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POPNA

A toolbox for conducting Policy Oriented Post-disaster Needs Assessments

Acknowledgements

The POPNA toolbox is based on experiences and lessons learned from conducting three consecutive assessments of the situation in areas affected by the May 12, 2008 Wenchuan earthquake in Sichuan province in the People's Republic of China. The surveys and this toolbox are developed by the Chinese Academy of Science and Technology for Development (Beijing, China) and Fafo Institute of Applied International Studies (Oslo, Norway). The authors would like to thank the Norwegian Ministry of Foreign Affairs and the Chinese Ministry of Science and Technology for funding the assessments that made it possible to accumulate knowledge for producing this toolbox.

The new approach presented in this publication is builds on experiences compiled by a large team of researchers. We are particularly grateful to Jon Pedersen and Hedda Flatø for their invaluable comments and editing efforts. Furthermore, we owe thanks to all the other Chinese and Norwegian research team members that contributed to the work in earthquake affected areas. Finally, we would like to thank the people and the government of Sichuan for sharing their experiences and views with us. Without them we would not know what we do today.

Acronyms

CAPI	Computer Assisted Personal Interviewing
CDPHE	Colorado Department of Public Health and Environment
CRED	Center for Research on the Epidemiology of Disasters
DALA	Damage and Loss Assessment
DANA	Disaster Assessment Needs Analysis
ECLAC	Economic Commission for Latin America and the Caribbean
FAO	Food and Agriculture Organization
FLDOH	Florida Department of Health
HNTS	Health and Nutrition Tracking Service
IASC	Inter-Agency Standing Committee
McRAM	Multi-cluster Rapid Assessment Mechanism
MRA	Multi-Sectoral Rapid Assessment
NAF	Needs Analysis Framework
OCHA	Office for the Coordination of Humanitarian Affairs
PDNA	Post Disaster Damage and Needs Assessment
POPNA	Policy Oriented Post-disaster Needs Assessment
PPS	Proportional Probability Sampling
SMART	Standardized Monitoring and Assessment of Relief and Transitions
TCHD	Tri-County Health Department
UNDAC	United Nations Disaster Assessment and Coordination
UNDP	United Nations Development Programme
BCPR	Bureau for Crisis Prevention and Recovery
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	The United Nations Children's Fund

USAID	United States Agency for International Development
WHO	World Health Organization

Contents

Part I: WHY conduct POPNA

1.1 Introduction

Our common history is a history of fighting against natural disasters. Despite technological advances, we cannot completely protect ourselves against natural disasters. However, well-functioning disaster response and disaster governance systems can help us cope with them.

Assessments of the scope and impact of natural disasters are an indispensable component of disaster governance and response. As stated in the United Nations Disaster Assessment and Coordination (UNDAC) assessment guidebook: “While good assessment information does not guarantee a good response, poor assessment information almost certainly guarantees a bad one” (UNDAC, 2006).

Needs assessments are specific types of disaster assessment tools. Such studies collect information from the disaster affected population and provide data and analyses to external supporters with the purpose of facilitating timely and appropriate

assistance. In recent years, governments, UN agencies, international organizations and researchers have put increasing effort into developing various post disaster needs assessment tools.

In this manual, a new type of needs assessment tool is introduced, namely, the Policy Oriented Post-disaster Needs Assessment (POPNA). The main function of the POPNA toolbox is to serve the needs of those who want to conduct rapid assessments with the aim of providing information for actors who are willing and able to implement large-scale and long-term reconstruction in a disaster area. It provides guidance for carrying out a post-disaster assessment survey aiming at collecting comprehensive information about the affected population's long-term needs for future reconstruction.

The POPNA toolbox is the result of collaboration between the Norwegian research institute Fafo and the Chinese Academy of Science and Technology for Development (CASTED). It is to a large extent based on the two research institutes' experiences with a large-scale needs assessment survey in districts that were seriously affected by the great Wenchuan earthquake in China in 2008 as well as two follow-up monitoring surveys of the reconstruction process in disaster areas (Wang, et al 2008; Zhao, et al 2009; CASTED 2011).

The first chapter of this manual discusses *why* use POPNA. It outlines how POPNA contributes to and expands on other needs assessment tools and for what objectives it is the most preferable assessment tool. Chapter two describes the main content of POPNA in order to outline *what* the toolbox is. Finally, the third chapter introduces the methodology recommended for POPNA, describing *how* to conduct such a survey.

1.2 Background

1.2.1 Disasters and disaster assessments

Disasters can be defined as any occurrence that causes damage, ecological disruption, loss of human life, and/or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community (WHO 1998). Natural disasters have been frequent in recent years. Oxfam, a leading UK-based charity organization, reported in a recent study that weather related disasters have quadrupled over the last two decades (Oxfam International

2007). Center for Research on the Epidemiology of Disasters (CRED) reported that 385 natural disasters took place in 2010, killing around 300,000 people and affecting more than 217 million, with economic losses amounting to nearly US $ 123.9 billion (Guha-sapir, et al. 2011). Climate change has been cited as possible cause of the increased frequency of natural disasters (Anderson and Bausch 2006, IPCC 2007). Moreover, there has been a major increase in man-made disasters, such as pollution, mining and transportation accidents, radiation leakages and other types of risk related to the rapid development of modern technology, which is also causing destruction of life, properties and environment (Beck 1992). Some argue that the world's population growth has increased vulnerability to natural disasters (Bouwer 2011, Huppert and Sparks 2006). With relatively frequent outbreaks of both natural and man-made disasters in recent years, disaster assessments have increasingly attracted attention from governments and international organizations.

Government departments, UN agencies, international organizations, universities and research institutes have put great effort into developing tools for producing assessments of various emergencies. UNHCR defines assessments as a set of activities necessary to understand a given situation, including collection, up-dating and analysis of data pertaining to the population of concern (needs, capacities, resources, etc.), as well as the state of infrastructure and general socio-economic conditions in a given location/area (ReliefWeb 2008). Disaster assessments are used in different phases of disasters and can serve various objectives, such as to evaluate the condition of victims, the extent of damage, the resources available, or various needs.

Guha-Sapir distinguishes between disasters that are acute with rapid onset, such as earthquakes, flash floods or hurricanes, and chronic with slow onset, such as civil wars, epidemics, droughts or famines (D. Guha-Sapir 1991). In general, there is a much larger body of assessments of chronic, slow onset disasters, particularly within the health field, than in the case of acute rapid onset disasters (Pedersen, Zhao and Zhang 2010). It is more demanding to mobilize the funding and personnel needed for carrying out an assessment in conjunction with acute rapid onset disasters. The dominant concern and focus of assessments on sudden-onset and slow-onset disasters are different in many aspects, and therefore the methodologies applied to these different types of assessments might vary. This toolbox will mainly focus on assessments of acute rapid onset disasters, although some of the ideas presented

here may easily be used in assessing slow-onset disasters as well.

International organizations, research institutes, and governments of affected populations have carried out post-disaster assessments of varying scope and out of varying concerns (DMPI 2004, Brennan and Rimba 2005, Bayleyegn, et al. 2006). In the aftermath of large-scale natural disasters, international rapid assessments of socio-economic and environmental damage are often conducted. For example, the Asian Development bank and the World Bank carried out joint assessments following the Dec 26, 2004 tsunami in Sri Lanka (Asian Development Bank; Japan Bank for International Cooperation and World Bank 2005), and the October 8, 2005 earthquake in Pakistan (Asian Development Bank and World Bank 2005). These more or less follow handbook of disaster assessment produced by the Economic Commission for Latin America and the Caribbean (ECLAC 2003).

Kelly classifies disaster assessments as one of three types; (a) assessments of the damage done, (b) assessments determining the basic needs of the affected population; or (c), assessments of the conditions needed to fulfill a population's right to live a life in dignity (Kelly 2008). The various approaches are based on different concerns and lead to somewhat different policy responses.

A damage assessment is useful in defining the damage caused by a disaster event and taking stock of the physical resources needed for reestablishing the situation before the disaster. This type of assessment is frequently applied by the government and media. However, it is not useful in capturing the social or psychological impacts of disaster or for evaluating the resources available to survivors (Kelly 2008). The needs-based assessment, with its focus on victims' needs, is more efficient with regard to provision of post-disaster assistance. Even though needs assessments are often conducted by NGOs and external stakeholders, governments of disaster-affected populations have also found them useful in gathering information for post-disaster reconstruction. UN agencies and NGOs have developed various standards for basic needs assessments in disaster situations, such as HNTS[1] (Health and Nutrition Tracking Service), SMART[2] (Standardized Monitoring and Assessment of Relief and Transitions) and SPHERE[3] standards. Right-based assessments focus

[1] The HNTS is an independent interagency initiative launched in late 2007 by the members of the Health and Nutrition Clusters of IASC. It aims to establish systematic technical and field arrangements to provide information on mortality and nutrition indicators during emergencies (HNTS 2009).
[2] SMART is a basic integrated, standardized method for improving the estimates of nutritional status and mortality rates during emergencies. It was developed in the late 1990s (SMART 2006).
[3] The Sphere Project was initiated in 1997 by a group of humanitarian non-governmental organizations (NGOs)

on the general situation in disaster affected areas; therefore, they also take into account poverty, human rights violations or other social problems which might have existed already before the disaster. Although the right-based approach aims to promote a fair and equitable recovery, it has until now been the domain of NGOs and UN organizations rather than governments. Such assessments may not be welcomed by the government of disaster-affected areas or by external donors, who do not want to mix short-term relief with longer-term issues (Kelly 2008). Political responses in practice might mix the three approaches in different phases of the disaster situation, with each approach addressing different problems and serving different needs related to policy formulation and implementation.

1.2.2 Rapid versus long-term needs assessments

The design of needs assessments vary according to what kind of information it is meant to produce. Assessments on immediate survival and humanitarian needs would be quite different from reconstruction based assessments. Therefore, it is important to identify the phases of the disaster cycle and the timeline of the assessment.

The disaster cycle can be differentiated into five main phases: The warning phase, the impact phase, the emergency phase, the rehabilitation phase and the reconstruction phase (Guha-Sapir and Flechat 1986). The emergency phase is the period when survival is the main purpose of disaster response; during the rehabilitation phase, essential services are provided on a temporary basis; while the reconstruction phase refers to longer-term post-disaster policies and measures aimed at rebuilding society to a normal state.

