the personal social networks that provide the basis for relational social capital may on the other hand transcend community boundaries. This finding confirms the point already made by Kirschenbaum (2004) that much can be overlooked by drawing rigid physical and geographical boundaries when studying disaster preparedness. In other words, while communities remain an important unit of analysis in many respects, the study of social capital and its influence on disaster attitudes and behaviors should not be restricted to the geographical area where most of the physical damage is expected to occur. Relationships with people both within and outside of this area (i.e., the community) can prove influential in determining disaster attitudes and behaviors and whether people choose to behave proactively before disasters happen.

The second important and related theoretical implication of this study is that relational and community social capital have distinctive effects. People are simultaneously involved in different types of social networks (personal and community-based) to which correspond different forms of social capital. The difference between relational and collective conceptions of social capital, it appears from this study, is more than one of the unit of analysis at which the utility of social capital is considered. When relational and community social capital are both operationalized at the household level, they yield different results. While social capital as a concept is extremely valuable in bringing attention to the importance relationships have in achieving a wide range of

outcomes, different notions are in fact regrouped under the same label, which leads to some confusion. The social resources and the characteristics of the relations making up personal networks and the web of networks and the rules and norms of trust and reciprocity that underlie them in a group (i.e., here in a community) define different types of human interactions that have different utility. Making a clearer distinction between these two forms of interaction and studying the relationship between them is a next important step in research to better understand the influence of social context on human attitudes, opinions and actions in a variety of domains. Suggestions for future research to confirm and further investigate these two key findings are offered next.

6.3.2. Future Research on the Influence of Social Capital for Household Disaster Preparedness

Although this research confirms the existence of a positive relationship between social capital and household awareness of what to do in a disaster, the research design used for this study presents some limitations. Further studies are needed to confirm and refine results and to extend this research to other geographical and institutional settings.

One of the main limitations of this research is its sample size. First, the sample size limits the internal validity of the study because it was not possible to simultaneously control for all factors (particularly in terms of household characteristics) that may affect awareness of what to do. Although steps were taken to try to include all relevant predictors, some significant variables may have been omitted. Specifically, it is possible that suppressor effects were missed. A suppressor effect occurs when a variable appears to have a statistically significant effect only when another variable is controlled (Agresti & Finlay, 1986).

Second, a larger sample size may help correct some of the numerical problems that were encountered in this study because of zero counts, that is when no observations correspond to some of the cells obtained in the cross-tabulation of an independent variable with the dependent variable. These numerical problems did not allow obtaining reliable estimates of some effects. As a result, it was not always possible to reliably assert how influential social capital is relative to government representatives, local disaster committees and household and community contextual characteristics.

Next, the comparison of the effects of social capital, government representatives and local disaster committees could further be sharpened by including more communities in the research design. The selection of six villages in two districts is enough to introduce variations in government representatives and the level of effectiveness of local disaster committees but it is not enough to allow the use of refined measures for these two factors. A larger number of communities in more districts could allow taking into consideration variations in the capacity and commitment of government representatives in addition to how visible their involvement in disaster preparedness is at the household level. A larger number of communities would also allow sampling communities that do not have disaster committees and see how this affects household awareness of what to do in a disaster. This could not be done in this study because communities that did not have disaster committees also exhibited other systematic differences (e.g., other district, location very close to the capital city and higher level of commercialization, non-coastal community) which could not be controlled for given the small number of communities included in the design. Finally, including more villages would allow developing a more refined disaster committee effectiveness index and testing its validity using factor

analysis. While the index used in this study appeared to make sense on the basis of the information collected, its validity could not be tested empirically. More research is needed to better understand whether all qualities of disaster committees matter or if only some of them do and if so, which ones and under which circumstances. This may in turn provide more insights on what can be done to make disaster committees more effective.

Regarding the effect of household socio-economic characteristics, an additional limitation is that there is a large number of missing values for income (21.8%). In particular, 97.4% of these missing values correspond to respondents in the Western district with 61.5% in the same village (Colihaut). There is no evidence that suggests a direct relation between failure to answer and income level. Rather this pattern can largely be explained by the fact that one of the interviewers who administered most of the questionnaires in this village quasi-systematically failed to collect data on income. Thus findings on income need to be confirmed.

Finally, improvements are needed regarding the external validity of this study's findings. Because information was only collected on six communities, a fixed-effects model was used and inferences are only claimed for the households living in these six villages. An important improvement to this research would be to first expand this study to a larger sample of communities to seek inferences about the Dominican population at large. Second, this study could be replicated in other geographical and institutional settings in developing countries to determine whether a similar relationship between social capital and awareness of what to do in a disaster is observed. This could be achieved with only minor modifications to the research design regarding the measurement of community social capital, the influence of government representatives

and the effectiveness of local disaster committees (or other relevant civil society organizations). Confirming the relationship between social capital and disaster preparedness on a larger scale could prove particularly valuable for government aid agencies and private non-profit donor organizations to better understand the factors that influence the results of their community-based disaster preparedness programs over time and refine their design.

6.3.3. Future Research on the Differential Effects of Relational and Community Social Capital

In addition to confirming the results of this study, future research is needed to better understand the nature of the causal chain that enables relational and community social capital to affect awareness of what to do in a disaster, as well as the conditions under which each form of social capital becomes relevant. The answer to the latter question has important implications both in relation to household preparedness and more generally for social capital theory. The available evidence indicates that both relational and community social capital positively affect awareness of what to do in a disaster. Yet it remains unclear how exactly each form of social capital is brought to bear on awareness of what to do. Questions in particular remain on whether relational and community social capital serve similar or different purposes and what the conditions for the mobilization of each form of social capital are.

One of the first points that need to be clarified in future research is the exact role served by relational social capital. Relational social capital has a significant, positive direct effect on all three aspects of preparedness. Because most of the information pertaining to these three items is not new, it would seem more likely that personal networks are used to debate and reinforce the relevance of preparedness information

rather than to seek new information. Yet this remains to be confirmed. In addition, only three aspects of network resources and structure were considered for which indicators could easily be derived from Position Generator data. It would be interesting to further assess the relationship between other related, yet distinct, commonly-emphasized network characteristics such as size and density and household disaster preparedness.

A second question to be answered in future research is to better understand the reason behind the differential pattern of effects of relational and community social capital. Individuals are simultaneously involved in a variety of networks (personal and community-based) and may a priori draw on any of their contacts for information. Both relational and community social capital, therefore, could serve the same purpose: providing channels for disaster information communication. Why then would both forms of social capital be simultaneously relevant for familiarity with disaster committee responsibilities when only relational social capital matters for other outcomes? And why should community social capital make a difference for familiarity with disaster committee responsibilities but not for other outcomes? A possible explanation presented in this study is that personal and community-based networks are developed and maintained for different purposes and that this in turn determines their ease of mobilization towards certain goals. In other words, the utility of each form of social capital may depend on the nature of the information exchanged and how well it relates to the more traditional goals and forms of actions associated with each form of social capital. Relational social capital relates to the mobilization of personal networks for a variety of individual outcomes and may be easily appropriable for disaster information communication as a by-product of these other interactions. Community social capital, on

the other hand, is tied to specific collective goals. As a result, it may only be available for those topics whose characteristics are closest to that of collective action problems. The circumstances that define the mobilization of community social capital, however, need to be identified more clearly and with more certainty.

Alternately, it may be that collective social capital serves a different purpose. As was indicated in Chapter 2, community social capital may define the way people perceive themselves in relation to others and their propensity to confront problems and as a result, affect their perception of the relevance of preparedness information and activities. The question still remains, however, of why community social capital, if it is relevant for one preparedness outcome, would not be relevant across all outcomes. In particular, if community social capital causes people to be more aware of the responsibilities of the disaster committee in their community, why wouldn't it enhance their knowledge of shelter procedures and thus of the items one should take along when evacuating to a shelter? One possible answer is that collective social capital can potentially be useful for a variety of purposes but that its mobilization is not automatic. In other words, community social capital is not automatically fungible across issue areas and additional mechanisms or specific circumstances are needed for its mobilization. This argument has received some attention, particularly in the literature on community social capital in regard to successful collective action (see for instance Evans, 1997; Krishna, 2002, 2003a; Wade, 1988; Warren et al., 2001). Examples of the conditions required for the successful mobilization of community social capital for collective action for instance include mutually supportive state-society relations (Evans, 1997; Woolcock, 1998), mediating agents that can act as intermediaries between communities and their

institutional environment where middle-level institutions are otherwise weak (Krishna, 2002) and differences in relative need linked to a difficult natural or societal environment (Hirschman, 1984; Wade, 1988). Evidence on the strategies and/or conditions that facilitate the mobilization of community social capital is rare and their nature is also likely to be context-dependent (Evans, 1997). Furthermore, it is limited to the study of community social capital in the context of collective action. Whether this argument similarly applies to household-level consequences of community social capital is worth investigating. A possible extension of this argument was presented here by suggesting that tangible focal points are needed to focus people's attention on the risks faced by themselves and others. More research is needed, however, to test this hypothesis or determine whether other mechanisms are at play that would explain the inconsistent pattern of effect of community social capital.

In summary, there may be differences in the utility of relational and collective social capital at the household level. More research and empirical evidence comparing the effects of relational and collective social capital is needed to better understand differences between these two conceptions of social capital, the type of outcomes for which they are valuable and the nature of the causal chains that link each form of social capital to these outcomes.

APPENDIX A

Disaster Preparedness in Dominica

Disaster management in Dominica really started after Hurricane David devastated the island in 1979, and arrangements for disaster management have since then evolved to their current state. This appendix provides some background information on disaster preparedness and key preparedness actors. It starts with an overview of disaster management in Dominica. It then presents three of the main actors involved in disaster preparedness at the national level (the National Emergency Planning Organization, the Office of Disaster Management and the Dominica Red Cross) and discusses their relationship with communities. Finally, it provides some information on three externally-funded community-based disaster preparedness programs that were implemented by the Dominica Red Cross between 1997 and 2004. These programs have served to develop the materials used to train and organize disaster committees in Dominica. Furthermore, three of the study communities, Dublanc, Colihaut and Fond Saint Jean, have directly benefited from one of these programs. A summary concludes this appendix.

A.1. Framework for Disaster Management in Dominica

Dominica is one of the 16 member countries of the Caribbean Disaster Emergency Response Agency. CDERA was set up in 1991 by the CARICOM heads of government to mobilize and coordinate response to natural disasters in member states requesting outside assistance and to promote regional disaster planning and awareness (CDERA, 2006). Following a series of devastating storms in the late 1990s, CDERA has

adopted a more comprehensive approach to disaster management aimed at promoting prevention, mitigation and reconstruction in addition to response activities (World Bank, 2001a). In spite of this new strategic framework at the regional level, however, disaster management in Dominica remains primarily focused on the preparedness and response phases of the disaster cycle.

Disaster management is organized under the Ministry of Public Works and Public Utilities. Responsibilities are shared among a network of government agencies, NGOs and private sector agencies and defined in a national disaster plan. Each agency, however, is left to draw its own plan to implement its duties. The first plan was issued in 1981 and subsequently updated and revised several times in the 1980s and early 1990s. Although a more recent draft was finalized in 2001, it is still awaiting approval from the Cabinet and disaster management actors are still operating under the 1996 plan.

A.2. Key Actors Involved in Disaster Preparedness

A.2.1. Overview of Preparedness Arrangements

In the national disaster plan, disaster preparedness is defined as "preparing the community to react promptly to save lives and protect property when it is threatened or hit by a disaster or major emergency of any kind" (NEPO, 1996, p. 3). The plan is built around the National Emergency Planning Organization (NEPO) whose main responsibility is to "ensure that the country is in a state of preparedness at all times" (NEPO, 1996, p. 7). Local disaster committees in turn provide a link between communities and NEPO. Community involvement is "vital for the effectiveness of any action in time of disaster" and it is thus "important that the community be involved in every stage of the disaster response planning scheme" (NEPO, 1996, p. 20).

NEPO regroups representatives of the various agencies involved in the implementation of the plan and is in charge of the planning, organization and coordination of counter-disaster measures at the central level. It is, however, essentially a reactive unit that is at the top of the chain of command in times of emergency (see Figure A.1). In the absence of imminent threats, NEPO meets on average once a year before the beginning of the hurricane season.

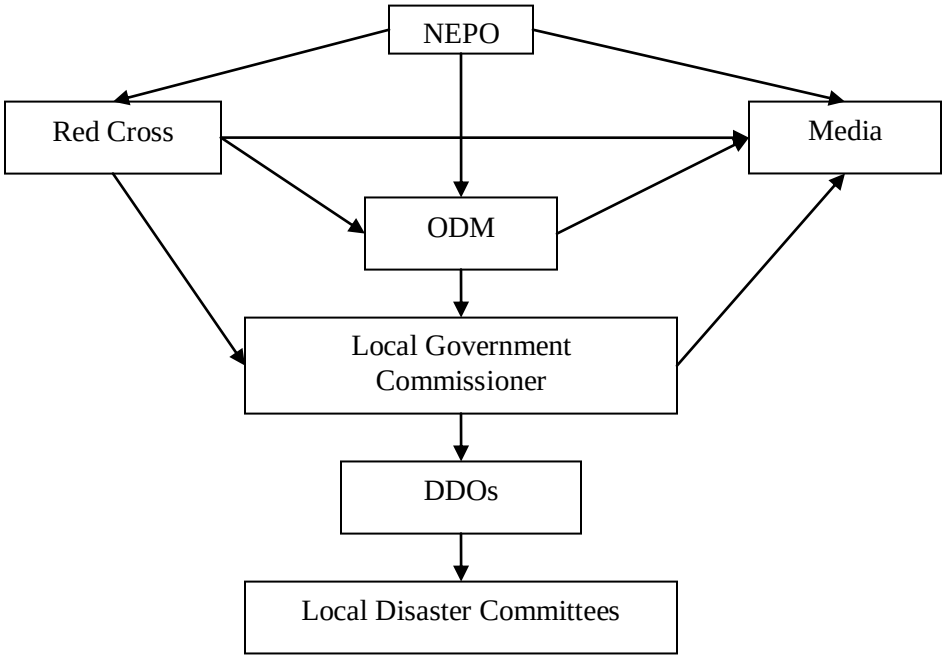

Figure A.1. Emergency information flow chart (Dominica Red Cross, n.d.a)

The Local Government Department of the Ministry of Community Development and Gender Affairs is responsible for establishing local disaster committees and assisting them in their activities (NEPO, 1996). This task is in practice carried out by District Development Officers and Assistants who therefore routinely interact with disaster committees. In addition, two other key organizations at the national-level provide resources for disaster committees to draw on: the Office of Disaster Management and the Dominica Red Cross.

A.2.2. The Office of Disaster Management

The Office of Disaster Management (ODM) is in charge of overseeing the on-going processes of public education, training, inventory and resource procurement that support the implementation of the plan on a daily basis (NEPO 1996; 2001). Furthermore, ODM is involved at the regional and international level, as the National Disaster Coordinator sits on CDERA's board and liaises with regional and international agencies. ODM, however, remains a small unit with a staff of 5 (a director, a consultant, a secretary, a driver/messenger and a cleaner) and operates on a small budget, so that its actions are in practice limited. As a result, ODM is not always able to meet the training and resource needs of local disaster committees.

A.2.3. The Dominica Red Cross

A branch of the British Red Cross established in 1958, the Dominica Red Cross was recognized as an independent society by the government of Dominica in 1983 and admitted to the International Federation in 1989 (IFRCS, n.d.). Although it was initially known for its role in first-aid training and social welfare, the Dominica Red Cross has established itself as a major player in relief management after its role in three storms in 1995 and in 1999 Hurricane Lenny. It currently serves on several NEPO subcommittees (i.e., health, welfare, relief distribution and telecommunications). Furthermore, it has served as implementing partner of donor agencies for a series of three community-based preparedness programs and has thereby become a well-acknowledged resource for the provision of disaster management training to complement ODM efforts. The Dominica Red Cross, however, is also understaffed with only three full time staff (a director general, a secretary and a messenger) and is therefore dependent on the availability of

external funding and the involvement of volunteers across the island for the implementation of its projects and activities.

A.3. Community-Based Disaster Preparedness Programs

The resources available to disaster committees remain limited outside of specific disaster events. Three externally-funded community-based disaster preparedness programs, however, have contributed to building capacity for disaster preparedness throughout the island. They have in particular contributed to developing strong ties between DDO/DDAs, ODM, the Red Cross and communities. In addition, they have helped develop the training materials and methods that are still used to organize and train disaster committees.

The three programs were implemented by the Dominica Red Cross. They were conducted at different times between 1997 and 2004 but in spite of some differences, they were for the most part all based on the same core materials and methodology. These three programs are the Community-Based Disaster Preparedness program, the Emergency Recovery and Disaster Management program and the Community Disaster Preparedness Education and Mitigation program.

A.3.1. The Community-Based Disaster Preparedness Program (CBDP)

The CBDP program was part of a regional program started by the Federation of Red Cross and Red Crescent Societies (Dominica Red Cross, 2000). DDO/DDAs were trained as facilitators as part of the program. In addition, program activities aimed at establishing and training disaster committees in a set of selected communities, assisting them to design a disaster plan and identify hazards in their communities and engaging the community in selecting and implementing a disaster mitigation micro-project.

The program was carried out between November 1997 and March 2000 in 21 communities, and later extended to a few others by Small Projects Assistance Team, a local NGO, with funding from the Caribbean Peoples Development Agency. Two of the study communities benefited from this program: Colihaut and Dublanc (see also Appendix G).

A.3.2. The Emergency Recovery and Disaster Management Program

Also regional in nature, the second program took place between 1999 and 2002 and was funded by the World Bank. It encompassed several areas at the national and community level including physical prevention and mitigation through sea defense works and shelter retrofitting, the strengthening of ODM through the provision of training and specialized disaster equipment, some work towards developing an effective early warning system, and community disaster management training (World Bank, 2004a). Several difficulties were encountered during implementation and some activities had to be cancelled, notably because of 1999 Hurricane Lenny, slow implementation, managerial weaknesses and problems with co-financing by the Dominican government, and constraints associated with the lack of staff and resources of implementing agencies (World Bank, 2004a). Nonetheless, the community-based disaster management component was carried out in late 2001 and 2002 and further contributed to building capacity at the local level.