Needs assessments can be defined according to the different phases of the disaster progression. The Red Cross and Red Crescent Societies classify three types of needs assessments: Rapid assessments conducted within one week after the onset of disaster; detailed assessments conducted within one month after the disaster; and continual assessments on a regular basis throughout the operational period (ICRC 2008). The UN's *Office for the Coordination of Humanitarian Affairs* (OCHA) identifies

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and the International Red Cross and Red Crescent Movement. It is meant to improve the quality of humanitarian assistance to affected people and to enhance the accountability of humanitarian system by developing a set of universal minimum standards in areas of humanitarian assistance (The Sphere Project 2011).

four phases and three types of need assessments in sudden onset crisis: Immediate initial response within the first and second phase; on-going initial response within the second and third phase; and in-depth assessments in the fourth phase.

Over the years, a number of rapid need assessments targeting the earlier post-disaster phases have been developed. The earliest rapid need assessments are designed to serve needs for immediate humanitarian assistance. Due to the specificity and urgency of early post-disaster phases, such assessments were first developed and applied by international organizations. For example, the USAID's Disaster Assessment Needs Analysis (DANA)[4] focuses on emergency and response immediately after disasters. The Disaster Initial Assessment, and the Initial Rapid Assessment[5], developed by the United Nations Disaster Assessment and Coordination (UNDAC) and the UN's Inter-Agency Standing Committee (IASC) respectively, both focus on gathering information during the initial phase of an emergency (IASC June 2009).

In recent years, there have been increasingly strong calls for conducting needs assessments and analyses in all phases after disasters (OCHA 2009). Many of the new assessment initiatives by IASC members are to be implemented in the fourth post-disaster phase. According to OCHA, they are therefore not truly "rapid needs assessments" but should rather be seen as "in-depth needs assessments". Such "in-depth needs assessments" are used to cater to information needs related to longer-term post-disaster assistance and/or reconstruction. The Economic Commission for Latin America and the Caribbean (ECLAC) post-disaster Damage and Loss Assessment (DALA)[6] provides information on long-term rehabilitation, while the same organization's Post Disaster Damage and Needs Assessment (PDNA)[7]

[4] DANA is a methodology introduced by United States Agency for International Development. It aims at carrying out an analysis of needs and systematic damage assessment, to propose priority actions and provide an initial estimate of the impact (USAID/ OFDA Project 2009).

[5] This Initial Rapid Assessment (IRA) tool has been developed by multi-agency teams, including government institutions, UN, INGOs and non-governmental institutions. IRA aims at providing a template to enable faster and better multi-sector rapid assessment.(IASC 2009)

[6] The Damage and Loss Assessment (DaLA) Methodology was initially developed by the UN Economic Commission for Latin America and the Caribbean (UN-ECLAC) in 1972. It aims at assessing the damage and loss, and the economic impact of disasters on affected households and therefore the social-economic needs for recovery and reconstruction (WB 2010).

[7] The PDNA project is a cooperative effort between United Nations Agencies led by UNDP as the Chair of the Cluster Working Group on Early Recovery (CWGER), the World Bank and the European Commission. The project will develop a Practical Guide to a Multi-Stakeholder Post-Disaster Needs Assessment (PDNA) and the Recovery Framework (RF). The main aim of the project is to address not only the need for effective recovery assessment and planning at the national level, but also the how-to of connecting national plans with effective means of delivering recovery programs at the local level (The Government ofBangladesh 2008, Government of the Republic of Haiti 2010)

emphasizes bridging the gap between emergency response and long-term reconstruction.

1.2.3 Single-topic versus comprehensive needs assessments

The purpose of most international organizations' rapid needs assessments is to identify acute humanitarian needs and enable evidence-based aid provision. Therefore, traditional rapid needs assessments focus on victims' humanitarian needs, with emergency health service provision and disease control as major aims.

Most needs assessment tools target a certain group of people or a specific concern, such as health and health services, nutritional status, education, food security, shelter or household economy. The World Food Program and UNICEF have developed a rapid needs assessment tool focusing specifically on food security, rural livelihoods and nutrition (WFP 2005), and various organizations have produced rapid assessment reports within their sector of expertise, such as UNESCO for education (UNESCO 2005) and FAO for agriculture (Department of Agriculture, Muzaffarabad and FAO 2005).

Other needs assessments are targeted at certain population groups, such as evacuees, displaced populations or refugees. For example, the Florida Department of Health (FLDOH) requested the Center of Disease Control to conduct a rapid needs assessment of older adults after the Hurricane Charley in 2004, while the Colorado Department of Public Health and Environment (CDPHE) and the Tri-County Health Department (TCHD) conducted rapid needs assessments among Hurricane Katrina evacuees in 2005 (Dippold, et al. 2005). There are few comprehensive need assessments. One rare example is the rapid need assessment conducted by the Asian Development Bank and the World Bank after the 2005 earthquake in Pakistan, which employed ECLAC's Damage and Loss Assessment (DALA) tool.

It is increasingly recognized in the international community that global resources to help deal with disaster are limited, and that the post-disaster needs assessments developed by various organizations often 'over-assess' victims. Therefore, there is increasing demand for humanitarian actors to join efforts and develop an overall joint assessment methodology which can cover all clusters of affected population groups and issues, so as to rapidly identify and assess overall needs and provide

strategically targeted assistance.

At the 68th IASC Group meeting in June 2007, inadequate coordination within the field of needs assessments was discussed, and the United Nations' Office for the Coordination of Humanitarian Affairs (OCHA) was requested to map key existing initiatives and explore opportunities for joint assessments or a joint approach (OCHA 2009). Since IASC meeting in Nepal in 2009, the organization's Initial Rapid Assessment had been expanded and developed into a more comprehensive rapid needs assessment tool called the Multi-cluster Initial Assessment (MIRA) (IASC June 2009). An inter-cluster project called Multi-cluster Rapid Assessment Mechanism (McRAM) project was thereafter developed in Pakistan in 2008 by then clusters of UN agencies in Pakistan. McRAM is a collaborative assessment tool designed for rapid post-emergency assessment, and also one of the important assessment tools developed in recent years that utilize Personal Digital Assistant (PDA) technology for disaster assessments.

1.2.4 Needs assessment methodology

The United Nations Development Programme (UNDP) classifies existing post-disaster assessments according to the methods they employ (Bollio and Khanna 2007). Recovery-focused methods are represented by Post-disaster Damage and Needs Assessment (PDNA), Damage and Needs Assessment (DNA)[8], and the UNDP-BCPR's Post-disaster Recovery Guidelines. Emergency-focused methods include those employed in the Needs Analysis Framework guidelines (NAF)[9] and UNICEF's Multi-sectoral Rapid Assessment (MRA)[10]. The last type is reconstruction-focused methods, such as ECLAC's methodology for estimating the socio-economic and environmental impact of disasters. The ECLAC handbook lists a number of information sources that can be used in reconstruction-focused needs assessments, such as strategic sources, the press, secondary data analysis, interpersonal communication, surveys, and remote sensing data.

[8] Damage and Needs Assessment is led by ADB and WB, and estimates the damage and reconstruction costs resulting from the crisis (ADB and WB November 2009).
[9] Need Analysis Framework is a basic analytical framework meant to help UN country teams organize and present existing information on humanitarian needs in a coherent and consistent manner. Its aim is to use existing assessment data from multiple sources covering all sectors, to cater the responses proposed in Consolidated Appeals (CAPs) (IASC CAP 2007).
[10] MRA is a toolkit developed by UNICEF as part of the IASC clusters working group, and is intended as a common reference for an efficient, coordinated and effective interagency rapid assessment within the first 72 hours after a rapid onset disaster (UNICEF 2009).

The most widely used methods for carrying out needs assessments are reviews of existing literature, field observation, focus group discussions and key informant interviews. For example, the various assessments conducted after the Pakistan earthquake mainly utilized these methods. Organizations working in limited areas or on specific issues also often use similar approaches, focusing mainly on victims' immediate needs rather than macro-economic recovery (Merlin 2008, DMPI 2004).

Community surveys appear to be most common methodology employed in rapid post-disaster needs assessments. Such surveys are usually based on interviews with key informants or community leaders. For example, after the Gujarat (India) earthquake of 2001, community-based surveys were carried out, focusing on deaths, morbidity, damages and needs (Pawar, Shelke og Kakrani 2005). Household surveys have been more widely used in complex and slow onset disasters, with focus on malnutrition and disease (Kamp, et al. 2006). Household surveys with cluster design have been applied in humanitarian emergencies such as in the aftermath of the 1993 Hurricane Andrew in South Florida (Hlady, et al. 1994).

After the tropical cyclone Nargis struck Myanmar in May 2008, an assessment jointly conducted by ASEAN, the UN and the Burmese government took a more systematic approach. First, a Village Tract Assessment was carried out, followed by a Damage and Loss Assessment (DALA) within the first two months after the disaster- Over the next two years, Periodic Review (PR) monitoring assessments and Social Impact Monitoring (SIM) studies were conducted. A centric systematic area sample method was used to identify probability sampling units (Milne 1959). Each assessment was either built on or complemented previous ones. Thereby, they functioned not only as needs assessment tools but also as tools for monitoring disaster management.

With the development of high technology, remote sensing and GIS techniques have also been applied in assessment processes (Kelly 1998). Remote-sensing and related technologies have functioned as important supplementary methods for demographic assessments, and for assessing the needs of inaccessible populations. It is especially useful for conducting rapid and accurate assessments of structural damage after disaster events (Voigt, et al. 2007, Kerle 2010). Moreover, PDA (Personal Digital Assistants) technology has been applied in emergency rapid needs assessments in order to rapidly provide feedback on the post-disaster situation, such as with the Multi-cluster Rapid Assessment Mechanism (McRAM) surveys since 2008.

1.3. The POPNA toolbox

1.3.1 Why choose POPNA

As described above, many rapid needs assessment tools have been developed and implemented in post-disaster situations. Most are immediate or on-going initial needs assessments conducted in the early phase (usually a few weeks) after the onset of disaster, with a focus on immediate humanitarian assistance needs such as provision of food, water, shelter, health services, etc. The present Policy Oriented Post-disaster Needs Assessment (POPNA) toolbox is different from most post-disaster rapid needs assessments. It is not a rapid assessment aiming at collecting information about immediate humanitarian needs, nor is it a normal living condition survey. It has some similarities with what OCHA defines as in-depth needs assessment in the fourth phase of OCHA's emergency assessment timeline, but it is far from identical to it.

The main feature that sets POPNA apart from other post-disaster needs assessments is its specific objective. POPNA is designed for collecting comprehensive information about what the disaster affected population needs for longer-term post-disaster recovery and reconstruction. The information produced is intended to be reported to policy makers and other political actors, such as central and/or local governments in the affected region, international organizations, NGOs, etc. The aim of conducting a POPNA is to provide such stakeholders with knowledge that enables them to formulate policies or decisions that efficiently facilitate victims' recovery in the long run. As a consequence of this specific aim, POPNA is different from traditional needs assessments in that it is policy oriented, has a long-term outlook, and is comprehensive yet targeted in scope, content and methodology.

1.3.2 Policy orientation

Post-disaster reconstruction is an extensive and complex social project. In order to formulate well-suited long-term reconstruction plans, policymakers need information on the affected population's views and opinions as well as relevant empirical evidence. Reconstruction should not be solely dependent on external aid and governmental assistance, nor should it be a simple, top-down decision making process. All

stakeholders, especially people who are directly affected, should be involved in the reconstruction process and have the opportunity to express their views. The needs of those who are affected are the best guidelines of post-disaster reconstruction planning. The implementation of POPNA can build a bridge between policymakers and the affected public.

In the context of disasters it is of particular importance that policy formulation is based on as accurate knowledge as possible. Post-disaster situations are characterized by uncertainty and complexity. The needs of those who are affected vary across geographic areas, across social groups, and with time. Social surveys based on rigorous methodology are useful for collecting accurate information about the affected population's needs and can thereby provide a solid data foundation for policy making. Moreover, those who are directly affected by a disaster will be more aware of its impact, and more concerned with the quality of reconstruction, than external policy makers. In this sense, by accurately mapping out the needs of affected populations, POPNA further contributes to building a solid knowledge base for reconstruction policy making.

Hence, policy orientation is a defining characteristic of the POPNA toolbox. This is not to deny the fact that most needs assessment tools are to some extent policy-oriented. However, what is particular about POPNA is that it is expressly focusing on building up a good disaster governance system which takes the needs of all stakeholders into consideration and is based on a solid knowledge foundation. POPNA facilitates dialogue between the affected people and policy makers by collecting comprehensive needs information from the affected people and transferring important messages on their views to policy makers. Therefore, POPNA can also play an important political role in post-disaster contexts.

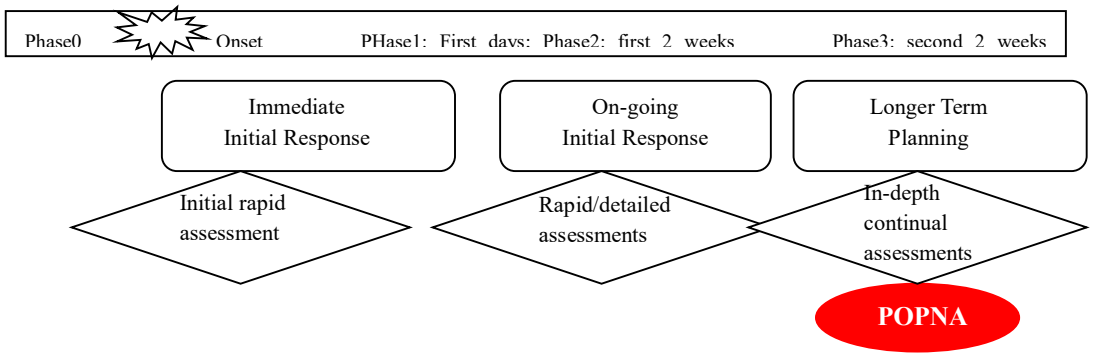
1.3.3 Long-term outlook

As POPNA is aiming at meeting longer term post-disaster needs, it should not be conducted immediately after a disaster. That is partly because in the immediate post-disaster phase, most affected people focus their attention on basic needs such as food, water, shelter, etc. Many are likely to find it too early to think about longer term reconstruction of their lives in the midst of an on-going emergency situation. Still, POPNA should not be conducted too long after the disaster. In order to be of use, it

must be conducted in time to provide input for long-term reconstruction planning. If it is conducted after plans have already been formulated, the POPNA is not much different from an ordinary living conditions survey.

Hence, what time period is appropriate for conducting a POPNA depends on when policy makers start working out long-term plans for post-disaster reconstruction. Preferably, POPNA should be conducted shortly before reconstruction plans are formulated- usually, this would be one to two months after the disaster. Figure 1 shows the location of POPNA in the timeline classification of post-disaster needs assessments applied by The Red Cross and Red Crescent Societies (ICRC, 2008) and OHCA (2009). The best time to conduct POPNA would be in the "in-depth assessment" phase.

Figure 1: Post-disaster needs assessment timeline (adapted from OCHA, 2009)



Although POPNA is not 'rapid' in the sense that it is conducted immediately after the onset of disaster, it should be completed within a relatively short period of time in order to be able to fulfill its aim of providing needs information for post-disaster reconstruction planning. Therefore, POPNA is another type of 'rapid' needs assessment. Usually, the survey should not last longer than three weeks. Given the broad scope and large scale of POPNA, this time limit poses significant challenges with regard to survey design and fieldwork logistics.

By collecting information in the beginning of long-term post-disaster reconstruction, POPNA provides base-line data of the reconstruction process. This provides a useful basis for monitoring the entire reconstruction process. Following up on the POPNA survey by conducting several rounds of annual longitudinal surveys during the coming three to five years would complement the POPNA with even more useful and

interesting information.

1.3.4 Comprehensive in scope, content and methodology

POPNA is comprehensive in both scope and content, and as a consequence, also in its methodology. As POPNA aims at collecting comprehensive information about the needs of the affected population and involving ordinary people in post-disaster policymaking, it is important to cover the entire affected population. Thus, POPNA has to be conducted within the geographic scope of the entire area that is seriously affected by disaster, and it should include a large, representative sample of the affected population.

Most existing needs assessments tend to pay more attention to those who are most seriously affected. This is reasonable for emergency rescuing and humanitarian aid. However, when formulating general policies for the long-term reconstruction of the entire affected area, the needs of all social groups, including those who are less severely affected, should be taken into consideration. Thus POPNA should cover respondents from all geographic areas in the seriously affected region, including not only those living in the most seriously affected, but also those in comparably less seriously affected areas.

For similar reasons, POPNA should elicit information from a representative sample of the affected population. Many rapid needs assessment tools, limited by time and access problems, employ convenience sampling, purposive sampling and other non-probability sampling methods. POPNA, however, is designed to take representative samples of the affected population, because only a representative survey can provide unbiased estimates of its indicators and thus ensure that information about the needs of all social groups can be accurately collected and taken into account in policy making. POPNA also allows for further analyses on the needs of various social groups by background variables such as gender, ethnicity, age, education, etc. This helps policymakers obtain a more complete understanding of the affected population's needs, and also enables them to identify vulnerable groups in need of special policy attention.

POPNA is also comprehensive when it comes to its content – i.e., the issues respondents are asked about. Post-disaster reconstruction is a complex process that includes economic recovery, social reconstruction, psychological recovery, etc. Therefore POPNA aims at collecting comprehensive information about a wide set of

issues, including affected people's resources and living conditions, current needs, their perceptions of the current situation, and their hopes for future reconstruction. Furthermore, political response towards disasters is usually based on a mixture of damage-based, need-based and right-based assessments (Kelly 2008). Therefore the POPNA toolbox should also consist of comprehensive indicators that measure the current living condition, needs and rights of the affected-people.

The main focus of POPNA is to measure the fundamental resources of the affected population. Theoretically, it is mainly based on a general living conditions survey framework (Hanssen-Bauer, Pedersen, & Tiltnes, 1998), where households and individuals are seen as bringing their resources to social arenas, in this case post-disaster reconstruction. Given their value orientation and their resources (wealth, education, health, social networks etc), they are able to produce outcomes that are more or less satisfactory, which in turn reconstitute their resources. In this framework, the earthquake constitutes an immense disturbance or shock to the normal life process, and the task of the survey is to assess how this shock affected and disturbed living conditions in the disaster area. For these reasons, POPNA includes multi-dimensional indicators commonly used in living conditions surveys, such as housing and infrastructure, education, health, working conditions, migration, knowledge, social networks, etc. The purpose of involving these indicators is not only evaluating the damage or loss of the people, but more importantly, to gain an overview of resources that can be mobilized for future reconstruction.

But POPNA is more than an ordinary living conditions survey. Therefore, it also includes indicators of people's hopes for the future reconstruction and their attitudes towards possible policy measures in future reconstruction. In planning long-term reconstruction, policymakers need to have a clear overview of the current situation of affected population, to know their urgent and longer-term needs, and to learn about their views on possible future reconstruction policies and measures. In this sense, POPNA is a dual needs assessment tool. It not only collects information on the needs of the affected population; in addition, in its early phases, it also collects information about policymakers' needs. What kinds of information are they most eager to know about? What kinds of information are most relevant for policy making? And what kinds of policy measures do they plan to implement? Such information is collected and used in POPNA research design, and enables the study to better serve the aim of responsive and evidence-based policy making.

As a consequence of its comprehensive scope and content, POPNA is also comprehensive in methodology. For example, it requires a representative sample covering the population of all seriously affected districts, and a relatively long questionnaire which includes multi-dimensional indicators of people's living conditions, needs, and attitudes.

Part II: WHAT is the POPNA toolbox?