Although the underlying goals and training materials and methodology were essentially the same as for the CBDP program, the approach was slightly different. Training was not conducted in the communities; rather about 500 resource persons (i.e., village council chairs and clerks, shelter managers and a cross-section of relevant

personnel and community members) were trained by the Dominica Red Cross and external facilitators in workshops at a central location in each of the seven districts (GoCD, 2002). None of the study communities directly participated in this program but the program nonetheless contributed to reinforcing community-based disaster preparedness in Dominica and to further establish the partnership between the Dominica Red Cross, DDO/DDAs and the Office of Disaster Management.

A.3.3. The Community Disaster Preparedness Education and Mitigation Program (CDPEM)

Dominica was one of the four Caribbean islands who benefited from CDPEM. The program was funded by USAID-OFDA and the American Red Cross and carried out between 2002 and 2004 in 5 selected communities. CDPEM relied on the same training materials and methodology that were produced by the Dominica Red Cross for the other programs, but used a more comprehensive approach. Like CBDP, CDPEM operated at the community level and included a disaster mitigation micro-project. The training was taken one step further to include a table-top simulation exercise requiring the disaster committee to respond to a hypothetical disaster scenario. Further work was conducted to reach out to households, first through a community awareness campaign (using billboards, disaster information calendars and a series of disaster tips in local newspapers) and second, by working with a sample of approximately 30 percent of households in each community and training them in preparing disaster family plans, with the idea that this knowledge would then be shared with relatives, friends and neighbors (Dominica Red Cross, 2004).

Fond Saint Jean is a small hamlet that depends administratively on the neighboring village of Bagatelle. The disaster committee in Bagatelle, which also serves

Fond Saint Jean, participated in CDPEM. The household component of CDPEM was carried out in Bagatelle so that in essence the activities carried out in Dublanc, Colihaut and Bagatelle/Fond Saint Jean as part of CBDP and CDPEM were relatively similar and essentially pertained to the organization of disaster committees.

A.4. Summary

Much progress has been made in Dominica regarding disaster preparedness since 1979 Hurricane David (Benson et al., 2001a). Progress was essentially made in three areas - institutional strengthening, infrastructure improvement, and community-based disaster management – and was largely dependent on the availability of external funding, initially from the UK and the Caribbean Development Bank, and later on from individual donors who financed a variety of discrete programs (Benson et al., 2001a).

Disaster management in Dominica today essentially focuses on disaster preparedness and disaster preparedness in turn revolves to a large extent on the establishment and sustained activities of disaster committees at the community level. Local Government representatives (DDOs and DDAs) play an essential role in working with disaster committees. The Office of Disaster Management and the Dominica Red Cross are also valuable resources for communities but their activities are limited outside of specific externally-funded programs.

Three community preparedness programs have in particular contributed to the training of facilitators and of many volunteers across the island and to the strengthening of ties between key preparedness actors and communities. They have also provided the approach that is still used to train and organize disaster committees in more communities.

Three study communities have benefited from these programs: Dublanc and Colihaut from CBDP and Bagatelle/Fond Saint Jean from CDPEM.

APPENDIX B

Household Questionnaire
Disaster Community Preparedness Study

ID Number _____

Date of Interview: _____
Name of Interviewer: _____
Name of Community: _____

Participation Consent Check
Interviewee agreed to do the interview Yes / No

Completeness Check
Number of questions answered as "Don't know/not sure" or "Refused to Reply"
Part A _____
Part B _____
Part C _____
Part D _____
Total _____

[DO NOT READ] **A. Household Disaster Preparedness and Awareness**
First, I would like to ask you some questions about how you and your community prepare for natural disasters.

A.1. Among the NATURAL hazards to which your community is prone, which one is of major concern to you?

[1] Volcanic eruptions
[2] Flooding
[3] Sea swells
[4] Earthquakes
[5] Hurricanes
[6] Landslides
[7] Other [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

A.2. Over the past year, have you and your household done anything to prepare for this hazard [NAME HAZARD]?

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

A.3. Does this community have any kind of a community disaster plan that has been drawn by the community itself? [NOT THE NATIONAL NEPO NATURAL DISASTER PLAN]

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

A.4. Can you name three areas of responsibility of the disaster committee in this community? [WRITE IN ALL THE ANSWERS GIVEN, DO NOT PROMPT]

[0] Not able to name anything
[1] There is no disaster committee in this community
1 _____
2 _____
3 _____
[99] Refused to reply

[DON'T ASK. THIS WILL BE FILLED BY YOUR SUPERVISOR]
Total number of correct answers: _____

A.5. If you needed to evacuate your house to go to a shelter in a disaster, 3 things you MUST bring with you are [WRITE IN ALL THE ANSWERS GIVEN, DO NOT PROMPT]

[0] Not able to name anything

1 _____

2 _____

3 _____

[99] Refused to reply

[DON'T ASK. THIS WILL BE FILLED BY YOUR SUPERVISOR]

Total number of correct answers: _____

A.6. Does your household have any kind of a family plan for disasters?

[1] Yes

[2] No

[88] Don't know/not sure

[99] Refused to reply

A.7. If a hurricane was expected to hit Dominica, name 3 ACTIONS you and your HOUSEHOLD would do AROUND YOUR HOME to prepare for it? [WRITE IN ALL THE ANSWERS GIVEN, DO NOT PROMPT]

[0] Not able to name anything

1 _____

2 _____

3 _____

[99] Refused to reply

[DON'T ASK. THIS WILL BE FILLED BY YOUR SUPERVISOR]

Total number of correct answers: _____

[DO NOT READ] **B. Community-Based Social Capital**
Thank you. Now, I would like to ask you some questions about the quality of life and the level of solidarity in your community.

[DO NOT READ] **Structural Features**
B.1. Are you a member of any community groups or organizations or of any interest groups?

[1] No, I am not a member of any group
[2] Farmers/fishermen group
[3] Church group
[4] Sports group
[5] Cultural Group
[6] Political group
[7] Parent-Teacher Association
[8] Village council/Improvement Committee/Enhancement Committee
[9] Disaster committee
[10] Other [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

Total number of groups: _____

B.2. In some communities, people get help from other residents when they build or repair their homes. If someone in this community was building or repairing their homes, then who do you think would help them?

[1] The family would deal with the situation individually or hire paid help
[2] Close relatives
[3] Relatives and neighbors/friends
[4] Relatives and neighbors/friends and a small group of other residents
[5] Almost everyone in the community
[88] Don't know/not sure
[99] Refused to reply

B.3. In some communities, residents contribute free labor to community projects such as the cleaning of land, road repairs, or the repair and maintenance of public buildings. Outside of community day of service, how many people in this community (what percentage) do you think would contribute free labor to such projects?

[0] No one
[1] Less than 25%
[2] Between 25 and 50%
[3] Between 50 and 75%
[4] More than 75%
[5] 100%
[88] Don't know/not sure
[99] Refused to reply

B.4. In emergency situations, people sometimes come together to assist each other. Suppose there was a hurricane in this community, how many people in this community (what percentage) do you think would volunteer and help clear debris?

[0] No one
[1] Less than 25%
[2] Between 25 and 50%
[3] Between 50 and 75%
[4] More than 75%
[5] 100%
[88] Don't know/not sure
[99] Refused to reply

B.5. Sometimes, people gather at the church, the rum shop, the playing field, or the street corner to play dominoes or just talk. How many people in this community (what percentage) take part in such informal gatherings?

[0] No one
[1] Less than 25%
[2] Between 25 and 50%
[3] Between 50 and 75%
[4] More than 75%
[5] 100%
[88] Don't know/not sure
[99] Refused to reply

B.6. Are there any groups or individuals in this community that primarily interact among themselves but not with the rest of the community?

[1] Yes
[2] No [GO TO B.8]
[88] Don't know/not sure [GO TO B.8]
[99] Refused to reply [GO TO B.8]

B.7. What do you think are the main reasons why these people primarily interact among themselves and not with others? [CHECK ALL THAT APPLIES]

[1] Income level
[2] Occupation/Job
[3] Religious beliefs
[4] Age
[5] Political affiliation
[6] Interests (likes and dislikes)
[7] Other [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

B.8. In some communities, there are significant political divisions. Are there any political divisions in this community?

[1] Yes
[2] No [GO TO B10]
[88] Don't know/not sure [GO TO B10]
[99] Refused to reply [GO TO B10]

B.9. In some communities, people from different parties won't cooperate on community matters ONLY around election times. In others, people won't cooperate even outside of election times with people from other parties. Do political divisions prevent people from cooperating on community matters in this community? [PROMPT FOR WHEN: DURING AND OUTSIDE OF ELECTION TIMES]

[1] Political divisions never prevent people from cooperating
[2] Political divisions prevent people from cooperating ONLY around election times
[3] Political divisions prevent people from cooperating even outside of election times
[88] Don't know/Not sure
[99] Refused to reply

[DO NOT READ] **Cognitive Features**

B.10. People care for and assist each other more in some communities than in others. In this community, who would you lend your blender, your electrical iron, a tool or other items from your house?

[1] No one
[2] Only close relatives
[3] Close relatives and neighbors/friends
[4] A small group of people besides relatives and neighbors/friends
[5] Almost anyone in the community
[88] Don't know/not sure
[99] Refused to reply

B.11. Some people are less fortunate than others and sometimes cannot afford to buy food. Are there such people in this community?

[1] Yes
[2] No [GO TO B.13]
[88] Don't know/not sure [GO TO B.13]
[99] Refused to reply [GO TO B.13]

B.12. Who in this community (what percentage) would share food with these people?

[1] No one
[2] Their close relatives only
[3] Less than 25%
[4] Between 25 and 50%
[5] Between 50 and 75%
[6] More than 75%
[7] 100%
[88] Don't know/not sure
[99] Refused to reply

B.13. In some communities, people have complained about gossip and small talk. Would you agree there is gossip and small talk in this community?

[1] Strongly agree
[2] Somewhat agree
[3] Somewhat disagree
[4] Strongly disagree
[88] Don't know/not sure
[99] Refused to reply

B.14. Some people have complained about safety in their community. What would you do to make your house safe it you leave at night?

[1] Nothing, this community is very safe
[2] Ask neighbors to watch for my property when I am away
[3] Lock the house
[4] Leave lights and/or TV on
[5] A fence, burglar bars or guard dogs
[6] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **Position Generator**

Thank you. Now I would like to ask you a few questions about the contacts you may have with people who occupy certain positions.

B.15. [FOR EACH JOB ASK] Do you know someone on a first-name basis (or well enough to talk to) who is [READ NAME OF JOB]?

[**IF NO** WRITE 0 AND MOVE ON TO NEXT JOB]
[**IF YES**] If you know more than one person, think of the one person you are the most familiar with. Is this person an acquaintance, a friend, or a relative?

[WRITE NUMERALS AND CODE ONLY THE STRONGEST RELATION. If the respondent mentions an acquaintance in response, ask whether he or she also knows a friend or family member. If a friend is mentioned, ask whether the respondent also knows a family member in this position. If a friend is mentioned as a first response, move on to the next occupation] [MOVE ON TO NEXT OCCUPATION]

	[0] Don't know anyone with this job	[1] An acquaintance	[2] A friend	[3] A relative	[88] Don't know/not sure	[99] Refused to reply
1. House help						
2. Office cleaner						
3. Messenger						
4. Fisher						
5. Farmer						
6. Secretary						
7. Policeman						
8. Teacher						
9. Nurse						
10. Accountant						
11. Police Commissioner						
12. School principal						
13. PS						
14. Medical doctor						
15. Bank manager						

[DO NOT READ] **C. Mediating Agencies**
Thank you. Now, I would like to ask you some questions about how things work in this community.

C.1. When community projects take place in this community, is the community AT LARGE involved in:

	[1] Yes	[2] No	[88] Don't know/not sure	[99] Refused to reply
1. Project selection and decisions				
2. Providing labor				
3. Project evaluation				

Total number of yes: _____

[DO NOT READ] **Village Council Chair**
First I would like to ask you some questions about the chair of the village council in this community.
C.2. Do you know who the chair of the village council is in this community?
[1] Yes [ASK NAME] _____
[IF THE ANSWER IS CORRECT GO TO C.3, OTHERWISE GO TO C.2]
[2] No
[88] Don't know/not sure
[99] Refused to reply

C.3. The chair of the village council in this community is [GIVE NAME]: _____ _____. Do you know who this person is?

[1] Yes
[2] No [GO TO C.7]
[88] Don't know/not sure [GO TO C.7]
[99] Refused to reply [GO TO C.7]

C.4. Some leaders' only goal is to provide a useful service to the community, while others are also motivated by personal goals or simply try to take advantage of their position for personal benefits. What do you think are the motivations of the chair of the village council [NAME]?

[1] This person provides a useful service to the community
[2] This person helps people in the community along with helping himself/herself
[3] This person simply takes advantage of her position
[88] Don't know/not sure
[99] Refused to reply

C.5. How often does the chair of the village council [NAME] personally participate in community projects in this community?

[1] Almost all the time
[2] Regularly
[3] Only on some occasions
[4] Never
[88] Don't know/not sure
[99] Refused to reply

C.6. If you were to make contact with the chair of the village council [NAME], do you think your opinions, suggestions and/or concerns would get a response or will you be ignored?

[1] I will get a response almost all the time
[2] I will sometimes get a response
[3] I will be ignored
[4] I would not go to that person
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **Disaster Committee Chair**
Thank you. Now I would like to ask you some questions about the chair of the disaster committee in this village.

C.7. Do you know who the chair of the disaster committee is in this community?

[1] Yes [ASK NAME] _____
[IF THE ANSWER IS CORRECT GO TO C.9, OTHERWISE GO TO C.8]
[2] No
[3] There is no disaster committee in this community
[88] Don't know/not sure
[99] Refused to reply

C.8. The chair of the disaster committee in this community is [GIVE NAME]: _____ _____. Do you know who this person is?

[1] Yes
[2] No [GO TO C.12]
[88] Don't know/not sure [GO TO C.12]
[99] Refused to reply [GO TO C.12]

C.9. Do you think the chair of the disaster committee [NAME]'s only goal is to provide a useful service to the community or do you think they are taking advantage of their position?

[1] This person provides a useful service to the community
[2] This person helps people in the community along with helping himself/herself
[3] This person simply takes advantage of his/her position
[88] Don't know/not sure
[99] Refused to reply

C.10. How often does the chair of disaster committee [NAME] personally participate in community projects in this community?

[1] Almost all the time
[2] Regularly
[3] Only on some occasions
[4] Never
[88] Don't know/not sure
[99] Refused to reply

C.11. If you were to make contact with the chair of the disaster committee [NAME], do you think your opinions, suggestions and/or concerns would get a response or will you be ignored?

[1] I will get a response almost all the time
[2] I will sometimes get a response
[3] I will be ignored
[4] I would not contact this person
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **District Development Officer**

Thank you. Now I would like to ask you some questions about the District Development Officer and Assistant.

C.12. The DDO for this community is: _____ and the DDA is _____. Do you know who these persons are?

[1] Yes, I know the DDO and the DDA
[2] I know the DDO but not the DDA
[3] I know the DDA but not the DDO
[4] No, I don't know either of them [GO TO D]
[88] Don't know/not sure [GO TO D]
[99] Refused to reply [GO TO D]

C.13. How often do you see the DDO or the DDA in this community?

[1] At least once a week
[2] Once every two weeks
[3] Once a month
[4] Less than once a month
[5] Never
[88] Don't know/not sure
[99] Refused to reply

C.14. Do the DDO or DDA assist your community with the following activities? [CHECK ALL THAT APPLIES]

[1] None of these activities
[2] Work with the village council
[3] Work with Community Organizations
[4] Organize/supervise disaster management activities
[5] Organize events such as Independence Celebration
[6] Other [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

Total number of activities: _____

[DO NOT READ] **D. Personal Information**

Thank you. Finally, I would like to ask you some questions about yourself.

D.1. *Please note the gender of the person:*

[1] Male
[2] Female

D.2. *Please note the ethnic background of the person:*

[1] African
[2] Carib
[3] Mixed
[4] Other [SPECIFY] _____

D.3. What is your age?

[1] Under 25
[2] Between 25 and 29
[3] Between 30 and 34
[4] Between 35 and 39
[5] Between 40 and 44
[6] Between 45 and 49
[7] Between 50 and 54
[8] Between 55 and 59
[9] Between 60 and 64
[10] Over 65
[99] Refused to reply

D.4. How many years have you been living in this community?

[1] All my life
[2] Other [SPECIFY] _____

D.5. What is your religion?

[1] Roman Catholic
[2] Protestant (for instance Methodist; Pentecostal; Seventh-Day Adventist; Baptist)
[3] Other [SPECIFY] _____
[4] None
[99] Refused to reply

D.6. How many people live in this household? _____

D.7. How many are children of school-age? _____

D.8. How many are elderly? _____

D.9. Which among the following sources do you consult regularly – at least once a month – for news and information?

[1] None
[2] Household members
[3] Other family members
[4] Neighbors
[5] Friends
[6] Radio or TV
[7] Newspaper
[8] Village council
[8] Others [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

Total number of sources _____

D.10. Does this household own, rent or lease this dwelling?

[1] Owned
[2] Rented
[3] Leased
[4] Rent-free
[5] Squatted
[6] Other [SPECIFY] _____
[88] Don't know/not sure
[99] Refused to reply

D.11. What is the highest level of education in this household?

[1] None or Primary
[2] Secondary
[3] Tertiary
[88] Don't know/not sure
[99] Refused to reply

D.12. Think about the major earner in this household. In which sector is this person employed?