2.1. Introduction

What can be done to best respond to the needs of the affected population and policy makers in a post disaster situation? This chapter describes the approach underlying the Policy Oriented Post-disaster Needs Assessment (POPNA) and discusses what that approach implies with regard to the content of the assessment. It will take a closer look at the framework that is taken as a point of departure for the POPNA toolbox, describing how a traditional living conditions framework in combination with a framework on information needs in policy developments come together in the POPNA framework. Further, the chapter will discuss the outline of content for such an assessment: What needs to be measured and how is it best done? Following the discussion of what should be measured, a further discussion of the scope of the assessment will be presented. Finally the chapter will make a thorough presentation of the possible outputs from a Policy Oriented Post-disaster Needs Assessment (POPNA). Its main output is related to answering to governments and other

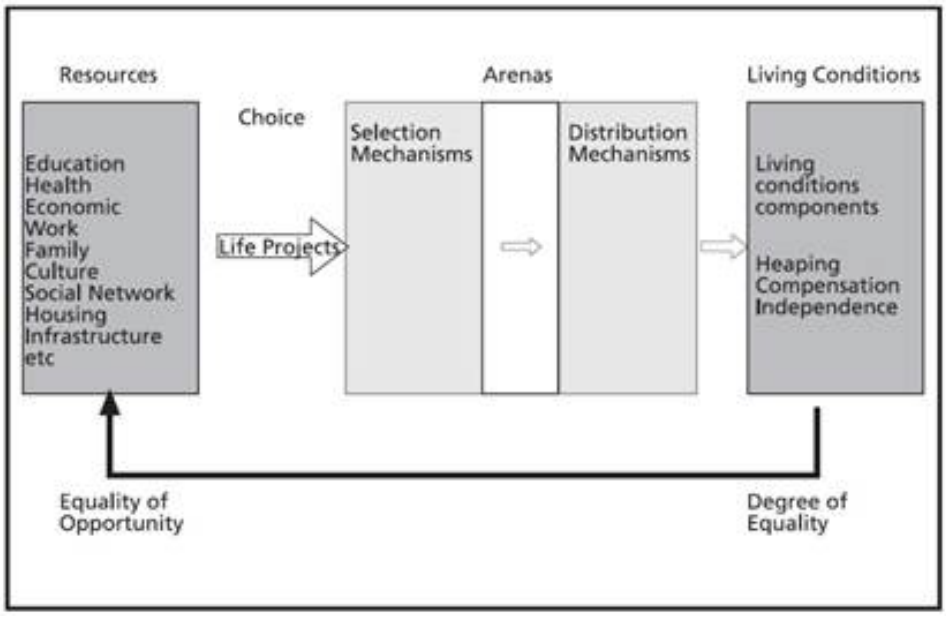
stakeholders' need for information that will underpin the development and implementation of policies. In addition, POPNA results in outputs that cater to the needs and interests of organizations, civil society, scholars and local communities.

2.2. What is the framework?

2.2.1 Living conditions

The Policy Oriented Post-disaster Needs Assessment (POPNA) aims to describe what resources are available to different actors in a society hit by disaster, and how those resources can be put to use. Theoretically, POPNA is based on a general living conditions framework (Hanssen-Bauer, Pedersen, & Tiltnes, 1998) where households and individuals are seen as bringing their resources to social arenas, such as the community or the labor market. Given their value orientation and their resources (wealth, education, health, social networks etc), they are able to produce outcomes that are more or less satisfactory, which in turn reconstitute their resources.

Figure 2: Living conditions framework (Hanssen-Bauer, Pedersen and Tiltnes, 1998)



Resources can be described as household members' access to physical belongings (house, car, clothes, production tools etc); personal capital (education, ability to work, health etc.); social capital (networks, family, membership in organizations etc.);

economic capital (income, savings, stocks etc.); and social status (ethnicity, residency, geographic location, etc.). The **choices** households make may be determined by the resources they have and are able to access, and on the arenas where they can make those choices. Such **arenas** can be described as the places where people can put their resources to use and "transform" them into living conditions, such as communities; the labor market; or political or value systems.

Many aspects of the living conditions framework may be well captured by a comprehensive household survey that describes households' and individuals' resources, choices and participation in different arenas. However, the features of arenas in themselves are not well described by a household survey. Particularly, features of the community within which the households live and act makes for possibilities or constrains for individual actors. If a community has been facilitating labor migration of individuals, it may be much easier for a household to turn to migration as a strategy for coping with disaster than if labor migration is something that has high cost and is seen as very difficult within a community. The POPNA framework sees the community as presenting both opportunities and constraints for individuals. Recognizing the importance of communities and the fact that they may affect different households differently, a separate survey module that aims at capturing the characteristics of communities is included in the POPNA toolbox.

The outcome of a household's resources and choices in combination with arenas is accumulated capital (social, human or material). This is described as living conditions. Sometimes, living conditions outcomes can be heaped in the sense that that "all good things go together" or "all things are bad". Redistribution mechanisms in a society are often vital in influencing whether and how heaping of living conditions is structured in a society.

A natural disaster can be portrayed as an immense disturbance or shock to the process outlined in the living conditions framework. The task of the POPNA is to discover how this shock affects and disturbs the production and distribution of living conditions in the disaster area. An earthquake or other natural disasters of large scale and rapid onset usually affect everyone in a society; but within societies, different entities are affected differently due to their "private coping capabilities" (Webb and Braun 1994). Coping strategies are "rational and calculated responses to minimize the intensity or durations of a crisis, to maximize limited resources and to preserve long term livelihood security (Adams et al 1998).The composition and resources of a

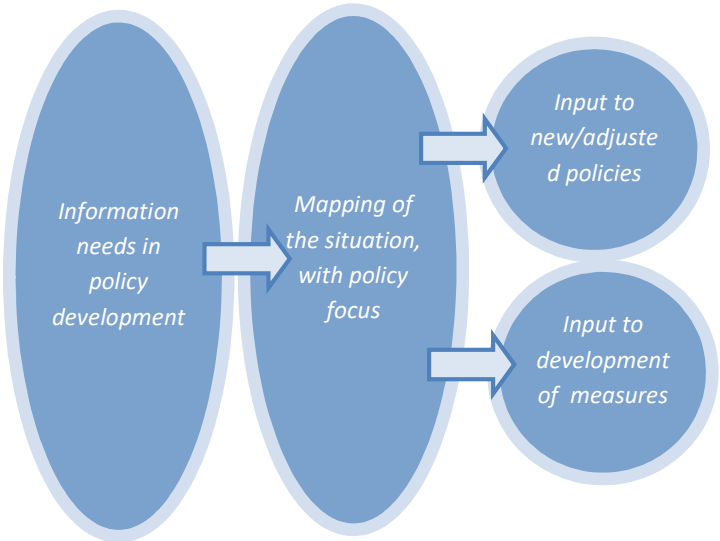
household may determine what coping strategies are available to them. The scope and content of POPNA makes it possible to study just these mechanisms. Furthermore, what makes POPNA special is that it accumulates information about the situation both before and after the disaster. Hence it provides information about how different entities (individuals, households and communities) that were in different situations before the disaster have been affected by and are coping (or not coping) with the shock.

2.2.2 Input to policy

In addition to describing the living conditions of a society after disaster has hit, the POPNA is made with the purpose of providing information to stakeholders (national governments, international organizations etc.) in the development of long term recovery and reconstruction policies in disaster affected areas.

In order to contribute to this target, POPNA tools are developed with special consideration that they should cater to the stakeholders' particular need for information to be used for development of policy. This means including measurements on specific topics relevant to policy development and on measures meant to fulfill these policies.

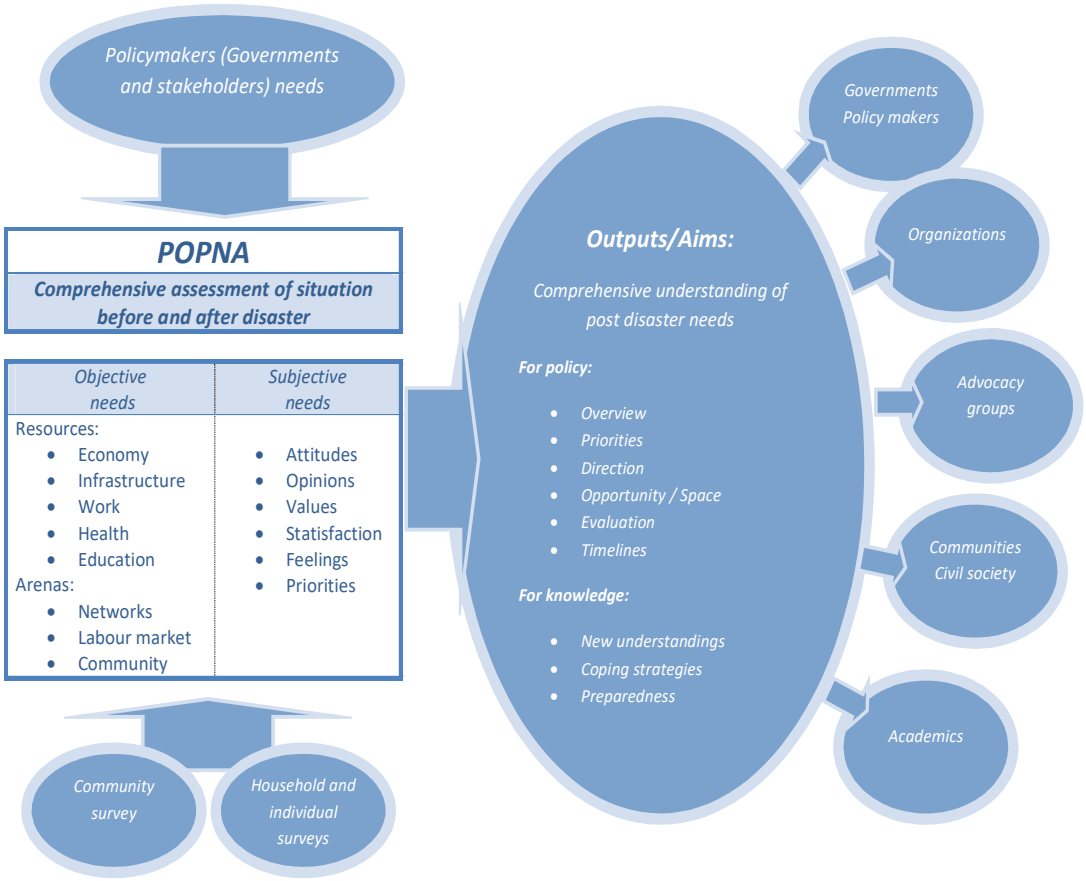
Figure 3: POPNA and policy



2.2.3 The POPNA tool

POPNA links describing needs and living conditions based on information about both households and the communities they live in, on the one hand, with seeking information for development of policy and measures, on the other. This makes POPNA a unique tool for governments and organizations alike. In addition to describing the situation shortly after a disaster has hit, the POPNA also focuses on the situation before the disaster, asking households, individuals and communities not only about their current situation, but also about what it used to be like before the disaster struck. This comprehensive approach makes for an understanding of complex mechanisms that needs to be taken into consideration when planning for the best possible reconstruction not only for individual victims, but for a society as a whole.

Figure 4: The POPNA framework



2.3. What is the survey content?

2.3.1 Questionnaires and Indicators

Living conditions, identification of needs and input to development of policy and measures need to be made operational: We must develop measurable indicators that provide information on the issues we seek to study, and tools – mainly, questionnaires - that can be used to compile information.

A relatively complex questionnaire tool is needed to describe the different aspects of the POPNA framework. In addition to a comprehensive household questionnaire for collecting information on both the household as a whole and its individual members, a community questionnaire should be included. Furthermore, the POPNA tool can be supplemented with other optional questionnaire modules catering to specific needs (for example modules that collect more detailed information on enterprises, the environment, or other specific issues).

Using a broad and comprehensive questionnaire tool makes sense in post-disaster situations. Collecting relatively detailed information about the situation of each household and their surroundings/context provides useful information and is time- and cost efficient in comparison with using a large number of very short and targeted questionnaires. This is particularly true in disaster affected areas, where transportation might be a substantial challenge and an excessive amount of time is often used to move between and establish good and respectful relations with respondents. Furthermore, a comprehensive survey tool allows respondents and disaster survivors to tell their stories and elaborate on their current situation. In a post disaster situation, this has a value in itself.

In order to collect information on household composition, resources, perceptions of the situation and hopes and expectations for the future, the questionnaire presented to the household should include three subsections: First, one section about the household as a unit, covering their economic situation, their housing conditions, access to infrastructure, networks and assistance. Second, a section with questions about each member of the household on issues related to demographics, education, health, and labor force participation. Third, a section with questions about values, opinions and expectations, asked to one randomly selected adult member of the

household.

Moving from the household as a unit to the community in which the households live, a community questionnaire is also included in the survey tool. The community questionnaire should be answered by community leaders and aim at providing information about the community as a unit at large. The rationale for including such a module is twofold. On the one hand, several characteristics affecting the population are common for the entire community, and can best be answered by community leaders who have access to information from records etc. On the other hand, it might be difficult to abstract information about the community from households, since households within a community may differ widely. Using a community questionnaire to map this information will provide more accurate information and be more time efficient than trying to obtain such information from individual households

POPNA allows for additional modules and questionnaires to be added to the basic survey tool in order to provide data on specific topics of interest to policymakers or other stakeholders. Among possible additional modules are questionnaires directly targeting enterprises or other economic entities, modules about environmental conditions in the disaster area, or alternately on other specific groups and issues.

2.3.2 The household questionnaire

The household questionnaire is asked to the household as a whole, and includes detailed questions about each household member. The questionnaire design should emphasize capturing the situation of the household and its members both before **and** after the disaster. This differentiates the POPNA questionnaire from other household questionnaires used in post disaster situations (such as HESPER), which almost exclusively focus on describing the current situation of affected households. Capturing the conditions both before and after the disaster is important in order to be able to describe how different groups of the population are able to adapt and cope after the disaster. Hence, POPNA introduces a differentiated and dynamic description of households in disaster. Below is a more through elaboration of the content of the household questionnaire.

Part 1: About the household as a whole

In order to capture the requirements of POPNA in a household survey it is important to collect information about the physical conditions under which people are living. This provides important information to users of the assessment, and serves as input to planning and development of policies and measures for reconstruction. Hence it is important to ask about the conditions of household dwellings, the degree of damage caused by the disaster and about current housing amenities for those who have been forced to leave their former dwelling.

It is also vital for policy developers and actors involved in reconstruction to obtain accurate information about the supply of basic infrastructure and service delivery in households' current place of living and about each household's opportunity to use these services. Sufficient access to and delivery of services is crucial for sustaining the quality of life for victims; for preventing contagious diseases; and for the legitimacy of reconstruction actors. Hence, it is important to include questions on access to water, sanitation, garbage collection, electricity,

Box 1
POPNA household questionnaire

Household as a whole:

- Housing, infrastructure and amenities (more specifically, type of housing, water and sanitation, and access to basic infrastructure such as electricity and telephone).
- Household economy, economic activities and agriculture
- Economic support in the aftermath of the disaster
- Migration and plans to move
- Social networks
- Household mortality

All individual household members:

- Basic demographic information including age, gender, ethnicity, marital status
- Health situation, including injuries due to the disaster
- Work and relation to the labor market before and after the disaster
- Education, current enrollment and attendance

Randomly selected individuals (RSI):

- Trust in people and institutions
- Satisfaction with service delivery and assistance
- Mental health and distress (12 item scale)
- Access to information
- Participation in society
- Attitudes about work

telecommunication and transportation (roads) in the household questionnaire.

In order to understand household needs and better plan for the reconstruction after a disaster, information on the economic situation of households is important. The POPNA questionnaire tool includes a section on households' in-kind assets, financial situation, sources of income, access to credit and access to agricultural and other economic production activities after and before the disaster. This knowledge provides valuable input on how different types of households can best recover. The section about the economic situation of households should also include information on economic support after the disaster, so as to provide an understanding of different households' ability to mobilize resources in the aftermath of the disaster.

It is not only economic assets that play an important part in how different households cope. Much also depends on their ability to utilize social networks and develop alternative strategies for recovery. The POPNA household questionnaire includes a module on social networks, alternative support providers and migration plans, all in all providing a comprehensive overview of households' ability to draw on connections outside their own household and outside the disaster area in their recovery.

Part 2: About individual members of the household:

The composition of each household is important, both with regard to the assets (human, social and economic) they have and the burdens they are faced with. In order to provide information on this, the POPNA household questionnaire registers data on each individual member of the household.

Individual registrations include basic demographic information such as age, gender, marital status, ethnicity, religion, and relation to the household head; all related to the composition of the household. In addition, the section includes questions on health status (acute and/or chronic diseases) and the use and cost of healthcare services. This section adds to the "capital" of the household both with concern to the burden of sick members and the cost of health care. In a disaster such as an earthquake, this type of information is essential. Many household members may have been injured, and their access to needed medical services may be inhibited by health system damage and/or lack of resources. The survey tool also registers how many households lost members in the disaster, and the characteristics of the deceased[11].

[11] Including questions about mortality is important not the least to the respondents. When asking about what happened during the disaster and after, not including questions about deaths in the near family would come across

The ability of the survey tool to estimate mortality depends on the sample size, but both health and mortality data may be successfully supplemented by register data from hospitals to provide a more accurate picture.

Box 2
POPNA Community Questionnaire:

- Demographic information:
  - Population size
  - Vulnerable groups
  - Deaths from disaster
  - Changes in population due to migration etc.
- Economic situation of the community
- Damages due to disaster on:
  - Land
  - Agricultural infrastructure (irrigation)
  - Houses
  - Transportation infrastructure
  - Schools/kindergartens
  - Health facilities
- Disaster rescue in the community:
  - Scope of rescue
  - Rescue actor
  - Perception of quality
  - Locally organized rescue
- Characteristics of reconstruction work
- Aid and assistanse
- Perception of main problems facing community

Data on education and labor force participation is also collected for each individual household member. Such data adds to the information about access to human capital and about the arenas where this human capital can be used. The section on participation in the labor market is designed to provide knowledge about the situation both before and after the disaster in order to describe how households are adapting to and coping with the situation (see Box 1).

Part 3: About the Randomly Selected Individual (RSI)

Factual information about the situation for households in the disaster areas is crucial for reconstruction planning and for the development of future policies and measurements. But it is how the affected population perceives the situation that determines their attitudes towards the government or other actors who wish to contribute to reconstruction. In an environment where most people are distrustful and unhappy, implementation of

as insensitive and rather strange from a respondent's perspective.

reconstruction policies and measures may be a very challenging process. Therefore, collecting information about the perceptions, expectations and feelings of the population will provide valuable input to the reconstruction process. This may refer to the level of social cohesion, trust in various institutions, the degree of dissatisfaction, and the general social stability in affected areas. Operating in a setting of high or low trust may give rise to different approaches to rebuilding and different priorities in policy making.

In order to capture the personal views, opinions, values and expectations of people affected by a disaster, the POPNA household questionnaire includes an additional section to be asked to only one household member. Recognizing that different people in the household may have different views on and opinions on these matters, the individual who would answer these questions were randomly selected from a list of household members. RSI questions were developed with the aim of representing important aspects of social wellbeing (see Box 1).

Box 3
POPNA optional Questionnaire modules:

- Specific entities:
  - Reconstruction actors (NGOs, volunteers etc.)
  - Local organizations
  - Economic entities (SMEs)
- Specific issues:
  - Environment
  - Health
  - Children

2.3.3 The community questionnaire

The community where households live matters greatly. For example, a community may have suffered considerably from the natural disaster or been less affected; it may have included large vulnerable groups already before the disaster or have gone through rapid transformation with a high degree of in- or out-migration; and it may be located in mountainous areas or in the plains. Such factors are all crucial determinants for how reconstruction could best be arranged and how policies best can be developed and implemented. Communities also face differing challenges after a disaster: Some have lost a lot of infrastructure, some have high numbers of casualties, some may have many injured community members, and others may have

lost a large part of a specific population group, such as school children due to collapsed schools. All of these characteristics present particular challenges in reconstruction and rebuilding.

The POPNA survey tool therefore includes a questionnaire for the community leaders. It can be used individually or be merged with the household/RSI questionnaire. The community questionnaire is meant to be answered by community leaders and often requires access to registration data. It aims at collecting general data from the community, with a focus on the situation in the community before and after the disaster, and on the rescue and reconstruction efforts (see Box 2).

2.3.3 Optional additional questionnaire modules

The POPNA allows additional modules to be added to the survey tool in order to cater to specific information requests from policy makers or other stakeholders. These questionnaires or surveys can be

Example 1: Studies of small and medium enterprises in Sichuan earthquake districts

The POPNA in earthquake affected districts in Sichuan included additional studies of small and medium enterprises (SMEs) in the disaster area. This module was added in order to obtain information about larger entities than households and more complementary information on economic recovery and development in the area.

The SME sector was of particular importance to the Chinese government because many of the longer term reconstruction policies centered around support to and continued development within this sector. Small and medium enterprises are seen as drivers in economic recovery and reconstruction after the earthquake, both as producers of economic revenues, and - just as importantly - as providers of stability and employment opportunities.

The assessment targeted enterprises from major industries in the area, including manufacturing,; construction; wholesale and retail trade; information transmission and services; leasing and business services; transport; and hotels and catering. Such a wide scope was deliberately chosen in order to include a wide specter of enterprises.

The additional SME questionnaire tool included questions on the production and operation of the enterprises; employment; innovation; financing; business environment; policy evaluation, as well as business owners' confidence about the future.

The assessment provided useful information on the SME sector. In addition, it contributes knowledge about the context in which affected households and their members operate. For researchers, the public and policy makers alike, this provides knowledge and increased input to policy formation and policy reevaluation or amendments.

aimed at entities of specific interest such as enterprises, actors in the reconstruction process (NGOs, volunteers etc.), local organizations or information providers. Otherwise, it can be targeting a specific issue such as environmental protection, psychological health, services to children, etc.