[1] Unemployed
[2] Receive remittance from overseas
[3] Agriculture – bananas
[4] Agriculture – other
[5] Fishing
[6] Manufacturing
[7] Construction
[8] Restaurants/hotels
[9] Wholesale/retail
[10] Transport/communication
[11] Government
[12] Other services
[88] Don't know/not sure
[99] Refused to reply

D.13. In which of these groups did your total family income from all sources fall last year before taxes? Just tell me the letter

[A] < EC$ 12,000
[B] EC$ 12,000-17,999
[C] EC$ 18,000-23,999
[D] EC$ 24,000-29,999
[E] EC$ 30,000-35,999
[F] EC$ 36,000-41,999
[G] > EC$ 42,000
[88] I don't know/not sure
[99] Refused to reply

APPENDIX C

Disaster Committee Chair Questionnaire
Disaster Community Preparedness Study

Date of Interview: _____
Name of Interviewer: _____
Name of Community: _____

Participation Consent Check
Interviewee agreed to do the interview Yes / No

Completeness Check
Number of questions answered as "Don't know/not sure" or "Refused to Reply"
Part A _____
Part B _____
Part C _____
Part D _____
Part E _____
Part F _____
Part G _____
Part H _____
Total _____

[DO NOT READ] **Disaster Committee Activities**

[DO NOT READ] **A. Disaster Committee Staff and Meetings**
First, I would like to ask you some questions about how this disaster committee operates.

A.1. This past year, has the disaster committee in this community held meetings:

	Yes [1]	No [2]	Don't know/unsure [88]	Refused to reply [99]
At the beginning of the hurricane season				
During the hurricane season (June-November) BESIDES that preliminary meeting				
Outside of the hurricane season (December-May)				

Total number of yes: _____

A.2. Are regular meetings well attended by disaster committee members (what percentage)?

[1] There are no meetings
[2] Few members attend. Below 25%
[3] Between 25 and 50%
[4] Between 50 and 75%
[5] More than 75%
[6] 100%
[88] Don't know/not sure
[99] Refused to reply

A.3. In some communities, disaster committees form subcommittees to carry out specific activities. For each of the following tasks, please indicate if there is a subcommittee in charge of it?

[1] Dissemination of information (e.g., disaster plan, shelter location)
[2] Identification of hazards
[3] Alert
[4] Evacuation
[5] Shelter management
[6] First aid
[7] Food and relief distribution
[8] Damage/needs assessment
[9] Transport and clearance of roads
[10] Communications
[11] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

Total number of tasks: _____

A.4. Does any group or individual help this disaster committee recruit volunteers?

[1] Yes (Please specify who) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

Thank you. Now, I would like to ask you some questions about the current activities of the disaster committee in this community.

[DO NOT READ] **B. Hazard and Vulnerability Assessment**

B.1. Does this community have any kind of a hazard map outlining the areas that could potentially be affected by various types of hazards (such as landslides, flooding or fires)?

[1] Yes (Please specify when the map was created) _____
[2] No [GO TO B.3]
[88] Don't know/not sure [GO TO B.3]
[99] Refused to reply [GO TO B.3]

B.2. Has this map either been created or updated within the last five years?

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

B.3. Does the disaster committee keep a list of particularly vulnerable persons such as the elderly and physically or mentally challenged who live in hazardous areas in this community?

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **C. Planning**

C.1. Does this community have any kind of a disaster plan that has been drawn by the community (separate from Red Cross guidelines and national NEPO natural disaster plan)?

[1] Yes
[2] No [GO TO C.5]
[88] Don't know/not sure [GO TO C.5]
[99] Refused to reply [GO TO C.5]

C.2. Which hazards are covered by this plan?

[1] Volcanic eruptions
[2] Floods
[3] Fires
[4] Earthquakes
[5] Hurricanes
[6] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

Total number of hazards _____

C.3. In which year was this disaster plan created? _____

C.4. Has this plan ever been updated since it was first created?

[1] Yes (Please specify in which year) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

C.5. Have any community exercises and/or emergency drills ever been conducted in this community?

[1] Yes
[2] No [GO TO C.8]
[88] Don't know/not sure [GO TO C.8]
[99] Refused to reply [GO TO C.8]

C.6. When was the last drill or community exercise conducted? _____

C.7. Who organized that drill?

[1] Government
[2] Red Cross
[3] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

C.8. When a disaster strikes, people sometimes need to evacuate their homes. Have shelters been identified in this community?

[1] Yes (Please indicate how many) _____
[2] No [GO TO C.10]
[88] Don't know/not sure [GO TO C.10]
[99] Refused to reply [GO TO C.10]

C.9. Are there signs posted in the community with the location of the shelters on them?

[1] Yes (How many?) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

C. 10. Does the disaster committee keep copies of damage and needs assessment forms?

[1] Yes (Please specify where and how many) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

C.11. Does the disaster committee own first-aid kits?

[1] Yes (Please specify where and how many) _____
[2] No [GO TO C.14]
[88] Don't know/not sure [GO TO C.14]
[99] Refused to reply [GO TO C.14]

C.12. How were these first aid kits secured?

[1] Initiative of disaster committee
[2] Request of disaster committee (Please specify to whom) _____
[3] DDO
[4] Red Cross
[5] ODM
[6] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

C.13. Have perishable items in these first-aid kits ever been replenished?

[1] Yes (Please specify when) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

C.14. Does the disaster committee own a VHF transreceiver?

[1] Yes
[2] No but one a member is a HAM radio operator
[3] No, and the committee doesn't have access to one
[88] Don't know/not sure
[99] Refused to reply

C.15. Does the disaster committee own emergency supplies (e.g., lanterns, blankets)?

[1] Yes (Please specify what) _____
[2] No [GO TO C.17]
[88] Don't know/not sure [GO TO C.17]
[99] Refused to reply [GO TO C.17]

C.16. How were these emergency supplies secured?

[1] Initiative of disaster committee
[2] Request of disaster committee (Please specify to whom) _____
[3] DDO
[4] Red Cross
[5] ODM
[6] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

C.17. Did the disaster committee ever request any materials or tools (e.g., plywood, tools to clear roads)?

[1] Yes
[2] No [GO TO C.21]
[88] Don't know/not sure [GO TO C.21]
[99] Refused to reply [GO TO C.21]

C.18. When was the last time the disaster committee requested such materials? _____

C.19. To whom did the disaster committee address this request?

[1] DDO
[2] Red Cross
[3] ODM
[4] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

C.20. Were these materials obtained?

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

C.21. Over the past year, has the disaster committee carried out any mitigation projects in the community (e.g., clearing drains, fund-raising for supplies, ensuring that shelters have shelters or use plywood)?

[1] Yes
[2] No
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **D. Public Information and Education**

D. 1. One of the responsibilities of the disaster committee is to inform residents of disaster preparedness activities and of their roles and responsibilities. Which activities are carried out BY THE DISASTER COMMITTEE in this community to inform and educate residents?

[1] Assistance in writing up household plans
[2] Dissemination of brochures, flyers, posters, or pamphlets
[3] Billboards or signs
[4] Open-air meetings
[5] Others (Please specify): _____

_____

[88] Don't know/not sure
[99] Refused to reply

Total number of activities: _____

D.2. When is the last time that the disaster committee carried out a community information session about hazards and disasters in this community?

[1] No information session were ever carried out
[2] The last session was carried out _____
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **E. Independence**

Thank you. Now, I would like to ask you some questions about when this disaster committee was first created and whom it reports to.

E.1. Who formed the disaster committee in this community?

[1] DDO
[2] Red Cross program
[3] ODM
[4] Village council
[5] Local people (group) _____
[6] Local people (one person) _____
[88] Don't know/not sure
[99] Refused to reply

E.2. How many years has this disaster committee existed? _____ years

E.3. How many people have led the disaster committee since its inception? _____

E.4. On average, over the past five years what has the single and most important financial source for the disaster committee been?

[1] None, there is no funding
[2] Fund raising
[3] Small grants from the government
[4] External NGOs or donors
[5] Other (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

E.5. Does the disaster committee report to or is supervised by any one

[1] The disaster committee doesn't report to anyone
[2] DDO
[3] Other (Please specify) _____
[88] Don't know/not sure [GO TO F]
[99] Refused to reply [GO TO F]

E.6. Please explain:

E.7. What does the DDO assist this disaster committee with?

[1] Assist to meetings
[2] Call meetings
[3] Access training
[4] Access small grants
[5] Access emergency supplies
[6] Access materials
[7] Others (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **F. Disaster Management Capacity-Building**

Thank you. Now I would like to ask you some questions about any training that this disaster committee may have received.

F.1. Has the disaster committee ever received any training from outside the community?

[1] Yes
[2] No [GO TO G]
[88] Don't know/not sure [GO TO G]
[99] Refused to reply [GO TO G]

F. 2. Did the disaster committee ever request training itself?

[1] Yes (Please specify when the last time was and to whom) _____
[2] No
[88] Don't know/not sure
[99] Refused to reply

Now, I would like you to think about the first time this disaster committee received training.

F.3. In which year was this training received? _____

F.4. Who accessed (requested) this training?

[1] Disaster Committee
[2] DDO
[3] Red Cross
[4] Other (please specify) _____
[88] Don't know/not sure
[99] Refused to reply

F.5. Who conducted this training?

[1] Red Cross
[2] District Development Officer
[3] Office of Disaster Management
[4] Other (please specify) _____
[88] Don't know/not sure
[99] Refused to reply

F.6. How long did this training last? _____

F.7. On which topics was training received?

[1] Developing a hazard map
[2] Developing a community disaster plan
[3] Practicing a disaster plan
[4] Information communication
[5] Shelter management
[6] Damage/needs assessment
[7] Management of relief supplies
[8] Evacuation planning/relocation
[9] Hurricane tracking
[10] Basic first aid
[11] Retrofitting
[12] Others (Please specify):_____

_____

[88] Don't know/Not sure
[99] Refused to reply

Total number of topics: _____

F.8. Has the disaster committee received any training from outside the community over the past TWO years?

[1] Yes
[2] No [GO TO G]
[88] Don't know/not sure [GO TO G]
[99] Refused to reply [GO TO G]

F.9. If the disaster committee has received training more than once over the past two years, please think about the time when that training was the most comprehensive. Who requested this training?

[1] Disaster Committee
[2] District Development Officer
[3] Other (please specify) _____
[88] Don't know/not sure
[99] Refused to reply

F.10. How long did this training last? _____

F.11. On which topics was training received?

[1] Developing a hazard map
[2] Developing a community disaster plan
[3] Practicing a disaster plan
[4] Information communication
[5] Shelter management
[6] Damage/needs assessment
[7] Management of relief supplies
[8] Evacuation planning/relocation
[9] Hurricane tracking
[10] Basic first aid
[11] Retrofitting
[12] Others (Please specify):_____

_____

[88] Don't know/Not sure
[99] Refused to reply

Total number of topics: _____

[DO NOT READ] **G. Inter-organizational Relations**

Thank you. Now I would like to ask you some questions about the relations between this disaster committee and other organizations.

G.1. Is there any communication between this disaster committee and other government organizations?

[1] Yes
[2] No [GO TO G.3]
[88] Don't know/not sure [GO TO G.3]
[99] Refused to reply [GO TO G.3]

G.2. Please describe which organizations and how they relate to each other (Negative; Neutral; Positive/Reciprocal):

G.3. Is there any conflict between the disaster committee and the village council?

[1] Yes
[2] No [GO TO G.5]
[88] Don't know/not sure [GO TO G.5]
[99] Refused to reply [GO TO G.5]

G.4. Please explain:

G.5. Is there any communication between this disaster committee and other organizations in this community?

[1] Yes
[2] No [GO TO G.7]
[88] Don't know/not sure [GO TO G.7]
[99] Refused to reply [GO TO G.7]

G.6. Please describe which organizations and how they relate to each other (Negative; Neutral; Positive/Reciprocal) [PROMPT RED CROSS BRANCH AND CBOs]

G.7. Is there any communication between this disaster committee and any other organizations?

[1] Yes
[2] No [GO TO H]
[88] Don't know/not sure [GO TO H]
[99] Refused to reply [GO TO H]

G.8. Please describe which organizations and how they relate to each other (Negative; Neutral; Positive/Reciprocal) [PROMPT RED CROSS AND ODM]

[DO NOT READ] H**. Personal Information**

H.1. *Make a note of gender of participant*

[1] Male
[2] Female

H.2. What is your ethnic background?

[1] African
[2] Carib
[3] Mixed
[4] Other
[88] Don't know/not sure
[99] Refused to reply

H.3. What is your age? _____

H.4. How long have you been living in this community? _____

H.5. How long have you been holding leading positions in either collective or governmental bodies in this community? _____ years

H.6. How long have you been chair of the disaster committee in this community? _____ years

H.7. What is your level of education?

[1] None or primary
[2] Secondary
[3] Tertiary
[88] Don't know/not sure
[99] Refused to reply

H.8. What is your job (What was your job if you are retired)? _____

H.9. Have you ever received any type of leadership skills training (e.g., how to lead a committee; how to run a meeting)?

[1] Yes
[2] No [GO TO I.11]
[88] Don't know/not sure [GO TO I.11]
[99] Refused to reply [GO TO I.11]

H.10. If yes, please specify when and in which context

APPENDIX D

District Development Officer Questionnaire
Disaster Community Preparedness Study

Date of Interview: _____
Name of Interviewer: _____
Name of Community: _____

Participation Consent Check
Interviewee agreed to do the interview Yes / No

Completeness Check
Number of questions answered as "Don't know/not sure" or "Refused to Reply"
Part A _____
Part B _____
Part C _____
Part D _____
Total _____

[DO NOT READ] **A. Disaster Training**
First I would like to ask you some questions about disaster training you may have received as part of your job.

A.1. Have you ever received any disaster training?
[1] Yes
[2] No [GO TO B]
[88] Don't know/not sure [GO TO B]
[99] Refused to reply [GO TO B]

Now, I would like you to think about the first time you received training.
A.2. In which year were you trained? _____

A.3. Who conducted this training?
[1] Red Cross
[2] Office of Disaster Management
[3] Other (please specify) _____
[88] Don't know/not sure
[99] Refused to reply

A.4. On which topics did you receive training?
[1] Developing a hazard map
[2] Developing a community disaster plan
[3] Practicing a disaster plan
[4] Information communication
[5] Shelter management
[6] Damage/needs assessment
[7] Management of relief supplies
[8] Evacuation planning/relocation
[9] Hurricane tracking
[10] Basic first aid
[11] Others (Please specify):_____

_____
[88] Don't know/Not sure
[99] Refused to reply

Total number of topics: _____

A.5. How long did this training last? _____

A.6. Have you received further training over the past TWO years?
[1] Yes
[2] No [GO TO B]
[88] Don't know/not sure [GO TO B]
[99] Refused to reply [GO TO B]

A.7. If you have received training more than once over the past two years, please think about the time when that training was the most comprehensive. Who conducted this training?

[1] Red Cross
[2] Office of Disaster Management
[3] Other (please specify) _____
[88] Don't know/not sure
[99] Refused to reply

A.8. On which topics was training received?

[1] Developing a hazard map
[2] Developing a community disaster plan
[3] Practicing a disaster plan
[4] Information communication
[5] Shelter management
[6] Damage/needs assessment
[7] Management of relief supplies
[8] Evacuation planning/relocation
[9] Hurricane tracking
[10] Basic first aid
[11] Others (Please specify):_____

_____

[88] Don't know/Not sure
[99] Refused to reply

Total number of topics: _____

A.9. How long did this training last? _____

[DO NOT READ] **B. Disaster Committee Chair Information**
Thank you. Now I would like to ask you some question about the chair of the disaster committee in _____.

B.1. In some communities, the disaster committee is essentially run by one person who makes most of the decisions, while in others disaster preparedness is a responsibility shared by all members of the disaster committee. Which one would you say is the case in this community?

[1] Disaster preparedness is a shared responsibility between all members of the disaster committee
[2] The chair of the disaster committee does most of the work and takes most of the decisions
[88] Don't know/Not sure
[99] Refused to reply

B.2. In some communities, the disaster committee functions by itself while in others the DDO or someone else needs to constantly remind them of their responsibilities. Which one would you say is the case in this community?

[1] The disaster committee functions by itself
[2] The disaster committee needs to be constantly reminded of its responsibilities by the DDO
[3] The disaster committee is constantly reminded of its responsibilities by someone else (Please specify) _____
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **C. Village Council Chair Information**
Thank you. Now I would like to ask you some question about the chair of the village council in _____.

C.1. In some communities, the chair of the village council makes most of the decisions while in others members of the village council cooperate. Which one would you say is the case in this community?

[1] The village council chair and the village council cooperate
[2] The village council chair makes most of the decisions
[88] Don't know/Not sure
[99] Refused to reply

C.2. In some communities, when the chair of the village council needs to make contact with a government department or other donors, they take the help of an intermediary person such as the DDO or the Parliamentary Representative, while in others they establish such contacts themselves. Which one is the case in this village?

[1] The chair of the village council makes direct contact with government department and donors
[2] The chair of the village council makes contact through myself
[3] The chair of the village council makes contact through another intermediary person (Please specify): _____
[88] Don't know/not sure
[99] Refused to reply

[DO NOT READ] **D. Personal Information**
Thank you. Now I would like to ask you some questions about yourself.
D.1. *Make a note of gender of participant*

[1] Male
[2] Female

D.2. What is your age? _____

D.3. What is your ethnic background?

[1] African
[2] Carib
[3] Mixed
[4] Other
[88] Don't know/not sure
[99] Refused to reply

D.4. In which district do you live? _____

D.5. In which community and district do you live? _____

D.6. What is your level of education?

[1] None or primary
[2] Secondary
[3] Tertiary
[88] Don't know/not sure
[99] Refused to reply

D.7. What is your background in? _____

D.8. What is your previous job, if you have had any? _____

D.9. How long have you been a Disaster Development Officer? _____

D.10. How long have you been DDO in this district? _____

D.11. How concerned are you about a hurricane occurring in the future and resulting in major damage and loss of life?

[1] Very concerned
[2] Somewhat concerned
[3] Not very concerned
[4] Not concerned at all
[88] Don't know/not sure
[99] Refused to reply

D.12. How likely do you think such a hurricane is to occur in the next ten years?

[1] Very likely
[2] Somewhat likely
[3] Not very likely
[88] Don't know/not sure
[99] Refused to reply

APPENDIX E

Measuring Community Social Capital and Understanding its Nature in Dominica

Community social capital is one of the key factors hypothesized to influence household preparedness in the conceptual framework presented in Chapter 2. Community social capital has received considerable attention from researchers over the last two decades and has been operationalized and measured differently across studies. Part of the difficulty in developing standardized measures of community social capital is that its empirical correlates vary across contexts (Krishna & Shrader, 2002). A contextually-relevant measure of community social capital in the Dominican context was presented in Chapter 3. A confirmatory factor analysis (CFA) was used to validate the use of a single social capital index based on five indicators but an exploratory factor analysis (EFA) approach was also used to determine whether an alternate measure of social capital would be more appropriate. A two-factor model emerged from the EFA and a second CFA of the two-factor model was subsequently run to compare the initial one-factor model to the two-factor model. Even though the two-factor model was not retained in the final analysis, the two dimensions that emerged from the EFA provide some insight on differences in community social capital across villages.

This appendix presents the five questions and the coding scheme that were used to build the community social capital index. It then presents the results of the EFA, a possible interpretation of the two-factor model and the results of the comparison of the

one-factor and two-factor model. Finally, evidence on differences in community social capital across villages is reviewed in the light of the two dimensions identified in the EFA. A summary concludes this appendix.

E.1. Community Social Capital Indicators

A household-level community social capital index was used to reflect household access to community social capital. This index is comprised of five indicators taken directly from answers to the household survey. A larger number of indicators was initially considered but some of them had to be excluded after examining the distribution of answers, either because almost all answers fell in the same response category or because there were too many missing values. The five final indicators can be separated in three categories: two indicators tap into the structural features of community social capital, two correspond to its cognitive dimension and one pertains to collective action and serves as an output measure. These distinctions, however, are somewhat arbitrary and primarily served as a point of departure to build the questionnaire. Answers to the initial questions were recoded based on the distribution of responses. The questions and final coding scheme are presented below.

E.1.1. Structural Features

Answers to two questions served as indicators for the structural dimension of collective social capital. These were:

Membership in Groups. Are you a member of any community groups or organizations?
[0] No
[1] Yes

Expectations of Mutual Support. In emergency situations, people sometimes come together to assist each other. Suppose there was a hurricane in this community, how many people in this community (what percentage) do you think would volunteer and help clear debris?

[1] Less than 25%
[2] Between 25 and 50%
[3] Between 50 and 75%
[4] More than 75%
[5] 100%

It has been repeatedly claimed in the social capital literature that not all types of networks and associations contributed equally to social capital and that the character of associational life itself was important (Hall, 1997; Stolle & Rochon, 1998). A difference was thus made between associations that emphasized community or public interest (i.e., church group, sports group, cultural –for instance, tribal dance- group, PTA and community development groups) and institutions that primarily catered to private or instrumental needs (i.e., farmers group, political group). The second question on expectations of mutual support reflects whether people would get together to deal with situations affecting everyone.

E.1.2. Cognitive Features

Two questions were asked that pertain to the cognitive dimension of collective social capital. Both questions cover expectations about the extent to which households would receive assistance from others in certain situations. The first asks for an evaluation of levels of solidarity in the community, while the second measures personal willingness to engage in specific transactions.

Expectations of Solidarity. In some communities, people get help from other residents when they build or repair their homes. If someone in this community was building or repairing their homes, then who do you think would help them?

[0] The family would deal with the situation individually or hire paid help or close relatives would help them
[1] Relatives and neighbors/friends
[2] Relatives and neighbors/friends and a small group of other residents
[3] Almost everyone in the community

Lending of Personal Items. People care for and assist each other more in some communities than in others. In this community, who would you lend your blender, your electrical iron, a tool or other items from your house to?

[0] No one or only close relatives
[1] Close relatives and neighbors/friends
[2] A small group of people besides relatives and neighbors/friends
[3] Almost anyone in the community

E.1.3. Collective Action

Collective action serves as an output measure as it is expected to be more vibrant where social capital is higher. In Dominica, there is a long-standing tradition of koud-mai or self-help, according to which residents organize and provide free labor to build and maintain infrastructure in their communities. One question was asked to determine the perceived extent of koud-mai:

Koud-Mai. In some communities, residents contribute free labor to community projects such as the cleaning of land, road repairs, or the repair and maintenance of public buildings. Outside of community day of service, how many people in this community (what percentage) do you think would contribute free labor to such projects?

[1] Less than 25%
[2] Between 25 and 50%
[3] Between 50 and 75%
[4] More than 75%

E.2. Exploratory Factor Analysis

E.2.1. Confirmatory Factor Analysis and Exploratory Factor Analysis

Factor analysis is used to uncover the latent dimensions of a set of variables. As such, it can be used to validate indexes and to help confirm the latent variables

researchers are trying to model. There are, however, two major classes of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). While CFA allows testing measurement models that are specified a priori, EFA seeks to uncover the latent structure of a set of variables. In other words, CFA is used to confirm a pre-existing theory but EFA allows all indicators to correlate with every possible factor and further allows for an unspecified number of factors. It is thus possible to conduct EFA without any prior expectations regarding the number or nature of underlying factors or without declaring these expectations in the model (Garson, 2007; Kline, 1998; Thompson, 2004).

CFA was used first in this study because the initial intent was to produce a single index of community social capital. Yet measures of social capital have been proposed that consist of more than one factor (see, for instance, Narayan & Cassidy, 2001). Given the contextual nature of community social capital, it is possible that a measurement model based on several sub-factors all linked to the higher-order hypothetical construct of community social capital would be more relevant in the Dominican context. To test this hypothesis and because EFA has repeatedly been used in the social capital field (see Krishna, 2002; Narayan & Cassidy, 2001), EFA was conducted next.

E.2.2. Results of the Exploratory Factor Analysis

Oblique factor analysis was conducted using promax rotation starting with a principal component analysis as implemented by proc factor in SAS. Oblique rotation was chosen because the emerging factors are expected to correlate (Thompson, 2004). Preliminary analysis of the data for suitability for factor analysis yielded a Kaiser-Meyer-Olkin overall measure of sampling adequacy of 0.63, which is adequate to proceed

(Garson, 2007). The number of factors extracted was based on the Kaiser-Guttman rule of eigenvalues greater than 1 and a scree plot (Thompson, 2004). Factor loadings greater than 0.4 were retained for each factor[54] (Norman & Streiner, 2000). Two factors emerged from the analysis, which together explain 55.1 % of the variance[55] in the data. Three items loaded to the first factor: expectations of solidarity, koud-mai and expectations of mutual support. This factor can be interpreted as a traditional form of social capital. The two remaining items, membership in groups and lending of personal items, loaded to the second factor as indicated in Table E.1 and can be taken to reflect a more modern form of social capital (see section 3 below).

Table E.1. Factor loadings of the two-factor model of social capital (EFA)

Item	Factor Loading (completely standardized coefficients)	
	Factor 1: Traditional Social Capital	Factor 2: Modern Social Capital
Membership in Groups	-	0.66
Expectations of Solidarity	0.66	-
Koud-mai	0.77	-
Expectations of Mutual Support	0.66	-
Lending of Personal Items	-	0.85
Eigenvalue	1.55	1.20
Proportion of Variance Explained	31.0	24.0
Inter-Factor correlation	-0.15	

[54] When the sample size is 100 or more, Norman and Streiner (2000) recommend a cutoff of 5.152/[SQRT(n-2)]. The number of observations for which values are available for each of the six retained indicators is 172, yielding a cutoff of 0.40.

[55] The sum of the eigenvalues for the extracted factors divided by the number of measured variables represents the proportion of the information that the factors as a set reproduce (Thompson, 2004).

E.2.3. Model Comparison

A CFA of the two-factor model[56] was conducted next to assess the fit of the two-factor model and compare it to the results of the one-factor model (see Tables E.2 and E.3). As indicated in Table E.2, both models present a good absolute fit to the data[57]. The one-factor model[58] is nested in the two-factor model and their fit can be compared with a chi-square difference test. The chi-square difference statistic equals 2.59, which with a single degree of freedom is nonsignificant at the 0.1 level. Thus the fit of the two-factor model is not significantly better than that of the one-factor model and the one-factor model is preferred. A single household-level index of community social capital was thus used in the rest of this study.

Table E.2. Fit statistics for the one-factor and two-factor models (CFA)

Model	χ^2	df	RMSEA
One-factor model	3.87	5	0.00
Two-Factor Model	1.28	4	0.00

[56] To set scales for the two factors, the variances of the factors were set to 1. A total of 11 parameters including 5 factor loadings, 5 variances and 1 covariance between the factors remain, with 15 observations. Since measurement is unidimensional and there are three indicators per factor, the two-factor model is identified with 4 degrees of freedom.

[57] Commonly reported fit indices such as GFI, AGFI, NFI, CFI and PNFI are not available from LISREL when weights are used in the analysis.

[58] The one-factor model can be considered as a two-factor model with an inter-factor correlation of 1.0.

Table E.3. Completely standardized parameter estimates for the two-factor model (CFA)

	Two-Factor Model Completely Standardized Factor Loadings (t value)		R^2	One-Factor Model Completely Standardized Factor Loadings (t value)	R^2
	Factor 1	Factor 2		One-Factor	
Membership in Groups		0.60 (1.89)	0.37	0.30 (3.07)	0.09
Expectations of Solidarity	0.48 (4.33)		0.23	0.49 (4.47)	0.24
Koud-mai	0.61 (5.04)		0.37	0.59 (5.08)	0.34
Expectations of Mutual Support	0.42 (3.51)		0.18	0.42 (3.54)	0.18
Lending of Personal Items		0.27 (1.64)	0.07	0.16 (1.29)	0.03
Inter-factor correlation		0.45		-	

Note: The factor loadings are not identical to the ones reported for the CFA. This is due to the fact that the CFA and EFA rely on different criteria to extract factors. The CFA uses maximum likelihood to maximize fit. The EFA uses a principal component analysis followed by an oblique promax rotation to maximize prediction.

E.3. Interpretation of the Two-Factor Model

Even though the one-factor model was preferred over the two-factor model, the two-factor model provides valuable insights on differences in community social capital in the six study villages. The first factor is comprised of expectations of solidarity, koud-mai and expectations of mutual support and represents community social capital in its traditional form. The second factor (membership in groups and lending of personal items) reflects a more modern manifestation of community social capital.

E.3.1. From Traditional Community Social Capital to Modern Social Capital

The traditional community social capital factor is driven by koud-mai, a traditional form of collective action in Dominica. Koud-mai has historically developed as a coping mechanism in isolated rural communities. These remote villages were not connected to the capital city where most services were concentrated and had to fend for themselves. As a result from this isolation, a tradition of mutual support based on

reciprocity and trust emerged whereby households would share food, clothing and services and exchange labor. The Catholic Church later extended this tradition to the community level by relying on free community labor to build churches and, later on, schools in the 1960s. Over the years, this form of self-help became even more established as British colonists institutionalized it in a series of self-help programs. These programs were continued in the 1970s as the government started to move towards independence and went on well into the 1990s. Relying on funding and materials from the UK and, later on, from donors and on free labor from community residents, the programs allowed communities to acquire the services and amenities they wanted and that the government lacked funding to provide (Carrette, 1991; Harrison & Simons, 1982).

At the same time as koud-mai became increasingly popular, people's expectations started to rise with the advent of roads, TVs and newspapers and the more paternalistic role the government was able to play for a while after Independence in 1978 due to favorable economic circumstances. Workers and farmers came to expect more and to demand better conditions and more services from the government, including being paid for the labor they provided. As a result, even though koud-mai is still alive nowadays, it has progressively declined over the last two decades. Turn out typically remains very high on Community Day of Service, a day traditionally set aside for residents to devote themselves to community development projects since it was introduced by the government in the early 1980s. Aside from Community Day of Service, however, koud-mai is not as evident as it used to be. Yet it is still apparent in three of the five social capital indicators: households assist each other to build or repair their homes (i.e.,

expectations of solidarity indicator), they contribute free labor to community projects (i.e., koud-mai indicator) and they come out in times of emergency (i.e., expectations of mutual support).

Koud-mai was very likely a perfect example of a local manifestation of social capital at its origins. However, as it has progressively been exploited to further national and developmental goals over the years, it has also lost some of its mutual support and self-help connotation and morphed into a somewhat institutionalized tradition. In other words, koud-mai may be in the process of acquiring a new meaning and no longer be an accurate reflection of levels of social capital in and of itself.

The second factor emerging from the EFA consists of membership in groups and willingness to lend personal items. This factor may represent a more modern manifestation of social capital. There are no significant differences in average household scores for lending of personal items across communities (see Table E.4) but membership in associations varies widely. While koud-mai and traditional social capital appear to have declined over the years, associational life, on the other hand, has gained momentum. In addition to PTAs, church and sports group, new groups have been formed in some of the study communities. Men in Development, for instance, is a unique and very successful community development group in Dublanc. Colihaut, Dubique and Petite Savanne have active cultural groups involved in a variety of activities (e.g., tribal dance, cultural preservation). Involvement in associations is a widely-used indicator of social capital in industrialized countries. This manifestation of social capital, however, may be linked to economic development and only become visible "after levels of per capita income have risen above a certain level" (Krishna, 2002, p. 4).

It would appear, therefore, that economic development has been paralleled by a change in the manifestations of social capital. The transition may however not yet be complete as koud-mai remains by far the form of collective activity the most commonly mentioned by local people. Even though a two-factor structure reflecting the aforementioned changes emerged from the EFA, this may explain why the one-factor model could not be rejected.

E.3.2. How the Transition from Traditional Social Capital to Modern Social Capital is Reflected across Study Communities

Evidence collected from the six study communities indicates that the relative strength of the two forms of community social capital (traditional social capital and modern social capital) varies across villages. The extent to which each form of community social capital manifests itself today is in particular affected by the history of these communities. The following sections provide some historical background on each of the six villages to put in perspective the data collected about community social capital. This information was obtained from key informant interviews and informal talks with village residents. Table E.4 shows the distribution of community social capital indicators across communities to support this discussion. Two indexes were constructed to measure traditional and modern social capital, that represent the unweighted average of the corresponding indicators.

Table E.4. Distribution of community social capital indicators across communities

Indicator *Mean* *(SD)* *n*	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	ANOVA
Traditional social capital							
Expectations of solidarity	1.71 (1.19) 28	1.41 (1.00) 56	0.94 (0.97) 18	1.40 (0.73) 20	1.56 (0.68) 18	1.83 (0.55) 36	3.13**
Koud-mai	3.52 (0.77) 29	2.00 (0.94) 56	1.72 (0.99) 18	2.05 (1.00) 19	1.53 (0.75) 19	2.09 (0.94) 35	15.85***
Expectations of mutual support	3.90 (0.92) 29	4.21 (0.67) 56	3.56 (1.01) 18	3.75 (0.54) 20	3.89 (0.31) 18	3.97 (0.28) 37	3.44***
Traditional social capital index	**1.36 (2.53) 28**	**0.08 (2.11) 56**	**-1.61 (2.28) 18**	**-0.47 (1.57) 19**	**-0.63 (1.41) 17**	**0.28 (1.21) 34**	**6.22*** **
Modern social capital							
Membership in groups[a]	0.45 (0.50) 29	0.29 (0.45) 56	0 (0) 18	0.15 (0.36) 20	0.21 (0.41) 19	0.43 (0.50) 37	3.99***
Lending of personal items	1.24 (1.25) 29	1.45 (0.84) 56	1.00 (1.00) 18	1.70 (0.95) 20	1.32 (0.73) 19	1.51 (0.86) 37	1.31
Modern social capital index	**0.19 (1.91) 29**	**0.04 (1.47) 56**	**-1.05 (1.04) 18**	**0.01 (1.43) 20**	**-0.26 (1.04) 19**	**0.43 (1.44) 37**	**3.28*** **

Note: The definition of the indicators is provided in section F.1, along with the coding scheme that was used.

[a] Dummy variable indicating membership in at least one community group. Because this variable was coded as 0/1, the average can be directly interpreted as the percentage of residents members of at least one organization.

E.3.2.1. Dublanc

Dublanc is what could be considered the darling community of Dominica. Once identified as one of the five poorest Dominican communities in the 1995 Poverty Assessment, Dublanc has turned its fate around and become a prime example of successful community development. According to all key informants, Dublanc is particularly renowned for the extent of koud-mai in the village, a fact that was also confirmed by the household survey. Although everyone agrees that koud-mai has

declined over the years, residents indicate that an average 75%[59] of villagers still come out and contribute free labor to community projects. Pairwise comparisons of average household scores across communities for the koud-mai indicator show that this tradition is more alive in Dublanc than in any other village. Dublanc also has a series of active community groups. As can be seen in Table E.4, 45% of households are involved in at least one community group. As mentioned earlier, Dublanc is especially famous for one of these groups, Men in Development, that has no equivalent in other communities. MID is a group of about 30 male residents that was created in 1999 and contributes to community development. For instance, the group has helped buy materials and provided labor to build roads. It has also organized raffles to pay for fees and books and to help send children to secondary school.