2.3.4 Using international indicators

Indicators can tell policy makers and reconstruction actors where they are, which way they are going and how far they have come – alternatively, how far they are away from where they want to be. A set of good indicators will provide information that can draw the attention of policy maker to a problem before it gets too difficult to fix. International standard indicators are particularly important to policy makers because they often serve as measurement of performance and progress. The POPNA toolbox can help provide measurements of indicators that serve four main objectives:

- To describe the current situation and provide information/input to meeting immediate reconstruction needs
- To serve as a tool for longer term planning and policy making, and an indicator of possible problems in the future
- To serve as a grounds of comparisons (a yardstick/baseline) when new versions of the tool is developed and implemented or when other comparable research is done
- To provide indicators that can be compared with international standards and hence measure progress and performance

In order to ensure that a POPNA survey can be compared to other international assessments and baseline statistics, international standard indicators should be employed wherever possible. Using already developed measurements allows for easier comparisons with already existing data and possible comparisons to new data in the field. Recognizing that other actors have done a substantial amount of work in developing indicators, large efforts were therefore devoted to identifying such useful international standards that could feed into the POPNA tool.

Several initiatives have promoted comprehensive standards for humanitarian responses in disasters and conflict, including indicators for measuring that these standers are attained to or aimed for. The Sphere initiative (Sphere Handbook 2011),

launched in the late 1990s by a group of humanitarian NGOs and the Red Cross and Red Crescent Movement, has contributed to setting standards for humanitarian responses. As opposed to the POPNA, which is a very technical tool focusing particularly on information for policy development; Sphere takes a very comprehensive approach. Still, efforts have been made to include indicators on most of the core standards presented by Sphere, such as water supply, sanitation and hygiene promotion, shelter, settlements, non-food items and health action (to a lesser extent food security and nutrition). The POPNA also ensures that information can be broken down on subgroups of the populations, thereby registering information on specific target groups presented in the Sphere framework.

In the household questionnaire section on infrastructure and service delivery, it is particularly important to make use of Unicef's indicators for water, sanitation and hygiene (WASH[12]), since this is closely related to key issues such as communicable diseases and service delivery. Further, in the registration of information on each individual household member, standard definitions for enrollment and attendance in schools, literacy, employment and participation in the labor force should be used used. By making sure that these indicators follow international standards for measurement, POPNA results can be compared to national statistics in the country where the disaster occurred and to other international statistics.[13]

Also in the assessment of health, POPNA should aim at including international standards in the survey tools. To measure mental health and distress, the POPNA may use a 12 point scale (GHQ-12)[14] development by Goldberg in the 1970s. The scale asks whether the respondent has experienced a particular symptom or behavior recently, and it has been extensively used in various national and cultural settings. Since psychological health and mental problems are important issues in post-disaster settings and crucial with regard to reconstruction, the scale is a very important tool for post-disaster assessments. The GHQ-12 is brief, simple and easy to complete; and its application in research settings as a screening tool is well documented. Therefore, it can constitute a valuable contribution to the POPNA tool.

[12] Indicators for monitoring Hygiene Promotion in Emergencies
[13] For example the Millennium Development Goals and the World Development Index (UNDP)
[14] The questionnaire was originally developed as a 60-item instrument but at present a range of shortened versions of the questionnaire including the GHQ-30, the GHQ-28, the GHQ-20, and the GHQ-12 is available. Each item is rated on a four-point scale (less than usual, no more than usual, rather more than usual, or much more than usual); and for example when using the GHQ-12 it gives a total score of 36 or 12 based on the selected scoring methods. The most common scoring methods are bi-modal (0-0-1-1) and Likert scoring styles (0-1-2-3).

Measures and generators from the literature on measuring of social networks can be replicated in the POPNA tools. Name generators (Campbell, Marsden & Hurlbet, 1986; De Graaf & Flap 1988; Boxman, De Graff & Flap, 1999) or position generators (Lin & Dumin, 1986; Volker & Flap, 1996) can be used to measure respondents' networks. Further, measures of trust in people and institutions can be taken from the World Value Survey (Inglehart, 1977). This provides opportunity to compare results on social cohesion, levels of trust and social capital to other international research.

There are limitations to which and how many standard indicators can be included in a POPNA. Some international indicators are difficult to use since they are measured on another level than households (aggregated data), or they are composed as complicated indexes or composite indicators with a mixture of highly aggregated data which it would be difficult to obtain for the purpose of conducting a POPNA.

2.4 What is the scope?

POPNA's unique aim of collecting comprehensive information about the needs of a disaster affected population with the purpose of feeding into policy development has particular implications for the coverage and scope of the assessment. The POPNA survey should cover a very large geographical area and a correspondingly large population, providing unbiased estimates of its wide variety of indicators on individual, household and subgroup level, including variables such as infrastructure, health, economy and personal opinions.

The design of POPNA assessments as relatively large household surveys follows as a consequence of its broad scope and its aim of capturing all affected population groups. If attitudes and opinions are to be reliably assessed over a large area, there is little other choice than attempting to select a probability sample that could be used to generalize statistically. A similar observation can be made for the other household based indicators. Similarly, selecting "typical" locations in such a large area is fraught with the danger of selecting the wrong ones – if typical locations indeed can be said to exist – and in any case makes policy use much more difficult because planners may be embroiled in discussions of whether or not the locations were really typical after all.

In disasters and emergencies, particular attention should be paid to vulnerable groups such as women and children, youth, people with no social security net (people that

have lost all or some of their families during the disaster), people who have suffered physical injuries, and minorities within the population (ethnic or religious). With a survey of comprehensive scope and large scale, it is possible to produce results that are representative for sub-groups of the population, including the vulnerable groups mentioned above. These groups tend to be under or over represented in other research in disaster areas.

Results from the POPNA survey can be broken down on specific sub-groups. This is not to say that it can always be used to provide in-depth knowledge of the situation for these groups, but it provides an opportunity to identify vulnerable segments of the population that policymakers and other actors can direct special attention to in further reconstruction and planning. Hence, after the Sichuan earthquake in 2008, the POPNA assessment served as a very useful tool for national policy planners, both with concern to how to develop measures for implementing policies, and for the further development of new policies or even the revision of already existing plans.

2.5. What are the outputs?

2.5.1 Using POPNA data

Due to its comprehensive character, the POPNA will contribute specific knowledge for key stakeholders in a recovery process after disaster. In addition, it will add to the general knowledge about disaster management and governance in post disasters situations. The unique characteristics of comprehensive surveys combined with a policy oriented approach makes for a whole new perspective on reconstruction governance.

Use of data as information can be viewed in various ways. One may take a rationalist approach, seeing good data as knowledge that can be used to develop “correct” responses. In this view, the overall body of information provided by the assessment can be used as input to designing policies and measures and making decisions on prioritization of issues or population groups. It is also possible to take an advocacy approach to the use of data, utilizing the information strategically to advocate for one or several core issues already at the center of attention. While not at the center of the intended use of POPNA assessments, it is also possible to take a constructivist approach to the data available.

The outputs from POPNA can be divided into two main categories. The first is input to development and adjustment of policies and measures in the short and long term, and as a dynamic monitoring tool. The second main category of output is information to stakeholders and the general population (organizations, NGOs, academics and the public in general) and input to ongoing debates. Below is an overview of issues and arenas on which POPNA output can provide vital contributions.

2.5.2 Policy output

A: Short term policy development, evaluation and reformulation

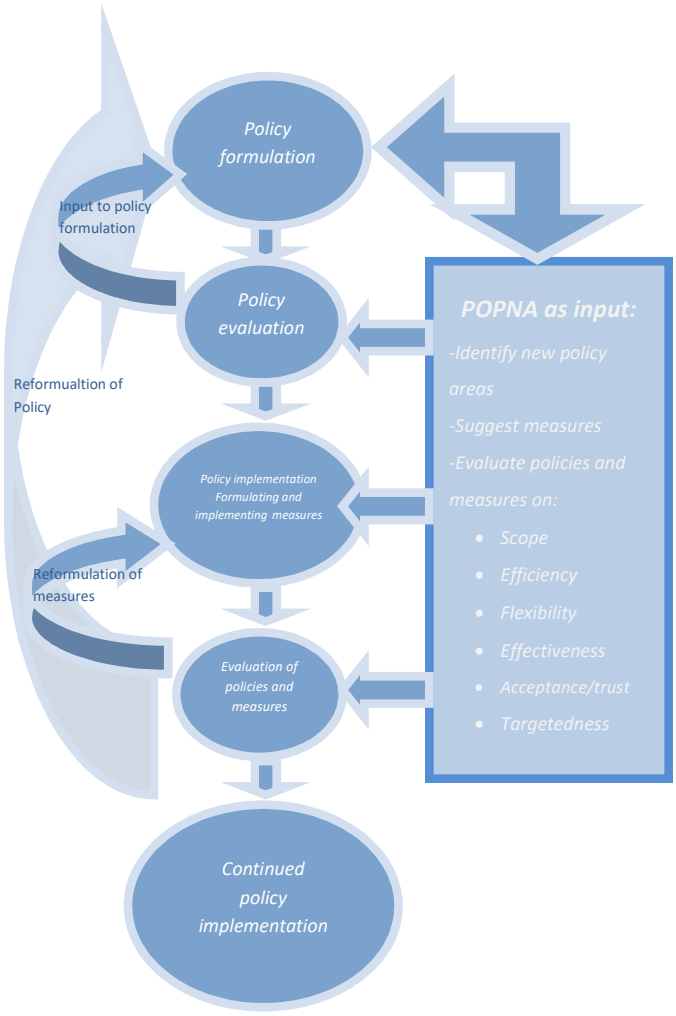
In order to cater to the specific target of providing information for longer term policy making and identification of measures to implement these policies, it is important to involve policy makers and implementers in the development of POPNA project tools. The results of POPNA surveys may serve both as inputs to new policy formulation, and as evaluations of already existing policies and measures.

shows how POPNA can contribute two types of knowledge to policymaking processes. First, information derived from standardized indicators is likely to be used in the policy development process because they enjoy general recognition and legitimacy. Responding to needs identified through these indicators is both important and difficult to avoid for policymakers and stakeholders, be they national or international. Examples of such indicators can be child mortality or access to clean water, both seen as core indicators of governments' and stakeholders' ability to protect their populations. Secondly, in-depth knowledge about a specific post-disaster situation contributes to the understanding of policy options. This enables policy makers and stakeholders to prioritize based both on actual needs and on ability to implement policies efficiently and effectively. Good policymaking depends on information to enable prioritizing of which areas or groups should be the focus of new or better policies.