Dublanc's long history of being an active community takes its root in its past. Original inhabitants primarily descend from workers on the former Shillingford estate and farmers have taken on loans to buy plots from the estate (Bonnerjea & Weir, 1996). Because of its remoteness, the community essentially has had to fend for itself and to build a lot of its infrastructure. In other words, Dublanc has taken responsibility for itself and although initially very poor, the community has made its way up and keeps taking advantage of programs offered by the government and making frequent requests for funding and projects. Several families have also migrated to England for work and subsequently returned and retired in Dublanc. In spite of the village's heterogeneous social composition, there appear to be no social divisions and residents trust each other and cooperate. All indicators of traditional social capital have relatively high averages in comparison to other communities. Furthermore, returnees serve as resource persons and

[59] This score is taken from the averaged answers to the household survey in Dublanc.

help write proposals and make requests. The community, however, is only partly driven by returnees and leadership is widely shared. As mentioned above, many people are involved in community organizations and take part in community affairs. Dublanc, therefore, has an outstanding tradition of koud-mai, as well as a strong organizational life. Both forms of social capital (traditional and modern) are apparent in Dublanc.

E.3.2.2. Colihaut

Colihaut, while also descending from an estate, has a different history. The estate was bought from the owner and people did not have to individually fight for land. Furthermore, the government contributed to the provision of infrastructure and the community did not have to fend for itself as much as Dublanc did. Nonetheless, quite a few projects were completed in the 80s and 90s in conjunction with the government. Koud-mai remains fairly high (37.5% of residents come out on average) but residents tend to come together more in time of need than for routine projects. Pairwise comparisons confirm that expectations of mutual support (i.e., whether people assist each other in times of emergency) are significantly higher in Colihaut than in any other community.

Over the years, however, many people born in Colihaut have migrated abroad to the UK, the USA and Canada. Colihaut has consequently suffered a loss of leaders and is not as active as it used to be. The village council is led by a few extremely dynamic individuals but leadership is not as widely shared and comparatively less people are engaged in groups than in some of the other communities. Membership in associations remains fairly high (29%) compared to Mero, Dubique and Fond Saint Jean but it is lower than in Dublanc and Petite Savanne. At the same time, emigrants have maintained

a strong tie to their community, in particular in the UK where they have formed a group, Colihaut in Focus (CIF). In addition to conducting cultural activities abroad, CIF is very active in helping the community to further its goals and develop itself, maybe more so than the Dominican government itself. CIF, for instance, is providing funding for a new community center.

In summary, although traditional social capital is relatively strong, residents are essentially good at coming together when need arises. Modern social capital is moderately strong as well but residents are as a whole comparatively less engaged in groups and less personally committed to advancing community goals than in some other communities (i.e., Dublanc and Petite Savanne).

E.3.2.3. Mero

According to all social capital indicators and key informant interviews, the village of Mero is endowed with low levels of traditional and modern social capital. Mero's distinctive feature is its migration rate. According to key informant interviews, there is some in-migration, notably from the neighboring villages of Saint Joseph and Layou. At the same time, many of the households whose names had been obtained from the 2001 Census listings could not be found as they had moved out of the village, reflecting high levels of out-migration, as was (again) confirmed by key informant interviews. Furthermore, Mero tends to be a dormitory community with a large number of farmers who spend their days out in the fields. As a result, Mero's residents exhibit a weaker sense of attachment to physical space and therefore get less involved in community projects aiming at improving the village. For similar reasons, it is also generally difficult to form and sustain groups. Furthermore, because of its small population, Mero does not

have a village council. A Village Enhancement Committee was recently formed but it is essentially dependent on the leadership of a small core group of people. Not only is the leadership base small in Mero, but it is also unstable because of the high migration rate and of partisan politics, posing some problems of continuity that go in the way of sustained development efforts.

E.3.2.4. Dubique

As in Dublanc, many of Dubique's residents used to work as laborers on a nearby estate, the Geneva Estate. Like Dublanc too, Dubique was identified as one of Dominica's five poorest communities in the 1995 Poverty Assessment. The two villages, however, have taken quite different trajectories over time. First, after the Geneva Estate was purchased by the government and divided into plots for sale, about 90% of the land was acquired by a large landowner (Bonnerjea & Weir, 1996). As a result, many people do not own the land on which they live or work, which prevents long-term investment in both land and housing. Second, like Mero, Dubique is a small village and does not have a village council. It is formally dependent on the village council of Grand Bay but Grand Bay is too far to allow a close working relationship. Dubique, however, has a Village Improvement Committee, which as opposed to that of Mero has an extremely stable leadership that has been in place since the 1980s.

In the 1990s, younger people and households with work have moved away, essentially leaving behind the most dependent households (i.e., old people and female-headed households with young children) with few opportunities for work due to the limited number of wealthier households to cater to and no one to depend on. Low levels of education, lack of skills and an overall sense of hopelessness make it hard to find

leaders and responsibilities often end up falling back on the same small group of people. As a result, Dubique has proved less able than Dublanc to take its own initiatives and to a large extent has been dependent for its development on external leadership and resource persons. Over the years, Dubique has benefited from a large number of externally-funded programs (e.g., UNESCO, UNICEF, and DFID) and residents have participated quite heartedly and contributed labor. As can be seen in Table 5.4, koud-mai remains moderately strong relative to other communities. Problems regularly arise, however, at the end of programs' funding cycle when the community is expected to take over ownership for the project and sustain efforts on its own. Progress has thus remained relatively limited. As a result from the outpouring of aid, Dubique has developed feelings of dependency which may account for the relatively low levels of traditional social capital, and particularly of self-reliance in times of emergency. Recent progress has been made, however, notably with the creation of a cultural/dance group that has won many national awards and contributed to instill a greater sense of self-confidence in the village and with a very active Youth group. Pairwise comparisons confirm that traditional social capital is rather low but modern social capital is moderate relative to other communities.

E.3.2.5. Fond Saint Jean

Fond Saint Jean is a small village that does not have its own village improvement committee. It is a hamlet of the larger community of Bagatelle, on which it is administratively dependent. The household survey was limited to the hamlet of Fond Saint Jean itself and does not provide any insight on Bagatelle. Key informant interviews, however, indicate that Bagatelle is a moderately active community that

regularly submits project proposals for funding but does not take outstanding initiatives. Key informants unanimously agree that Bagatelle suffers from inner conflicts among its leaders. As opposed to some other communities, difficulties are not linked to a narrow leadership base but rather to internal conflicts and rivalries arising in part from differences in political affiliations. Furthermore, disagreements with the former chair of the village council have limited achievements, both because of internal divergences and of a more distant relationship with the DDO/DDA, who traditionally help communities access funding and realize their projects. A new chair was recently elected, however, and a recent program conducted in 2003 and 2004 and geared towards agricultural self-employment and community development has further played a key role in motivating younger people and increasing levels of voluntarism and engagement in the management of community resources. Fond Saint Jean overall is a very quiet area. Although 21% of surveyed households are members of at least one group, Fond Saint Jean has relatively few groups of its own, other than a fishing cooperative, and depends on Bagatelle to get things done. The average household score for koud-mai is the lowest of all communities. Yet pairwise comparisons indicate that expectations of solidarity are moderately strong. Residents have a history of assisting each other, maybe because of the values instilled by fishing and pulling in nets together. Both traditional and modern social capital are limited.

E.3.2.6. Petite Savanne

Although the level of koud-mai is not as outstanding as that of Dublanc, Petite Savanne scores high on all community social capital indicators. It is reputed for being a well-organized and tight-knit community with a tradition of self-help and voluntarism.

This can once more be understood by looking at the history of this village. Petite Savanne is an agricultural community located at the South-Eastern tip of the island. It was initially populated by the descendants of the first French settlers and is located on one of the steepest and most difficult terrain of Dominica. For many years, there was only one very difficult route between Petite Savanne and Roseau, the capital city. Residents were thus forced to fend for themselves in many respects and had to take initiatives to develop their community. This may in turn explain why, as in Dublanc, membership in associations is high relative to other communities. Moreover, the rugged topography precludes the cultivation of bananas and Petite Savanne has historically been dependent on the production of bay oil, which has several important implications. First, bay oil is distilled using traditional methods that are passed down through generations, which has contributed to strengthening ties among people. Second, the production of bay oil involves several challenges such as hauling firewood from a distance and a low return to labor and land and has only survived due to the hardiness of local people. This difficult history has served to bind people together and helped them develop a tradition of mutual help that is still evident today. All indicators of traditional social capital indeed have high scores. For this reason and because of the remoteness of the village, residents are very attached to it and most of them live in the village all their life.

Petite Savanne has a history of being proactive and taking initiatives to improve its situation. It differs from other communities, however, in so far as most people are of the same origin and the village thus does not rely on returnees, immigrants or external actors as resource persons. Rather, leadership is widely shared and frequently renewed with the idea that everyone should take turns. As a result, collaboration and cooperation

are values that are continuously displayed both at the individual level and with respect to the organization of the community. Both traditional and modern social capital are evident in Petite Savanne.

E.4. Summary

In this appendix, we have presented the indicators used to construct the household-level index of community social capital. EFA, however, led to the consideration of a competing two-factor model of community social capital comprised of a traditional community social capital dimension and a modern social capital dimension. While CFA confirmed the validity of both indexes and indicated the preferableness of the one-factor model due to its parsimony, the two-factor structure provides a useful lens to better understand differences in community social capital across villages. On the basis of documentary evidence, key informant interviews and results pertaining to community social capital from the household survey in each of the six villages, it appears that a transition is taking place from a traditional form of social capital to a more modern form of social capital. The extent to which each form of community social capital is represented depends on the history of each village.

APPENDIX F

Description of Disaster Committees and Overview of the Overall State of Community Preparedness in the Six Study Communities

Local volunteers organized in community disaster committees are the backbone of disaster preparedness in Dominica. Disaster committees are in charge of: 1) selecting and appointing volunteers in the community to specific tasks; 2) organizing training for volunteers; 3) preparing, testing and periodically updating a community disaster plan; 4) forming groups to implement activities; 5) informing residents of preparedness activities and of their roles and responsibilities and 6) carrying out appropriate response activities in collaboration with the National Emergency Planning Organization (Dominica Red Cross, n.d.b). Variations in the effectiveness of disaster committees in accomplishing these tasks across communities result in different contexts for household preparedness and may have important implications in terms of residents' knowledge of what to do in a disaster.

This appendix provides contextual information on the disaster committees in each of the six study communities. This information was obtained through the interviews of disaster committee chairs and key preparedness actors at the central level and served to compile the disaster committee effectiveness index presented in Chapter 3. This appendix first reviews differences across disaster committees on the basis of the criteria that were used to construct the index. Although only six indicators were ultimately retained, a wider range of indicators had initially been selected. Some of these indicators

had to be excluded either because they did not accurately reflect the strength of community-level arrangements or because they did not have any discriminant value. Yet they provide valuable information on the overall state of community preparedness in the six villages included in this study. The second part of this appendix recapitulates this information. A brief summary concludes this appendix.

F.1. Differences in Disaster Committee Effectiveness across Communities

Differences across disaster committees are reflected in the disaster committee effectiveness index presented in Chapter 3. The index is comprised of three dimensions: disaster planning, current level of activity and long-term level of activity. Disaster committee age was used as a measure of long-term activity. Three of the six disaster committees have been in place for several years and the other three have recently been formed. Because it is easier to compare disaster committees who have been in place for comparable periods of time, age is discussed first and disaster committees of similar age are then compared regarding their degree of disaster planning and current levels of activity.

F.1.1. Creation of the Disaster Committees

Disaster committees are considered active when they hold meetings and have a structure in place to support their activities. The disaster committees in Dublanc and Colihaut were both formed in 1997 and the one in Bagatelle (which also serves as disaster committee for Fond Saint Jean) in 2002 and they have been active since then. Furthermore, these three committees have benefited from an externally-funded community-based preparedness program implemented by the Dominica Red Cross. Colihaut and Dublanc took part in the Community-Based Disaster Preparedness program

in 1997 and Bagatelle in the Community Disaster Preparedness Education and Mitigation program in 2002. Although the programs slightly varied in some of their components, they were essentially similar with respect to the organization and training they brought to each of these disaster committees (see Appendix A).

The disaster committees in Mero, Dubique and Petite Savanne have been formed in 2005. They have not benefited from any preparedness program but received initial guidance and training from the DDOs. Because the DDOs were trained as facilitators as part of the programs mentioned above, however, the same guidelines and standards were used. There are, however, two other differences between the communities who have benefited from a preparedness program and the ones who have not: 1) a micro-project emphasizing mitigation was carried out as part of the programs and 2) beneficiaries received some emergency supplies (e.g., lanterns, blankets). Neither of these two factors, however, ultimately entered in the calculation of the effectiveness index because they were not direct reflections of the effectiveness of the committees. It can also be argued that preparedness programs may have increased levels of household awareness of preparedness-related topics in recipient communities. These programs, however, were carried out several years ago and it was assumed that inflated levels of awareness or concern resulting from stepped up efforts linked to the programs had worn off over time. In essence, therefore, age is the main difference between the two groups of disaster committees.

F.1.2. Comparison of the Three Long-Standing Disaster Committees in Dublanc, Colihaut and Bagatelle/Fond Saint Jean

Since their creation, the disaster committees in Dublanc, Colihaut and Bagatelle/Fond Saint Jean have followed different trajectories and as a result, they exhibit variations in their degree of disaster planning and their levels of activity. Table F.1 summarizes the scores assigned to each of the committees on the basis of the evidence described below.

Table F.1. Breakdown of the disaster committee effectiveness index

	Long-Standing Committees			Recent Committees		
	Dublanc	Colihaut	Fond Saint Jean	Mero	Dubique	Petite Savanne
Disaster planning						
Disaster plan[a]	2	2	3	1	1	1
Action teams[b]	2	1	2	2	2	2
Disaster planning score	**0.78**	**0.61**	**1.00**	**0.56**	**0.56**	**0.56**
Current level of activity						
Number of core volunteers	13	6	20	12	9	18
Attendance to meetings as a percentage of volunteers	75	75	100	50	75	75
Meeting frequency[c]	2	3	3	1	1	2
Current level of activity score	**0.43**	**0.30**	**1.00**	**0.13**	**0.20**	**0.60**
Long-term activity level						
Age[d]	8	8	4	1	1	1
Long-term activity score	**1**	**1**	**0.5**	**0.13**	**0.13**	**0.13**
Index score	**2.21**	**1.91**	**2.50**	**0.81**	**0.88**	**1.28**

Note: See Chapter 3 for more details on the construction of the index.

[a] Variable indicating whether the disaster committee has compiled a disaster plan:
1=plan under construction;
2=completed plan but not kept handy and not regularly consulted;
3=completed plan and regularly consulted.

[b] Variable indicating whether action teams are in place to carry out the activities defined in the plan:
1=a few action teams in place;
2=action teams in place for all the responsibilities defined in the plan.

[c] Variable indicating the frequency of meetings:
1=only during the hurricane season;
2=immediately before and during the hurricane season;
3=throughout the year.

[d] Age of the disaster committee in years.

The disaster committee in Dublanc consists of 13 members who meet on a semi-regular basis. The current chair has been in place for 5 years and is only the second acting chair in 8 years of existence. While Dublanc is reported to be the most stable disaster committee in the Western district, motivation has somewhat died down since the committee was first created. The committee remains active and most members attend meetings, but meetings have also been spaced out as gathering too frequently was essentially perceived as a repetitive and superfluous routine. There is a disaster plan but it is kept at the village council and not regularly consulted by committee members. Some requests were made for training in 2005 but turnout was rather low, reflecting the decline in members' interest in the absence of any recent disaster event or perceived threat.

The disaster committee in Colihaut, on the other hand, has a more chaotic history. Several chairs have followed each other until the current chair who has been in position for three years. These repeated transitions have caused problems of continuity and may explain why the current committee is unaware of the existence of the community disaster plan that is kept at the village council. As a result, action teams are not clearly identified to carry out the responsibilities described in the plan. The current committee is kept intentionally small by its members (6 members), which limits its manpower, but it is also more focused and active than its predecessors. It meets regularly and is engaged in a variety of activities. The disaster committee in Colihaut, however, is fairly unusual in the sense that it is more concerned with its own activities than with training and maintaining a disaster plan as is the case in other communities.

The Bagatelle disaster committee is the one with the most members (20). It is the most stable disaster committee in the South, and in fact, the best organized and most

active of all the six committees observed as well. The leader has been the same since the committee was reactivated in 2002 and meetings are held regularly and are well-attended. The committee also makes regular requests for training to its DDO and keeps regular inventory of its supplies. Out of the three committees, it is also the only one that has revised its plan since it was first created.

F.1.3. Comparison of the Three Recent Disaster Committees in Mero, Dubique and Petite Savanne

The other three committees have only been formed in 2005 and thus had only been active for a few months by the time key informant interviews were completed and the household survey administered. Nonetheless, even within this short period, differences are visible across the three disaster committees as reflected in the disaster committee effectiveness index.

Mero and Dubique are not only the least organized but also the least active of all disaster committees at this point. Contextual factors account at least partly for this fact. Dubique and Mero are small villages and have a rather narrow leadership base. They constantly depend on the same small core of people to take charge of many activities in different domains. These persons tend to be overextended and as a result, they do not always have time and energy to devote to their responsibilities as members of the disaster committee. In both villages, the disaster committees are rather small (6 and 9 members respectively). Meetings were initially organized to put a plan together, organize action teams and assign responsibilities. At the end of the 2005 hurricane season, however, concern and motivation declined, other issues took precedence and it became difficult to sustain the momentum.

In comparison, key informant interviews indicate that the leadership base in Petite Savanne is broader. The disaster committee is larger (18 members). The chair doesn't hold key positions in any other organization and is fully committed to her role. Out of the three committees, Petite Savanne is the only one that has really sustained the momentum after the end of the hurricane season. A few more meetings have been held than in Mero and Dubique, progress made regarding organizational documents (e.g., disaster plan, hazard map), although they were not quite completed at the time of the interviews, and plans made for future activities. Although it is not quite up to speed with older committees in terms of its structure yet, the disaster committee in Petite Savanne has shown high levels of motivation and made fast progress.

F.2. Overall Assessment of the Activities of Disaster Committees across Communities

In addition to the indicators that make up the disaster committee effectiveness index, other indicators were initially selected based on the definition of the responsibilities of disaster committees presented in the National Disaster Plan and on interviews of key representatives of the major organizations involved in disaster management in Dominica. Together with the ones included in the index, these indicators provide a more comprehensive picture of the extent of disaster committees' activities and of the state of community preparedness in the six villages included in this study. An assessment of the overall level of disaster planning (including awareness and testing of the disaster plan, training of volunteers and disaster committees' resources) and of current activity of disaster committees in these six villages is presented next.

F.2.1. Disaster Planning

Disaster planning refers to the degree to which preparedness and response activities are planned in a community and is an essential dimension of community preparedness. DDOs play an important role in ensuring that communities have disaster committees in place and in helping these committees prepare a disaster plan and obtain training. All six communities have a disaster plan in place (or under construction at the time of this study for the three recently formed committees) and committee members regularly receive training on some aspect of preparedness. Yet disaster planning is also limited on several levels.

F.2.1.1. Awareness and Testing of the Disaster Plan

The disaster plan is intended to guide activities when disasters happen but it can only be useful if it is kept up-to-date and handy and if disaster committee members know its contents well. Yet, as indicated earlier, this is not always the case. Furthermore, community plans are generally limited to a set of documents including a map summarizing hazards and hazardous areas within the community, a calendar describing the risks to which the community is prone and at which times of the year they are most likely (e.g., hurricanes between June and November), a list of vulnerable persons in the community and a list of core committee members with a general definition of the responsibilities of the action teams they head. There is, however, typically no description of how these responsibilities are to be specifically carried out in the event of a disaster. Finally, although testing the disaster plan is specified as one of disaster committees' responsibilities, drills and community exercises are rarely conducted at the local level.

Some simulation exercises are conducted at the national level, but they are typically limited to specific hazards and specific areas.

F.2.1.2. Training of Disaster Committee Members

In order to be able to implement the disaster plan, it is also important that disaster committee members are trained. All communities have received at least some training over the last year. Training can be received from a variety of actors and in the absence of solid records, it was difficult to compare whether the training received was equally comprehensive and whether levels of turn-out at training sessions were comparable across communities. Yet interviews seemed to indicate that some aspects of training (in particular shelter management) were more emphasized than others and that turn-out was sometimes limited in some communities.

F.2.1.3. Resources to Support the Activities of Disaster Committees

In order to function efficiently, disaster committees need financial and material resources in addition to training. The six disaster committees, however, generally own very little equipment and typically have no financial resources of their own. Only the three long-standing committees possess emergency supplies. These supplies, however, remain limited and typically consist of a few blankets, lanterns and first aid kits (in which perishable items have often not been replenished). These supplies were for the most part obtained as part of one of the Dominica Red Cross-led programs in which Dublanc, Colihaut and Bagatelle/Fond Saint Jean participated. A particular concern is that none of the disaster committees owns a VHF transreceiver to allow them to communicate with emergency services if more regular communication channels were to fail during a disaster. Furthermore, while shelters are identified in each of the six communities, they

are by and large not equipped and typically not suitable in terms of washrooms and kitchen facilities.

F.2.1.4. Explanation for the Lack of Resources and Access to Training

Disaster committees' lack of resources and difficulties in obtaining comprehensive training are partly a reflection of the generally limited resources devoted to disaster preparedness in Dominica rather than a reflection of poor integration within broader preparedness and government structures. Disaster committees generally have a good relationship with local government authorities (i.e., the village councils or village improvement or enhancement committees) and their memberships overlap in many cases. The working relationship between disaster committees and District Development Officers and Assistants further provide a link to Central Government and key preparedness actors such as the Office of Disaster Management and the Dominica Red Cross. These actors, however, whether they are local government authorities or preparedness actors, have limited resources of their own. Local government authorities typically do not make any provisions for disaster preparedness in their budget. And as mentioned in Appendix A, both the Red Cross and the Office of Disaster Management have a limited personnel and limited financial and material resources to carry out programs on their own.

F.2.2. Current Levels of Activity

Because disasters are unpredictable and may strike at any time, it is also important that disaster committees remain active over time. Evidence shows, however, that sustaining activities can be a challenge, particularly in the absence of specific threats to keep levels of concern high. Disasters have low salience outside of periods of perceived threat (for instance, the hurricane season) and finding volunteers can be difficult in some

communities. Even when volunteers can be found, they do not always have the time, resources and energy to maintain their involvement over time. As a result, efforts tend to remain limited and are generally concentrated during the hurricane season between June and November or intensified when specific events raise levels of concern. The 2004 Indian Ocean tsunami, for instance, has increased volunteers' motivation in several of the study communities out of concern for their community's exposure to sea surges. Outside of the hurricane season or of specific focusing events, committees tend to be less active and to only have minimal activities in place.

F.3. Summary

All six study communities have disaster committees in place. These committees differ with respect to their level of disaster planning, their current level of activity and their age. The disaster committees in Dublanc, Colihaut and Bagatelle/Fond Saint Jean have been active for several years but the ones in Mero, Dubique and Petite Savanne were dormant until their reactivation in 2005. The three most recent disaster committees are not yet fully organized as they still had to finalize their disaster plan at the time interviews were conducted. Among the three, however, the disaster committee in Petite Savanne is the most advanced and the one that has met the most regularly so far. Similarly, the three long-standing disaster committees are not all equally organized and active. The disaster committee in Bagatelle/Fond Saint Jean is the most active one and the only one that has revised its disaster plan since it was first compiled.

Several of the indicators that were initially selected to reflect differences in the effectiveness of disaster committees across communities were not included in the final disaster committee index because of their lack of discriminant value. These indicators,

however, reveal that while disaster committees are in place with a basic structure to support their activities and generally well-connected to other preparedness and governmental actors, their ability to be fully operational and to function efficiently in times of emergency remains somewhat in questions. The two main obstacles encountered across communities are in particular a lack of resources to support activities and difficulties in sustaining the involvement and the motivation of local volunteers over time. These problems are not unique to Dominica (Pandey & Okazaki, 2003) but limit the effectiveness of community preparedness arrangements.

APPENDIX G

District Development Officers and Assistants

District Development Officers and Assistants are an important part of the disaster preparedness system in Dominica. Yet disaster preparedness is only one of their responsibilities and they are tasked with the broader duty of assisting communities in their development. This appendix provides contextual information on the status and responsibilities of District Development Officers and Assistants. It first provides an overview of the Ministry of Community Development and Gender Affairs and of its Local Government and Community Development department and of the specific duties of DDOs and DDAs. It then relies on data from district action plans and key informant interviews to discuss differences in the capacity and commitment of DDO/DDAs in the Western and Southern districts. The extent to which the activities cited in DDO/DDAs' work programs are reflected in practice and whether DDO/DDAs are equally engaged across the various communities in their district is then considered on the basis of data from the household survey. A brief summary of findings concludes this appendix.

G.1. Overview of the Ministry of Community Development and Gender Affairs and of the Local Government and Community Development Department

DDOs and DDAs are part of the Local Government and Community Development Department, which itself is a division of the Ministry of Community Development and Gender Affairs.

G.1.1. The Ministry of Community Development and Gender Affairs

The Ministry of Community Development and Gender Affairs is responsible for human and social services in Dominica. Its mission is "to respond to the identified social, cultural and economic needs of society's vulnerable and disadvantaged individuals, groups and communities through a range of social and economic programmes designed to enhance and sustain the living standards and life chances of the socio-economically underprivileged" (Ministry Corporate Plan 2002/2003 as cited in Halcrow Group Ltd., 2003, p. 104). It is comprised of seven divisions: Adult Education, Local Government and Community Development, Cooperative, Women's Bureau, Culture, Social Welfare and Administration (BNTF, n.d.).

G.1.2. The Local Government and Community Development Department

The Local Government and Community Development Department is responsible for: 1) poverty alleviation and the mobilization of communities for self-reliance and self-help; 2) the identification and administration of programs at the grassroots level and 3) community mobilization for the identification and implementation of further programs (Halcrow Group Ltd., 2003). In the area of disaster management, the Local Government Department is tasked with several responsibilities: 1) acting as a liaison between central-level actors and communities; 2) arranging with the media for broadcasts, talks and publication of information on disaster preparedness and prevention; 3) assisting with the dissemination of information; 4) informing the public of the location of shelters and first-aid posts; 5) identifying and updating the list of emergency shelters and identifying suitable shelter managers and assistant managers every year; 6) conducting rapid damage and needs assessment following disasters; 7) organizing community disaster committees

and arranging training for volunteers (NEPO, 1996, 2001). These responsibilities are to a large extent carried out by District Development Officers and their Assistants.

G.1.3. District Development Officers and Assistants

Dominica is divided in seven administrative local government areas or districts, each staffed with a District Development Officer and Assistant. The DDOs and DDAs work directly with a network of local authorities including village councils in 37 villages, 4 municipal councils and a variety of village improvement and enhancement committees in smaller localities (Halcrow Group Ltd., 2003). They act as a liaison between these councils and the Central Government, support their administrative activities, foster development initiatives and assist with their implementation (Harrison & Simons, 1982). The role of DDOs and DDAs has been consolidated over the years throughout a series of community development programs (e.g., the DFID-funded three-year community development program between 1996 and 1999 and the 1998-2000 UNDP Community Infrastructure and Human Resource Development Program) that have enabled DDOs and DDAs to develop strong relationships with communities.

In the area of disaster management, DDOs and DDAs were trained as facilitators as part of the 1997 Community-Based Disaster Program implemented by the Dominica Red Cross and further assisted with the implementation of this program in selected communities. They similarly assisted the Dominica Red Cross with the implementation of the 1998 World Bank Emergency Recovery and Disaster Management Program and the 2002-2004 USAID-OFDA Community Disaster Preparedness, Education and Mitigation Program, thereby strengthening their relationship with disaster preparedness actors and communities in the context of disaster preparedness (see Appendix A).

G.2. Variations across Pairs of DDO/DDAs in the Western and Southern Districts

The positions of DDO and DDA are defined as permanent in the 1978 Constitution. Officers are appointed by the Public Service Commission and report to the Local Government Commissioner. Although they can be rotated from district to district from times to times, the same officers typically remain in the same district for many years and develop tight relationships with communities. Each pair of DDO/DDA carries out the same core activities and assist communities in four main areas: the supervision of local government authorities, community development, disaster management and cultural events. Yet differences exist in the details of DDO/DDAs' work programs, including how much time they devote to disaster preparedness activities and in their level of involvement with the communities in their district.

G.2.1. Differences in Capacity and Attachment to District

Interviews of DDO/DDA in the Southern and Western districts do not put forth any differences in their levels of capacity or attachment to their district. Each pair of DDO/DDA is comprised of a man and a woman in similar age groups. They have comparable educational backgrounds and experience. They all live in the districts in which they work and have been in place for many years.

G.2.2. Differences in Work Programs and Emphasis on Disaster Preparedness

Table G.1 summarizes how well the different responsibilities of the DDO/DDAs are represented in their work programs. This information is derived from the analysis of the district plans submitted by DDO/DDAs of the Western and Southern districts to the Local Government Commissioner for 2004 and the period July 2005-June 2006. These action plans are expected to be fairly representative, as the types of activities conducted

by DDOs barely vary from year to year in the absence of any abnormal event. Differences in district plans' organization and uncertainty as to how the activities listed are actually carried out on the ground preclude a direct comparison of how much time each pair of DDO and DDA devotes to disaster preparedness in practice. It is possible, however, to compare the hierarchy of activities to determine the relative importance given to disaster preparedness in relation to other core responsibilities.

Table G.1. Breakdown of DDO/DDA responsibilities as described in their action plans (as a percentage of total activities listed in the 2004 and July 2005-June 2006 plans)

Activities	Western District		Southern District	
	Frequency	Percentage	Frequency	Percentage
Local Government	10	45.45	27	43.55
Cultural Events	7	31.82	18	29.03
Disaster Management	5	22.73	10	16.13
Community Development	0	0	7	11.29
Total	22	100	62	100

The hierarchy of responsibilities is the same in both districts. The most frequently cited activities are linked to the supervision of local government authorities, including, for instance, the auditing of village councils' accounts, the training of village councilors, the organization of elections and the promotion of the concept of Local Government, notably in schools. The second most important activity is linked to cultural events and in particular to the organization of Independence Celebrations in November. Disaster management comes third. The last activity, community development, only appears in the Southern District plans and consists of promoting projects, monitoring progress and evaluating outcomes. Aside from this difference, there does not appear to be any major differences in the hierarchy of activities between the two districts.

G.2.3. Differences in Engagement

Although it is not directly related to disaster management, an interesting difference emerges between the plans for the two districts. DDO/DDAs in the South appear to be generally more proactive and committed to community development and to making communities take their own initiatives and be accountable for them. This comes across in the community development area, which is under-represented in the Western district outside of the supervision of regular projects and of the activities of village councils. In the South, on the other hand, DDO/DDAs spend time promoting, monitoring and evaluating a variety of community development projects. But this commitment also shows in other areas, as the Southern district program for instance includes cultural training in addition to regular cultural activities, and in the area of disaster preparedness management meetings with disaster committees. Neither of these elements is mentioned in the plans for the Western district. While DDO/DDAs in both districts seem to be committed to disaster preparedness, their work programs, as well as key informant interviews, seem to suggest that DDOs in the South are generally more proactive and engaged with communities.

G.3. Households' Perceptions of DDO/DDAs and their Responsibilities

Work programs consist of a list of activities but do not provide any indication of whether and how these activities are carried out in practice. Two questions are of particular interest: 1) whether the hierarchy of activities indicated in the plan is reflected in DDO/DDAs activities in practice and 2) whether DDO/DDAs are equally engaged across the different communities in their district. Households' perceptions of

DDO/DDAs and their responsibilities across the six study communities can be used to answer these questions.

G.3.1. Differences in Households' Perceptions of DDO/DDAs and their Responsibilities

Table G.2 presents the survey results pertaining to household awareness of the DDOs in their district and to their knowledge of DDO/DDAs' responsibilities.

Table G.2. Household awareness of DDO and DDA and of their responsibilities by district (as a percentage of residents)

	All Communities	Western District	Southern District	Chi-square[a]
Know at least who either the DDO or the DDA is	45.25	28.16	68.42	26.04***
Able to name at least one activity DDO is involved in	38.55 (85.19)	23.30 (82.76)	59.21 (86.54)	25.01***
Aware that DDO works with village council	36.31 (80.25)	21.36 (75.86)	56.28 (82.69)	27.01***
Aware that DDO works with community organizations	25.14 (55.56)	11.65 (41.38)	43.42 (63.46)	25.26***
Aware that DDO is involved in disaster management activities	29.05 (64.20)	12.62 (44.83)	51.32 (75.00)	37.52***
Aware that DDO helps organize cultural events	29.61 (65.43)	14.56 (51.72)	50.00 (73.08)	27.15***
n	179	103	76	

Note: The first number is a percentage of all respondents. The score in parentheses is calculated as a percentage of people who answered they knew at least who the DDO or DDA was in their district.
[a] Rao-Scott chi square for weighted data.

A total of 45.25% of respondents knew at least who either the DDO or DDA was in their district and 38.55% could name at least one activity DDO/DDAs were involved in. Results are significantly different across districts, however, and support the idea that Southern DDO/DDAs are more engaged, as they are generally better-known. Interestingly enough, the hierarchy of activities as perceived by residents varies across districts and in the South, differs from the one reflected by DDO/DDAs' work program. Indeed, disaster management comes second before cultural events, instead of third.

Survey data, therefore, confirm that DDO/DDAs are more proactive in the South and may further be comparatively more engaged in disaster management activities.

G.3.2. Differences in Level of Engagement across Communities

DDO/DDAs, however, may spend more time or be more engaged in some communities than others within their district. Table G.3 summarizes survey results on DDO/DDAs across communities. While the results still support district differences, they further indicate significant variations in the levels of awareness of DDO/DDAs and their responsibilities across communities in a same district.

Table G.3. Household awareness of DDO and DDA in their district and of their responsibilities by community (as a percentage of residents)

	Dublanc	Colihaut	Mero	Dubique	Fond Saint Jean	Petite Savanne	Chi-square[a]
Know at least who either the DDO or the DDA is	41.38	26.79	11.11	75.00	42.11	78.38	39.92***
Able to name at least one activity DDO is involved in*	41.38 (100)	19.64 (73.33)	5.56 (50.00)	55.00 (73.33)	42.11 (100)	70.27 (89.66)	37.70***
Aware that DDO works with village council	37.93 (91.67)	19.64 (73.33)	0 (0)	45.00 (60.00)	42.11 (100)	70.27 (89.66)	N\A
Aware that DDO works with community organizations	24.14 (58.33)	8.93 (33.33)	0 (0)	40.00 (53.33)	31.58 (75.00)	51.35 (65.52)	N\A
Aware that DDO is involved in disaster management activities	34.48 (83.33)	5.36 (20.00)	0 (0)	35.00 (46.67)	36.84 (87.50)	67.57 (86.21)	N\A
Aware that DDO helps organize cultural events	24.14 (58.33)	12.50 (46.67)	5.56 (50.00)	45.00 (60.00)	31.58 (75.00)	62.16 (79.31)	22.70***
n	29	56	18	20	19	37	179

Note: The first number is a percentage of all respondents. The score in parentheses is calculated as a percentage of people who answered they knew at least who the DDO or DDA was in their district.

[a] Rao-Scott chi square for weighted data. SAS does not provide this statistic when there is a zero count.

In the South, Petite Savanne is the community where the DDO and DDA are the best-known and where awareness of their various responsibilities is the highest. The DDA lives in the community, but detailed results reveal that the DDO is also well-known (by 72.97% of respondents) thus indicating that awareness has more to do with the DDO and DDA's role than with physical proximity. After being identified as one of Dominica's poorest communities in the 1995 poverty assessment, Dubique has become a targeted community, which means it quasi-systematically benefits from available programs. The DDO and DDA thus spend quite some time in the community, and it is therefore logical that they are well-known. Fond Saint-Jean on the other hand, is a hamlet of Bagatelle. The DDO and DDA are more involved with Bagatelle, where they for instance work with the village council, than in Fond Saint Jean. This may explain why, even though 42.11% of residents still know who they are and can name at least one of their responsibility, these figures are slightly lower than they are for Dubique and Petite Savanne.