In order for policies to be successful, it is essential to formulate appropriate measures for implementing them. POPNA surveys can contribute to formulating measures as well as to further evaluating the measures that have already been implemented. Thereby, they can contribute input which leads to reformulation or even abandoning of measures that prove to be inefficient. As outlined in the model above, measures can

be evaluated according to whether they are able to capture target populations (scope and targeting), whether they seem to be working well (effectiveness and efficiency) and whether they are able adapt to the local context or be flexible. Finally, POPNA surveys are able to capture to what degree people trust policymakers and those implementing policy measures. By asking questions about trustworthiness and satisfaction with institutions and actors, notions of legitimacy can be mapped among the population as a whole and among sub-groups and regions. High levels of satisfaction and trust within a population creates an environment where it is easier to implement policies and measures, and it might also be conducive to allowing space and understanding for policymakers in their work.

Figure 5: POPNA as input to policy



Example 2: Identifying good practices after the Wenchuan earthquake

One example of good practices from Sichuan was that the assessment found that access to medical help in the emergency period was surprisingly good: Medical teams were deployed to all disaster areas, and treatment was provided free of charge. Improved access to health care contributed to feelings of trust and satisfaction among large parts of the population and served as an example to be followed.

The Sichuan assessment also mapped knowledge about "appropriate behavior during an earthquake/landslide" among the population in order to evaluate how much they knew and which areas should be emphasized in the promotion of disaster preparedness knowledge. Furthermore, the assessment found that communities with higher social trust and wider networks were able to recover better and more quickly from the disaster. Hence, the assessment may serve as encouragement to develop polices for strengthening social networks within Chinese communities.

Cooperating with policy makers and implementers in the development of POPNA tools will contribute to better serving their needs. In addition it will establish a sense of ownership to the assessment and the tool among policy makers and stakeholders. This can contribute positively in the implementation and dissemination of the assessment. POPNA surveys can also contribute perspectives and information to the international debate about how rescue and reconstruction work can best be organized and implemented (International Recovery Platform 2007; Jayasuriya, S. and P. McCawley for ADBI 2008; McEntire, Fuller, Johnston *and* Weber 2002).

B: Long term disaster preparedness and disaster reduction policies

Information about how different areas or population groups were affected by and cope with disaster provides a good starting point for developing future disaster preparedness and disaster reduction policies. Strengthening the capabilities of those who play important roles in the immediate rescue and reconstruction phase, identifying actors that enjoy trust among various groups, and enhancing their awareness and ability to contribute in possible disasters in the future, will lay the ground for better disaster reduction and disaster preparedness.

POPNA can also identify dysfunctional practices and relations that may be strengthened or changed in preparation of future disasters and hence serve as valuable input to new policies on preparedness and disaster reduction strategies.

C: POPNA as a monitoring tool

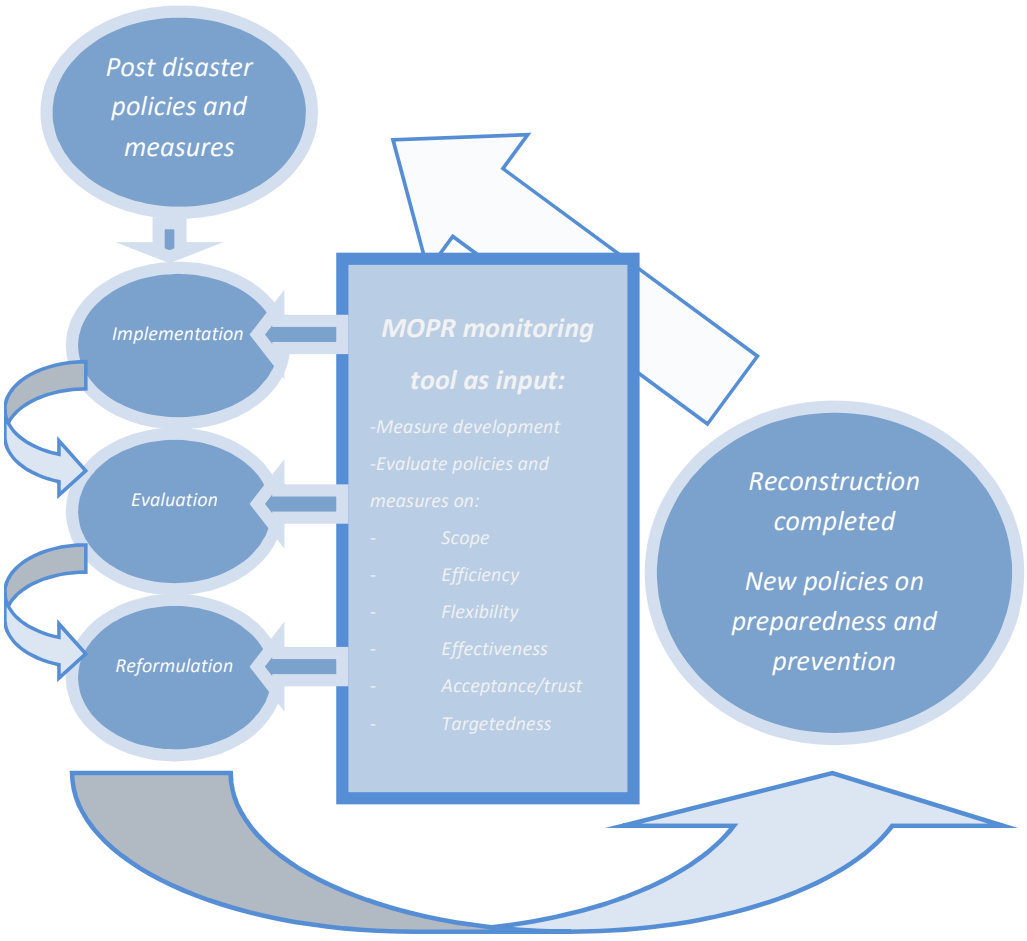
Policymakers and researchers have become increasingly concerned with longer-term monitoring of post-disaster reconstruction processes in addition to simply conducting post-disaster needs assessments. Longitudinal surveys reviewing economic, social and psychological recovery have been conducted by researchers in various disaster contexts in Japan and China (Wang, et al., 2000; Kimura, 2007). Longitudinal studies on behavior of displaced students and psychological distress have also been conducted after Hurricane Katrina in USA (Ward et al, 2008; Chan et al. 2008). After Cyclone Nargis struck Myanmar in 2008, ASEAN commissioned a four-rounds monitoring assessment survey lasting from 2008 to 2010 (ASEAN, 2010).

POPNA surveys provide a comprehensive baseline of the living conditions, resources, values, opinions and perceptions of individuals, households and in various communities. Combined with its particular focus on policy development and individual's policy evaluations, this provides a unique point of departure for developing a monitoring tool for future follow-up. Such a monitoring tool can measure the development and implementation of policies in post-disaster societies and among subgroups during different stages of the reconstruction process. The assessment can be repeated at for example a one-year consecutive interval, or at times when such an assessment is of particular interest, such as the midterm of reconstruction or when reconstruction is supposed to be completed. By doing so, the POPNA survey will be upgraded to becoming a longitudinal survey for Monitoring Post-disaster Reconstruction (MOPR).

The assessment can be repeated as whole with some adjustments to the questionnaire tools. It is also possible to repeat parts of the POPNA in order to obtain better knowledge about specific issues; this may be done by repeating questions on basic background variables and one or several of the questionnaire modules. The scope of the monitoring assessment may be adjusted in a follow-up survey in order to focus on specific groups of the population. All in all, monitoring surveys provide knowledge on the recovery seem from a grassroots perspective.

Contributing to the further understanding of how societies recover from disasters, information obtained by longer term monitoring surveys in post-disaster areas can be valuable for stakeholders, policymakers, organizations and academics alike. While some examples of such longitudinal monitoring studies were mentioned above, they are relatively few and far between. In disaster assessment and research, knowledge about post-disaster developments over time is underrepresented compared to knowledge on the situation at one particular point in time, often right after the disaster. Figure 6 illustrates how POPNA can be transformed into a monitoring tool (MOPR) that surveys developments and policy implementation in disaster affected areas. Thereby, the monitoring tool provides strategic input to evaluation and adjustments of already existing policies, and towards possible new policy developments on disaster prevention and preparedness.

Figure 6: MOPR - POPNA as a monitoring tool



2.5.3 Information output

A: For organizations and advocacy groups

In addition to providing information to the stakeholders and policymakers, POPNA surveys can contribute useful information also to other national or international actors involved in reconstruction. The surveys may serve as a tool to identify new or already existing areas (niches) where more attention is needed. Due to its comprehensive nature, POPNA may be used to produce information or knowledge of specific interest to smaller national or international actors. POPNA surveys implemented in varying post-disaster contexts can over time constitute an information base that can be used by various actors.

Advocacy groups can use information from POPNA surveys to elaborate on issues they want to promote and/or as baselines for intended change. This may be used to promote the interests of vulnerable groups, more openness, or specific sectors or issues (reform of the health system, environmental protection, fair distribution etc.).

B: Academic research and publications

It is not only policy makers, relief organizations and advocacy groups that need and use information about post disaster situations. An increasingly large body of academic research is conducted and produced on the issue (Barakat 2003; Yan , Wilkinson, Brunsdon, Seville, Potangaroa 2011, Barenstein, Pittet 2007; Burby 2006; Lyons 2009; Paterson, Re *and* Wang 2008). Information from POPNA surveys can serve as exceptional sources of data for such work, and analyses of POPNA data can contribute to further academic debates on various post-disaster management issues.

C: Public knowledge and awareness

As well as being a valuable source of information for stakeholders, policy makers, organizations, advocacy groups and academic researchers, POPNA surveys can also serve as sources of information to the general public. Information about the results of POPNA surveys should be channeled back to the surveyed communities. Those affected by the disaster should be presented with the main findings of the survey and with suggestions on how to make use of the new knowledge. On the basis on what is

identified as strengths and weaknesses in the aftermath of the disaster, action can be taken on a local level, including action initiated by the people themselves.

The findings in POPNA can also function as basis for news reports such as radio, TV, newspaper articles and features in popular media, to be distributed to the general public. By identifying lack of information, POPNA surveys can inspire new campaigns to enhance awareness in local communities on how to behave when disaster hits.

Part III: HOW to conduct POPNA

3.1 Introduction

The previous two chapters have outlined what POPNA is. We now turn to the question of how to proceed in order to use the tool. As we mentioned before, POPNA aims at collecting comprehensive needs information from the entire disaster-affected population. Qualitative research methods are not very appropriate for this aim, as they do not provide data that can be generalized to the entire population in the surveyed area. Therefore, quantitative research methods designed to collect information from a representative sample of a disaster affected population is the best suited methodology. More precisely, the main method recommended for collecting POPNA data is large scale face-to-face interviewing. However, this does not mean that qualitative methods are completely excluded; in fact, qualitative methods, such as in-depth interviewing, observation, focus groups etc. can be quite useful in pilot surveys and as supplements to the quantitative data.