In the West, residents in Dublanc know the DDO and DDA best. Dublanc is a very active community that makes frequent requests for projects to the government and the DDO and DDA may thus visit the community relatively often. Furthermore, the DDA lives in the community and is fairly involved and therefore visible. Levels of awareness of the DDO and DDA drop significantly in Colihaut, however, maybe in part because the community is larger and because proportionately less people are involved in community affairs. But this may also indicate that the DDO and DDA's presence is confined to the village council and specific events. Finally, very few people know the DDO and/or DDA in Mero and those who do are only aware of their activities in cultural

celebrations. This was in fact explained by the DDO and DDA themselves, who admitted spending less time in Mero since the community did not have a village council for them to supervise. Nonetheless, neither Dubique nor Fond Saint Jean had a village council of their own but residents in both villages knew their DDO and DDA better. This may thus once again reflect not only structural factors, but also differences in DDO and DDAs' presence in communities.

G.4. Summary

In summary, DDOs and DDAs are important elements of the disaster preparedness system in Dominica. They primarily work with disaster committees in communities but they are also responsible for keeping the public informed about disaster preparedness. Each district is staffed with a different pair of DDO/DDA. Their core responsibilities are the same and both teams further appear to have a comparable level of capacity and to both devote attention to disaster preparedness in their work programs. Variations appear, however, in how proactive each team appears to be. Findings from the analysis of district action plans, key informant interviews and the household survey generally support the idea that the DDO/DDA pair in the Southern district overall engages communities and residents more directly in their various activities and is also potentially more proactive regarding disaster preparedness. Furthermore, DDO/DDAs in both districts do not appear to be equally engaged in all the communities in their district. Differences in levels of engagement, however, were not factored as such in the analysis presented in Chapters 4 and 5 because what matters ultimately is DDO/DDAs' influence regarding disaster management and this influence may further vary across households

within a same village. For this reason, only awareness of DDO/DDAs' involvement in disaster management was kept in the final analyses and considered at the household level.

APPENDIX H

Logistic Regression Models

Data were analyzed using logistic regression. One outcome, awareness of what to take to a shelter, only took two different values and was analyzed using dichotomous logistic regression. The other two outcomes were analyzed using the proportional odds model for ordinal responses with more than two categories. Because continuous variables were included in the models for each outcome, the traditional tests used to assess the statistical significance of parameters and model fit are problematic and alternative methods had to be used.

This appendix provides an overview of logistic regression models with an emphasis on the proportional odds model. It then presents alternative statistics to evaluate the models: the Nagelkerke R^2, Somers' D and τ_P. Finally, this appendix discusses how such models can be interpreted.

H.1. Overview of Logistic Regression

Logistic regression is a particular class of generalized linear models that is used to describe the relationship between a categorical response and a set of independent variables. The logit function is used to transform the outcome to the natural log of the odds. Logistic regression for binary outcomes thus serves to estimate the effects of independent variables on the odds of an event's occurrence. The odds compare the probability of the event's occurrence to the probability that it does not occur. The

transformed model is linear in the parameters and the effects of explanatory variables on the log of the odds are additive.

H.1.1. The Proportional Odds Model

The proportional odds model applies this approach to ordinal responses with more than two response categories. There are several possible ways to define "success" for polytomous ordinal responses. In this study, success is defined as being at or above a given category of the response variable. The data are successively partitioned into dichotomous groups for each value of the response variable. Since the possible values of the response variable in this study range between 0 and 3, three groups are formed in this fashion: 1) score of 3, 2 and 1 versus 0 (at or above 1), 2) 3 and 2 versus 1 and 0 (at or above 2) and 3) 3 versus 2, 1 and 0 (at 3).

The proportional odds model estimates the effects of a set of independent variables on the odds of being at or above a given response score across all consecutive cumulative splits. A simplifying assumption is made in the proportional odds model that the effect of explanatory variables on the odds is invariant across the splits (O'Connell, 2006; Stokes et al., 2000). The model thus takes the following form:

$$\ln (Y'_j) = \ln \{\pi_j(x) / (1-\pi_j(x)) \} = \alpha_j + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_p X_p$$

where $\pi_j(x) = \pi_j(Y \geq j | x_1, x_2, \ldots, x_p)$ is the probability that a response falls in a category greater than or equal to the jth category (j=1, 2, 3) (O'Connell, 2006).

H.1.2. The Proportional Odds Assumption

SAS provides a score test for the proportional odds assumption. The null hypothesis is that of proportional odds or in other words that ordered logit coefficients are equal across the levels of the outcome. The score test was highly significant for both

proportional odds model. This test, however, is not powerful and it is furthermore anti-conservative. As such, it often leads to the rejection of the null hypothesis when the number of independent variables is large, the sample size is large and continuous variables are included (O'Connell, 2006). Before rejecting the assumption of proportional odds, it is thus recommended to conduct additional tests.

A reasonable test is to compare the effects of the independent variables across the cumulative logits. The separate binary logistic regression models corresponding to the ordinal model[60] were fitted and the coefficients for each independent variable compared across models, looking for changes in the patterns of slopes (O'Connell, 2006). Directionally and on average, the effects of the independent variables were similar across models with the exception of income for the binary models corresponding to familiarity with disaster committee responsibilities. Two dummy variables were used to measure the effect of income: one for very low income and one for medium or high income with low income serving as a reference category. Across the three binary models for familiarity with disaster committee responsibilities, the direction of the effects of the income dummy variables remains the same, but the magnitude of these effects varies. The odds ratios for the models contrasting zero correct answers to one, two or three accurate disaster committee responsibilities are much larger in magnitude. Although follow-up analyses relaxing the assumption of proportional odds for income are possible and could be used to better explain the different effects seen in the three binary models, they are complex and not provided here. As mentioned above, the direction of the effect does not change and while income is relevant to this study, the pattern of change of this variable is not

[60] The responses of the binary models reproduce the consecutive splits in the data that make up the cumulative model.

central to the results. The coefficients for the effects of the income dummy variables in the model corresponding to familiarity with disaster committee responsibilities must, however, be interpreted cautiously. With the exception of income for familiarity with disaster committees' responsibilities, the assumption of proportional odds was considered plausible.

H.2. Evaluating the Logistic Regression Models

H.2.1. Goodness of Fit Statistics

Goodness of fit of logistic regression models is traditionally assessed with the deviance[61] (or likelihood-ratio chi-square). The deviance, however, tends to overstate goodness of fit when continuous independent variables[62] are included and alternative methods to assess fit need to be considered (O'Connell, 2006; Stokes et al., 2000).

H.2.2. Measure of Association: Nagelkerke R^2

Several measures analog to the R^2 can be used in logistic regression. These pseudo-R^2s measure the strength of association between the set of independent variables and the outcome. The Nagelkerke R^2 is one of the most reported of these pseudo-R^2 estimates and is used in this study. It uses the log likelihood as a measure of the proportion in error reduction and is further rescaled to obtain a range between 0 and 1 (O'Connell, 2006). While the Nagelkerke R^2 is useful to compare competing nested models, however, it only provides limited information on the adequacy of a given model (O'Connell, 2006).

[61] The deviance compares the likelihood of the fitted model to that of the saturated model. The deviance test is based on the quantity -2 log-likelihood. Because the likelihood of the saturated model is 1, -2 LL is 0 and the deviance of any model is thus -2 LL. The deviance follows an approximate chi-square distribution and is expected to decrease towards 0 for better-fitting models. Non-significant results indicate adequate fit.

[62] Continuous variables result in sparse cells, which violate the sample size requirements for the deviance.

H.2.3. Ordinal Measure of Association: Somers' D

Somers' D is a rank-order correlation statistic that can be used to supplement the pseudo- R^2 (O'Connell, 2006). Somers' D is based on the examination of pairs of cases with dissimilar responses. For a binary response, these pairs consist of a case with an observed response of 0 and a case with an observed response of 1. When the predicted probability for the case with the observed value of 1 is higher than the case with the value of 0, the pair is concordant. Otherwise it is discordant. The formula is:

$$\text{Somers' D} = (nc - nd)/t$$

where nc is the number of concordant pairs, nd of discordant pairs and t the number of pairs with dissimilar responses (Meier & Brudney, 2002; O'Connell, 2006).

Somers'D represents the strength of correspondence between observed outcomes and predicted probabilities and ranges between -1 and 1, with a value of 0 reflecting independence.

H.2.4. Measure of Predictive Efficiency: τ_P

Measures of predictive efficiency examine the proportional change in error achieved with the fitted model in comparison to errors without the model[63] (Menard, 1995). τ_P is a measure of predictive efficiency that assesses how well observed categorical outcomes are reproduced. In other words, τ_P considers whether individual cases are predicted to fall into their original outcome (O'Connell, 2006). τ_P is not directly available in SAS but can be obtained through programming using a classification table that indicates the predicted and observed values of the outcome for the cases in the analysis.

[63] Predictive efficiency = (errors without model – errors with model) / errors without model.

For ordinal response models, τ_P can be defined as (Menard, 2000):

$$\tau_P = 1 - (n - \Sigma_i f_{ii}) / [\Sigma_i f_i (n - f_i) /n]$$

where i is the index for each category of the outcome variable, n the sample size, f_{ii} the sum of correctly predicted categories and f_i the observed frequency for category i[64].

τ_P adjusts for the base rate (the proportion of cases in the sample in each category) and indicates the proportion of reduction in classification error using the fitted model. The range of τ_P is not constant but varies from 1 to 2 for different marginal distributions. For classification tables with equal marginal distributions, τ_P varies between -1 and +1, with a value of 1 indicating that all cases are correctly classified and a negative value that that the model does worse than expected based on the observed marginal distribution (Menard, 1995).

H.3. Interpreting Logistic Models

After examining the overall adequacy of the models, we need to know how important the independent variables are. In the proportional odds model, the regression coefficients represent the change in the logit for each one-unit increase in X_j controlling for the effects of the other independent variables. The exponentiations of the regression weights are the odds ratio and indicate the effect of a unit change in the independent variables on the odds of success controlling for other variables. Odds ratios can range from 0 to infinity. An odds ratio of 1 (corresponding to a regression coefficient of 0) indicates that an independent variable has no effect on the odds of success, and odds ratios farther from 1 in either direction that there is a strong association between the independent variable and the outcome (O'Connell, 2006; Stokes et al., 2000).

[64] The denominator $\Sigma_i f_i (n - f_i) /n$ represents the appropriate definition of the expected error without the model for a classification model (Menard, 1995).

Several methods can be used to assess the statistical significance of regression weights. The Wald chi-square test is the default test provided by SAS and was used in the analyses in this study.

APPENDIX I

Base Models

Household characteristics were hypothesized to affect household preparedness in the conceptual framework presented in Chapter 2. Due to sample size limitations, however, all household controls could not simultaneously be included in the logistic regression analysis models. Base models containing only the set of household and community contextual factors were fitted for each outcome and only the household controls which achieved significance in the base models were entered in the final model for the corresponding outcome.

This appendix provides the results of the base models testing the effect of household and community contextual factors on each of the three outcomes. In addition to population at the community level, nine household characteristics are considered: gender, age, religion, number of school-age children, regular consultation of the print media, education, whether the breadwinner is a fisher or farmer, home ownership and income. It should be noted that there is a large number of missing values for income (21.8%). The base models were first fitted for the observations for which income data were available. If income was not significant, income variables were removed and the base models based on all observations were used for deciding on the variables to retain for later analyses[65]. Table I.1 presents the results for awareness of protective measures,

[65] The pattern of significance of predictors is the same for the base models with and without income variables with three exceptions. For awareness of protective measures, regular consultation of the print media is significant in the base model without income but is nonsignificant in the base model with income. Age, on the other hand, is nonsignificant in the base model with income but becomes significant

Table I.2 for knowledge of what to take to a shelter when evacuating and Table I.3 for familiarity with disaster committee responsibilities.

in the base model without income. For knowledge of what to take to a shelter, whether the breadwinner is a fisher or farmer is nonsignificant in the base model with income but becomes significant in the base model without income. Because income variables were significant for familiarity with disaster committee responsibilities, only the base model with income was considered for this outcome.

Table I.1. Base models for awareness of protective measures

Predictor	Base Model with Income		Base Model without Income	
	Estimate of Effect (S.E.)	Standardized Estimates	Estimate of Effect (S.E.)	Standardized Estimates
Intercept 3	-0.80 (1.30)		-0.44 (0.97)	
Intercept 2	0.49 (1.28)		0.82 (0.95)	
Intercept 1	2.39* (1.32)		2.96*** (1.00)	
Village-level dummy variables[a]				
Dummy 1	0.41* (0.21)	0.56	-0.09 (0.17)	-0.11
Dummy 2	-0.39* (0.22)	-0.54	-0.54 (0.16)	-0.67
Dummy 3	0.002 (0.23)	0.002	-0.13 (0.19)	-0.13
Dummy 4	0.17 (0.20)	0.25	0.56 (0.16)	0.75
Community controls				
Population	-0.002 (0.003)	-0.16	-0.002 (0.002)	-0.23
Household controls				
Gender[b]	-0.39 (0.45)	-0.27	-0.12 (0.37)	-0.07
Age[c]	-0.64 (0.61)	-0.38	-0.78* (0.46)	-0.41
Catholic[d]	-0.48 (0.77)	-0.30	-0.47 (0.70)	-0.26
Protestant[d]	-0.25 (0.82)	-0.13	-0.63 (0.71)	-0.31
Number of school-age children	0.10 (0.20)	0.18	0.10 (0.16)	0.16
Regular consultation of print media[e]	0.90** (0.45)	0.64	0.34 (0.35)	0.21
Education[f]	0.70 (0.52)	0.50	0.49 (0.40)	0.31
Fisher or farmer[g]	-0.48 (0.51)	-0.31	-0.11 (0.38)	-0.06
Home ownership[h]	0.70 (0.51)	0.34	0.03 (0.39)	0.01
Very low income[i]	-0.27 (0.67)	-0.18	-	-
Medium of high income[i]	-0.82 (0.73)	-0.44	-	-
n	131		169	
R^2_N	0.89		0.80	
Somers'D	0.45		0.48	
τ_P	0.28		0.28	
AIC	2070.62		2081.57	

Note: [a] The four dummy variables were added to account for all the in-between village variance.
[b] Dummy variable indicating that the respondent is a female.
[c] Dummy variable indicating that the respondent is over 65 years old.
[d] Dummy variable: the reference category is other or no religion. There were not enough respondents in the 'other' and 'no religion' category to create an additional dummy variable.
[e] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[f] Dummy variable indicating that the highest level of education in the household is secondary or tertiary education. The reference category is no or only primary education.
[g] Dummy variable indicating that the breadwinner is a fisher or farmer.
[h] Dummy variable indicating home ownership.
[i] Dummy variable: the reference category is low income (see Chapter 4). The model was fitted for the subset of observations (n=131) for which income data were available. Because income is nonsignificant, however, the sample size was not adjusted for other bivariate models.
*p<0.1 **p<0.05 ***p<0.01

Table I.2. Base models for knowledge of shelter items

Predictor	Base Model with Income		Base Model without Income	
	Estimate of Effect (S.E.)	Standardized Estimates	Estimate of Effect (S.E.)	Standardized Estimates
Intercept	9.00*** (2.28)		10.81*** (2.42)	
Village-level dummy variables[a]				
Dummy 1	1.23*** (0.33)	1.74	0.33 (0.26)	0.40
Dummy 2	-4.47*** (0.36)	-6.15	-4.64*** (0.22)	-5.50
Dummy 3	-2.50*** (0.52)	-2.63	-1.05** (0.46)	-1.33
Dummy 4	0.41 (0.33)	0.56	-1.66*** (0.30)	-1.87
Community controls				
Population	-0.02*** (0.005)	-2.46	-0.03*** (0.003)	-2.78
Household controls				
Gender[b]	-1.69** (0.86)	-1.16	-1.43** (0.70)	-0.87
Age[c]	-1.03 (1.04)	-0.62	-1.11 (0.68)	-0.58
Catholic[d]	-0.48 (1.90)	-0.30	-1.27 (1.90)	-0.70
Protestant[d]	-0.67 (2.21)	-0.35	-0.77 (1.94)	-0.38
Number of school-age children	0.21 (0.29)	0.38	0.03 (0.24)	0.05
Regular consultation of print media[e]	0.63 (0.78)	0.45	0.18 (0.60)	0.11
Education[f]	0.56 (0.73)	0.40	0.46 (0.67)	0.29
Fisher or farmer[g]	-0.86 (1.21)	-0.55	-1.29* (0.77)	-0.75
Home ownership[h]	-0.35 (1.34)	-0.17	0.43 (0.74)	0.19
Very low income[i]	1.23 (1.50)	0.82	-	-
Medium of high income[i]	-0.81 (1.26)	-0.44	-	-
n	131		168	
R^2_N	0.60		0.63	
Somers'D	0.57		0.64	
τ_P	0.45		0.43	
AIC	456.48		548.03	

Note: [a] The four dummy variables were added to population to form a set of five village-level variables and account for all the in-between village variance.
[b] Dummy variable indicating that the respondent is a female.
[c] Dummy variable indicating that the respondent is over 65 years old.
[d] Dummy variable: the reference category is other or no religion. There were not enough respondents in the 'other' and 'no religion' category to create an additional dummy variable.
[e] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[f] Dummy variable indicating that the highest level of education in the household is secondary or tertiary education. The reference category is no or only primary education.
[g] Dummy variable indicating that the breadwinner is a fisher or farmer.
[h] Dummy variable indicating home ownership.
[i] Dummy variable: the reference category is low income (see Chapter 4). The model was fitted for the subset of observations (n=131) for which income data were available. Because income is nonsignificant, however, the sample size was not adjusted for other bivariate models.
*p<0.1 **p<0.05 ***p<0.01

Table I.3. Base model for familiarity with disaster committee responsibilities

Predictor	Base Model with Income	
	Estimate of Effect (S.E.)	Standardized Estimates
Intercept 3	-4.15*** (1.49)	
Intercept 2	-2.54* (1.43)	
Intercept 1	-1.26 (1.45)	
Village-level dummy variables[a]		
Dummy 1	0.34* (0.20)	0.52
Dummy 2	0.17 (0.23)	0.19
Dummy 3	0.45* (0.26)	0.53
Dummy 4	0.21 (0.22)	0.30
Community controls		
Population	-0.003 (0.003)	-0.34
Household controls		
Gender[b]	-0.01 (0.46)	-0.008
Age[c]	-0.94 (0.63)	-0.57
Catholic[d]	3.09*** (1.04)	1.94
Protestant[d]	3.62*** (1.09)	1.91
Number of school-age children	0.02 (0.20)	0.04
Regular consultation of print media[e]	1.39*** (0.45)	0.99
Education[f]	0.43 (0.54)	0.30
Fisher or farmer[g]	-1.53*** (0.57)	-0.99
Home ownership[h]	0.27 (0.58)	0.13
Very low income[i]	-1.41** (0.59)	-0.94
Medium of high income[i]	-1.60** (0.72)	-0.86
n	131	
R^2_N	0.98	
Somers'D	0.60	
τ_P	0.32	
AIC	1810.78	

Note: [a] The four dummy variables were added to population to form a set of five village-level variables and account for all the in-between village variance.
[b] Dummy variable indicating that the respondent is a female.
[c] Dummy variable indicating that the respondent is over 65 years old.
[d] Dummy variable: the reference category is other or no religion. There were not enough respondents in the 'other' and 'no religion' category to create an additional dummy variable.
[e] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[f] Dummy variable indicating that the highest level of education in the household is secondary or tertiary education. The reference category is no or only primary education.
[g] Dummy variable indicating that the breadwinner is a fisher or farmer.
[h] Dummy variable indicating home ownership.
[i] Dummy variable: the reference category is low income (see Chapter 4). The model was fitted for the subset of observations (n=131) for which income data were available. Because income is nonsignificant, however, the sample size was not adjusted for other bivariate models.
*p<0.1 **p<0.05 ***p<0.01

APPENDIX J

Summary of the Direct and Total Effects of Predictors

The logistic regression models presented in Chapter 5 provide the direct effects of relational and community social capital, government representatives, local disaster committees and household and community contextual characteristics on the three aspects of household disaster preparedness considered in this study. The standardized coefficients for the direct effects of these variables were used to determine how influential relational and community social capital are relative to other factors. Another option would be to compare the total effects of these variables. Based on the conceptual framework presented in Chapter 2, the direct effects of relational and community social capital, government representatives and local disaster committees are also their total effects. The total effects of household and community contextual factors, however, need to be obtained separately.

This appendix provides a summary of the direct and total effects of relational and community social capital, government representatives, local disaster committees and household and community contextual factors. Three models are considered for each aspect of preparedness. The first model is a base model containing only the set of household and community contextual factors[66]. This model provides the total effects of

[66] In order to compare results across models for any given outcome, the same household and community contextual factors need to be considered in the three models for each outcome. Due to sample size limitations, particularly for the third model, only the household and community contextual

these variables. Institutional variables (i.e., awareness of DDO/DDAs' involvement in disaster preparedness and disaster committee effectiveness) are added in the second model (the institutional model) but social capital variables are not included. Finally, social capital variables (i.e., resource composition, resource diversity, kinship composition and the community social capital index) are added in the third model (the full model). These three models are presented in turn for each of the three aspects of preparedness (i.e., awareness of protective measures, knowledge of what to take to a shelter and familiarity with disaster committee responsibilities), along with a summary of the direct and total effects of relational and community social capital, government representatives, disaster committees and household and community contextual factors for each outcome.

J.1. Summary of the Direct and Total Effects of Predictors on Awareness of Protective Measures

Table J.1 presents the base model, the institutional model and the full model for household awareness of protective measures. The R^2_N value, Somers'D, τ_P and Akaike's Information Criterion remain virtually unchanged by the addition of institutional variables between the base model and the institutional model. These statistics, however, improve when social capital variables are added in the full model. The R^2_N value and Somers'D are higher and Akaike's Information Criterion is lower. The value of τ_P is comparable to that of the first two models. Social capital variables, therefore, increase the explanatory power of the model.

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characteristics that achieved significance in the model containing the full set of household and community contextual factors are considered in this appendix (see Appendix I).

Table J.1. Base model, institutional model and full model for awareness of protective measures

	Base Model		Institutional Model		Full Model	
	Estimates (S.E.)	Stand. Est.	Estimates (S.E.)	Stand. Est	Estimates (S.E.)	Stand. Est.
Intercept 3	-0.22 (0.41)		-0.25 (0.60)		-2.88 (1.77)	
Intercept 2	1.01** (0.39)		1.00* (0.58)		-1.50 (1.77)	
Intercept 1	3.08*** (0.48)		3.08*** (0.63)		0.80 (1.72)	
Village-level dummy variables[a]						
Dummy 1	-0.14 (0.16)	-0.17	-0.21 (0.18)	-0.23	-0.16 (0.22)	-0.17
Dummy 2	-0.53*** (0.15)	-0.65	0.63*** (0.19)	0.80	0.51*** (0.20)	0.65
Dummy 3	-0.16 (0.18)	-0.16	0.11 (0.16)	0.12	0.06 (0.18)	0.07
Dummy 4	0.55*** (0.15)	0.74	-	-	-	-
Relational social capital variables						
Resource composition	-	-	-	-	-0.005 (0.03)	-0.03
Resource diversity	-	-	-	-	0.28*** (0.07)	0.90
Kinship composition	-	-	-	-	0.02** (0.008)	0.51
Community social capital	-	-	-	-	0.07 (0.06)	0.24
D.C. eff. index[b]	-	-	-0.20 (0.29)	-0.14	-0.33 (0.31)	-0.23
DDO/DDAs[c]	-	-	0.57 (0.45)	0.33	0.33 (0.47)	0.19
Community controls						
Population	-0.003 (0.002)	-0.28	-0.002 (0.002)	-0.19	-0.003 (0.002)	-0.30
Household controls						
Age[d]	-1.14*** (0.36)	-0.60	-1.08*** (0.37)	-0.57	-0.53 (0.42)	-0.28
n	169		169		169	
R^2_N	0.75		0.77		0.88	
Somers'D	0.40		0.41		0.52	
τ_P	0.28		0.28		0.27	
AIC	2099.12		2091.78		1987.55	

Note: [a] The four dummy variables were added to population to form a set of five village-level variables and account for all the in-between village variance. Only three dummy variables are needed when both population and disaster committee effectiveness are included (i.e., in the institutional and full models).
[b] Disaster committee effectiveness index.
[c] Awareness of DDO/DDAs' involvement in disaster preparedness.
[d] Dummy variable indicating that the respondent is a female.
*p<0.1 **p<0.05 ***p<0.01

Table J.2 summarizes the direct and total effects of relational and community social capital, government representatives, disaster committees and the household and community contextual factors that were retained for the analysis. The comparison of the direct effects and the comparison of the total effects of these variables yield the same

results with one exception. Age (i.e., being over 65) has a significant, negative effect on awareness of protective measures but its direct effect is nonsignificant. The overall results, however, are unchanged as resource diversity has both the strongest direct and total effect on awareness of protective measures. Because the effect of age is not central to the results, only direct effects were discussed in Chapter 5.

Table J.2. Summary of standardized direct and total effects of predictors for awareness of protective measures

	Direct Effects	Total Effects
Relational social capital variables		
Resource composition	-0.03	-0.03
Resource diversity	0.90***	0.90***
Kinship composition	0.51**	0.51**
Community social capital	0.24	0.24
Disaster committee effectiveness index	-0.23	-0.23
Awareness of DDO/DDAs' involvement in disaster preparedness	0.19	0.19
Community controls		
Population	-0.30	-0.28
Household controls		
Age [a]	-0.28	-0.60***

[a] Dummy variable indicating that the respondent is a female.
*p<0.1 **p<0.05 ***p<0.01

J.2. Summary of the Direct and Total Effects of Predictors on Knowledge of What to Take to a Shelter

The base model, institutional model and full model for knowledge of what to take to a shelter are presented in Table J.3. As for awareness of protective measures, the model evaluation statistics for the base model and the institutional model are comparable but they improve when social capital variables are added in the full model. Once again, social capital variables increase the explanatory power of the model.

Table J.3. Base model, institutional model and full model for knowledge of what to take to a shelter

	Base Model		Institutional Model		Full Model	
	Estimates (S.E.)	Stand. Est.	Estimates (S.E.)	Stand. Est.	Estimates (S.E.)	Stand. Est.
Intercept	9.69*** (0.85)		1.32 (1.56)		0.70 (3.26)	
Village-level dummy variables[a]						
Dummy 1	0.26 (0.25)	0.32	-1.01** (0.48)	-1.24	-1.18*** (0.41)	-1.45
Dummy 2	-4.74*** (0.19)	-5.59	-3.45*** (0.31)	-4.18	-3.32*** (0.27)	-4.03
Dummy 3	-1.06** (0.44)	-1.35	1.15*** (0.35)	1.23	0.98*** (0.33)	1.05
Dummy 4	-1.71*** (0.28)	-1.91	-	-	-	-
Relational social capital variables						
Resource composition	-	-	-	-	-0.02 (0.05)	-0.14
Resource diversity	-	-	-	-	0.27** (0.12)	0.89
Kinship composition	-	-	-	-	0.006 (0.02)	0.18
Community social capital	-	-	-	-	0.14 (0.11)	0.49
D.C. eff. index[b]	-	-	5.78*** (0.52)	4.05	5.61*** (0.50)	3.93
DDO/DDAs[c]	-	-	1.34 (1.23)	0.76	1.45* (0.86)	0.82
Community controls						
Population	-0.03*** (0.003)	-2.70	-0.04*** (0.003)	-3.49	-0.04 (0.003)***	-3.76
Household controls						
Gender[d]	-1.40** (0.60)	-0.86	-1.36** (0.65)	-0.83	-1.37** (0.64)	-0.84
Fisher or farmer[e]	-0.86 (0.60)	-0.39	-0.71 (0.63)	-0.41	-0.62 (0.69)	-0.36
n	170		170		170	
R^2_N	0.52		0.54		0.65	
Somers'D	0.58		0.59		0.67	
τ_P	0.43		0.43		0.43	
AIC	579.10		572.90		537.01	

Note: Italicized estimates are not reliable due to numerical problems (see Chapter 5).
[a] The dummy variables were added to form a set of five village-level variables and account for all the in-between village variance.
[b] Disaster committee effectiveness index.
[c] Awareness of DDO/DDAs' involvement in disaster preparedness.
[d] Dummy variable indicating that the respondent is a female.
[e] Dummy variable indicating that the breadwinner is a fisher or farmer.
*p<0.1 **p<0.05 ***p<0.01

Table J.4 shows the direct and total effects of predictors on knowledge of what to take to a shelter. The comparison of direct and total effects yields similar results[67].

Table J.4. Summary of standardized direct and total effects[68] of predictors for knowledge of what to take to a shelter

	Direct Effects	Total Effects
Relational social capital variables		
Resource composition	-0.14	-0.14
Resource diversity	0.89**	0.89**
Kinship composition	0.18	0.18
Community social capital	0.49	0.49
Disaster committee effectiveness index	*3.93***	*3.93***
Awareness of DDO/DDAs' involvement in disaster preparedness	0.82*	0.82*
Community controls		
Population	*-3.76***	*-2.70***
Household controls		
Gender [a]	-0.84**	-0.86**
Fisher or farmer [b]	-0.36	-0.39

Note: Italicized estimates are not reliable due to numerical problems (see Chapter 5).
[a] Dummy variable indicating that the respondent is a female.
[b] Dummy variable indicating that the breadwinner is a fisher or farmer.
*p<0.1 **p<0.05 ***p<0.01

J.3. Summary of Direct and Total Effects of Predictors on Familiarity with Disaster Committee Responsibilities

Table J.5 shows the base, institutional and full models for familiarity with disaster committee responsibilities. Once again, the evaluation statistics for the base model and the institutional model are comparable but social capital variables increase the explanatory power of the model.

[67] The only difference (to be noted from Table J.3) is that the positive direct effect of awareness of DDO/DDAs' involvement in disaster preparedness is only significant when social capital variables are included in the full model. It is nonsignificant in the institutional model.

[68] Based on the links hypothesized in the conceptual framework, the direct effects of relational and community social capital, government representatives and disaster committees are also their total effects. These effects were obtained from the full model. The full model also provides the direct effects of contextual variables. The total effects of contextual variables were obtained from the base model.

Table J.5. Base model, institutional model and full model for familiarity with disaster committee responsibilities

	Base Model		Institutional Model		Full Model	
	Estimates (S.E.)	Stand. Est.	Estimates (S.E.)	Stand. Est.	Estimates (S.E.)	Stand. Est.
Intercept 3	-3.44*** (1.29)		-2.94** (1.35)		-4.00 (3.39)	
Intercept 2	-1.86 (1.27)		-1.34 (1.34)		-2.20 (3.40)	
Intercept 1	-0.64 (1.31)		-0.11 (1.36)		-0.82 (3.43)	
Village-level dummy variables[a]						
Dummy 1	0.36* (0.20)	0.55	0.39 (0.27)	0.47	0.33 (0.33)	0.40
Dummy 2	0.12 (0.23)	0.17	-0.27 (0.24)	-0.33	-0.26 (0.26)	-0.31
Dummy 3	0.56** (0.24)	0.66	-0.13 (0.21)	-0.17	0.08 (0.24)	0.10
Dummy 4	0.24 (0.20)	0.33	-	-	-	-
Relational social capital variables						
Resource composition	-	-	-	-	-0.01 (0.06)	-0.09
Resource diversity	-	-	-	-	0.22* (0.11)	0.86
Kinship composition	-	-	-	-	0.001 (0.01)	0.04
Community social capital	-	-	-	-	0.31*** (0.09)	1.23
D.C. eff. index[b]	-	-	-0.71* (0.37)	-0.57	-1.03*** (0.38)	-0.82
DDO/DDAs[c]	-	-	0.62 (0.53)	0.41	0.27 (0.58)	0.18
Community controls						
Population	-0.005* (0.003)	-0.50	-0.002 (0.003)	-0.27	-0.004 (0.003)	-0.42
Household controls						
Catholic[d]	2.85*** (1.05)	1.79	2.99*** (0.96)	1.88	2.93*** (1.08)	1.84
Protestant[d]	3.52*** (1.09)	1.86	3.55*** (1.04)	1.88	3.50*** (1.10)	1.85
Print media[e]	1.62*** (0.43)	1.16	1.54*** (0.43)	1.10	1.41*** (0.52)	1.01
Fisher or farmer[f]	-1.26*** (0.48)	-0.82	-1.33*** (0.48)	-0.86	-1.36** (0.53)	-0.88
Very low income[g]	-1.62*** (0.53)	-1.09	-1.63*** (0.53)	-1.09	-1.06 (0.65)	-0.71
Med/high inc[g]	-1.35* (0.69)	-0.73	-1.52** (0.71)	-0.82	-1.64** (0.75)	-0.88
n	131		131		131	
R^2_N	0.97		0.97		0.99	
Somers'D	0.59		0.60		0.65	
τ_P	0.33		0.32		0.37	
AIC	1840.94		1832.65		1711.98	

Note: [a] The dummy variables were added to account for all the in-between village variance.
[b] Disaster committee effectiveness index.
[c] Awareness of DDO/DDAs' involvement in disaster preparedness.
[d] Dummy variable: the reference category is other or no religion.
[e] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[f] Dummy variable indicating that the breadwinner is a fisher or farmer.
[g] The reference category is low income. These estimates may not be reliable (see Appendix H).
*p<0.1 **p<0.05 ***p<0.01

Table J.6 summarizes the direct and total effects of predictors on familiarity with disaster committee responsibilities. The results obtained through the comparison of direct and total effects are similar overall, with two exceptions. Population size has a significant, negative total effect on familiarity with disaster committee responsibilities but its direct effect is nonsignificant[69]. Very low income also has a significant, negative total effect on familiarity with disaster committee responsibilities. Households with lower socioeconomic status have repeatedly been found to be both less informed and less prepared than better-off households and this result is therefore not surprising. This effect, however, is no longer significant when relational and community social capital are controlled for. The effects of population size and very low income, however, are not central to the results. Furthermore, the pattern of effects observed when comparing the direct and total effects of predictors is overall consistent. With the exception of religion, community social capital is the most influential factor (i.e., it has both the strongest direct and total effect). The influence of resource diversity is more moderate but remains fairly strong relative to other predictors.

[69] The effect of population size becomes nonsignificant when institutional variables are added (see the institutional model).

Table J.6. Summary of standardized direct and total effects of predictors for familiarity with disaster committee responsibilities

	Direct Effects	Total Effects
Relational social capital variables		
Resource composition	-0.09	-0.09
Resource diversity	0.86*	0.86*
Kinship composition	0.04	0.04
Community social capital	1.23***	1.23***
Disaster committee effectiveness index	-0.82***	-0.82***
Awareness of DDO/DDAs' involvement in disaster preparedness	0.18	0.18
Community controls		
Population	-0.42	-0.50*
Household controls		
Catholic[a]	1.84***	1.79***
Protestant[a]	1.85***	1.86***
Print media[b]	1.01***	1.16***
Fisher or farmer[c]	-0.88**	-0.82***
Very low income[d]	-0.71	-1.09***
Med/high inc[d]	-0.88**	-0.73*

[a] Dummy variable: the reference category is other or no religion.
[b] Dummy variable indicating that the respondent consults newspapers at least once a month for news and information.
[c] Dummy variable indicating that the breadwinner is a fisher or farmer.
[d] Dummy variable: the reference category is low income. These estimates may not be reliable (see Appendix H).

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