In many aspects, the social survey methods used in POPNA are the same as those used in normal situations. Yet, some adaptations are needed. In any social survey, the overall organization of work is crucial to the success of the venture. This is even more so in POPNA because of strict time limitations and complicated post-disaster contexts. The following section outlines and briefly discusses the main steps that have to be taken in conducting POPNA. Later in the chapter, some of the most important steps will be introduced and discussed in more detail.

3.2 How to proceed

Figure 7: POPNA step by step

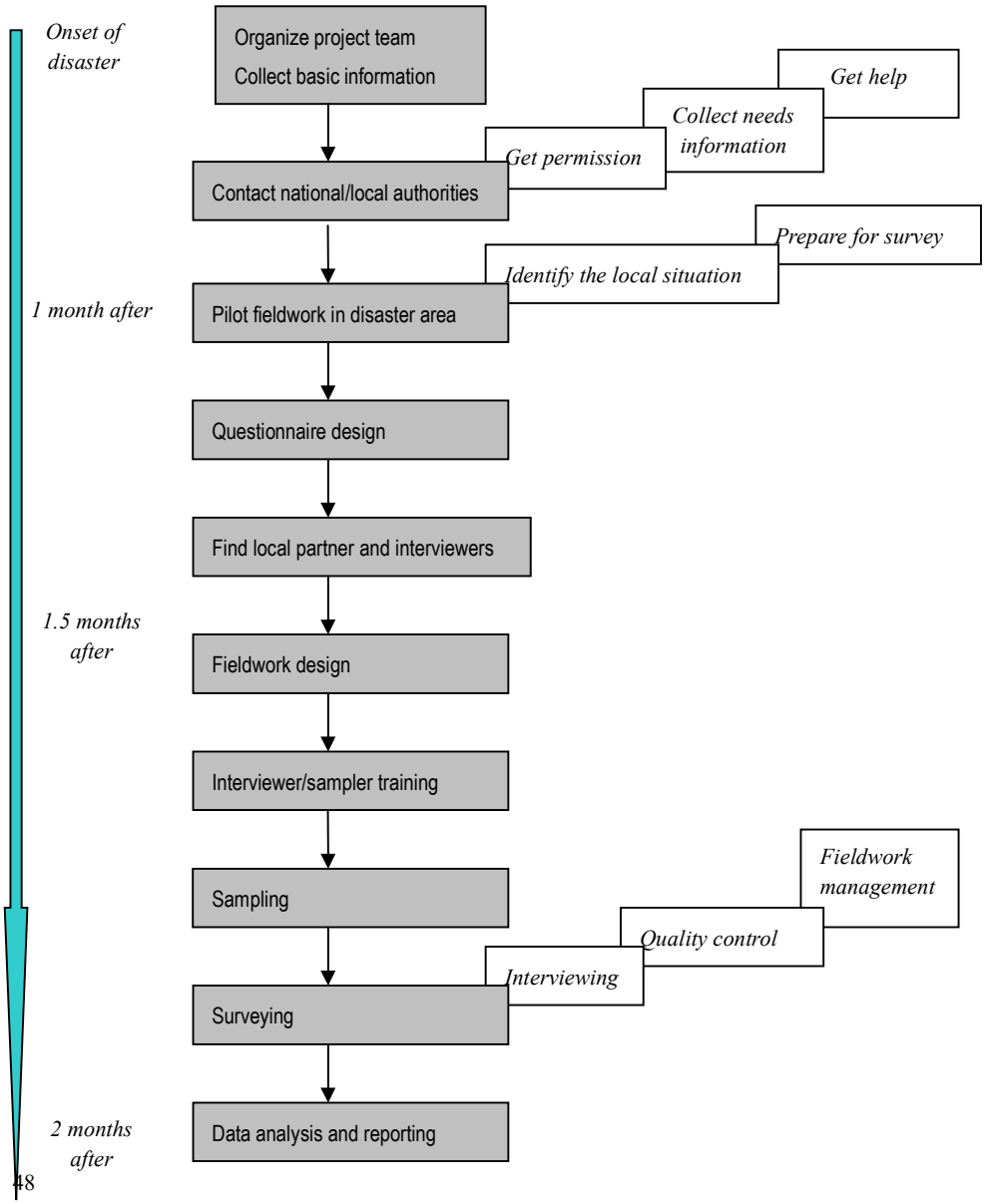


Figure 7 summarizes the main steps that have to be undertaken when conducting a POPNA. Some of the steps may overlap or be repeated at various stages of the process. Below is a more detailed description of each step of the procedure.

Preparation

- Shortly after the onset of disaster, a POPNA project team should be organized.
  - 3-5 core members (depending on the size of the exercise)
  - Social scientists, policy researchers, survey statisticians.
- Start preparing the survey by collecting information about the disaster and affected areas:
  - Type of disaster;
  - Impacts of disaster, such as casualties, damage to houses, economic loss, size and characteristics of the affected population, etc;
  - Prior knowledge about the disaster area, such as size, population density and structure, topography, etc;
  - Organization and performance of emergency rescue work, including baseline data of the affected area like access to food and water, shelter, health status and health services, etc;

Contacting national/local authorities

- During the first month after disaster, the POPNA project team should establish contact with political actors - in most cases, central and/or local governments.
- Aims:
  - Obtain official permissions
  - Identify policymakers' information needs and preferences

- Ensure official assistance.

- The project team should maintain efficient communication with authorities throughout the project.

Qualitative pilot surveys

- Pilot surveys in affected areas should be conducted as early as possible.
- Mainly qualitative methods such as in-depth interviewing, observation, focus groups, etc.
- Aims:
  - Gain better and deeper understanding of the actual situation in disaster areas;
  - Identify the affected population's major problems and main needs;
  - Collect practical information important for survey design and logistics, e.g. on housing and shelter patterns, public transportation, communication, etc.
- Although qualitative pilot work is somewhat time consuming, it is highly worthwhile because:
  - Improves survey quality
  - Improves understanding important for data interpretation

Questionnaire design

- Right after the first pilot survey, work on questionnaire design should start
- Questionnaire design is based on general POPNA indicators; policymakers' needs and requirements; and information collected in the pilot survey
- Small scale pre-tests of the questionnaire should be conducted during the design phase in order to check how long it will take to conduct an interview as

well as to test the validity and reliability of the questionnaire (i.e., to ensure that questions are clear, unambiguous and useful).

Recruit partners, samplers and interviewers

- As soon as the project has gained official permission to go ahead, the project team should start recruiting samplers and interviewers. If possible, local partners who can help organize fieldwork and coordinate with local authorities should also be recruited.
- Partners, samplers and interviewers should preferably be natives of the disaster affected areas
  - Ensures local/community participation
  - Local people are likely to be strongly motivated
  - Local people contribute important local knowledge, such as knowledge about the local language/dialect, culture and customs

Fieldwork design

- Before large-scale survey fieldwork can start, the project team should draw up a plan for the fieldwork, with help from local collaborators. The following should be included in the fieldwork design:
  - Organization of samplers and interviewers in the field
  - Logistics plan, such as means of transportation, accommodation, and communication
  - Coordination with local authority, etc.

Sampler and interviewer training

- As soon as the necessary design, survey instruments and training materials are ready, training of samplers and interviewers should be conducted.

- Focus on common social survey issues. In addition:
  - Personal safety and risk reduction
  - Training in dealing with possible secondary disasters, local conflicts, and psychological issues

Sampling

- A sampling frame must be produced before fieldwork can start
- Ideally, the project team should obtain a complete sampling frame with help from national or local authorities, and then use probability sampling methods to draw a representative sample.
- This can often prove impossible in post-disaster settings as lists of residents are rarely available, especially in most seriously affected areas. In such cases, alternative sampling methods like geographical sampling may have to be used.
- In most cases, sampling has to be conducted in several stages:
  - In the first stage, the research team obtains a list of villages or communities in the area to be studied and draws a sample from the list. This must be done before the start of fieldwork.
  - In the second stage, households and/or individuals are sampled within each community. This can be conducted by trained samplers in the field. Usually, second stage sampling can take place simultaneously with field work.

Surveying

- After the list of sampled communities is completed, survey fieldwork can start.
- Fieldwork must be organized in a highly flexible manner in order to cope with the uncertainties and rapidly changing situations in disaster areas

- During the survey period, the project team should maintain close communication with interviewers. This is not only due to safety considerations, but also for the purpose of monitoring the survey process and for quality control.

Data analysis and Reporting

- After all data collection has been completed, the project team can start data analysis and report writing.
- Simple statistics methods such as frequencies, means and cross-tables are suggested to be used rather than more complicated methods.
- The report should at first meet the needs of policy makers by reporting on questions they are interested in and by providing a complete description of people's living conditions and needs. The report should be completed as soon as possible in order to be submitted in time for providing input to reconstruction planning.

Example 3: POPNA procedure after the Wenchuan earthquake

The steps of the POPNA procedure are theoretically listed. In practice, each step of the procedure may overlap or be conducted in non-chronological order. This was to a large extent the case in the Post Wenchuan Earthquake Needs Assessment.

Shortly after the May 12th earthquake in Wenchuan, a project team consisting of researchers at Chinese Academy of Science and Technology (CASTED) and Fafo Institute for Applied International Studies (FAFO) was organized. CASTED researchers wrote several internal reports to the Chinese government, emphasizing the importance of post-disaster needs assessments and applying for permission and funding to conduct such a survey. Meanwhile, FAFO researchers applied for funding from the Norwegian government. Also, general information about the disaster and disaster areas was collected.

In early June, a small team of researchers undertook a pilot survey in Sichuan's earthquake affected areas. After the pilot survey had been completed, the team started working on questionnaire design. This was done even though no permission for the survey had been issued by any government agencies, as the team reckoned they would be too short on time if they waited with design work until after permission had been confirmed.

As soon as an informal permission from the central government was issued on June 23rd, the project team started work on several tasks simultaneously: Contacting provincial and city governments for further help, especially with the sampling frame; designing the questionnaire; recruiting local partners, samplers and interviewers; organizing fieldwork; and designing a laptop software program for conducting the survey. These tasks had to be completed quickly and simultaneously because the government had set a clear time limit for the survey - in order for the report to be taken into account in further reconstruction planning, it would have to be submitted before July 16th.

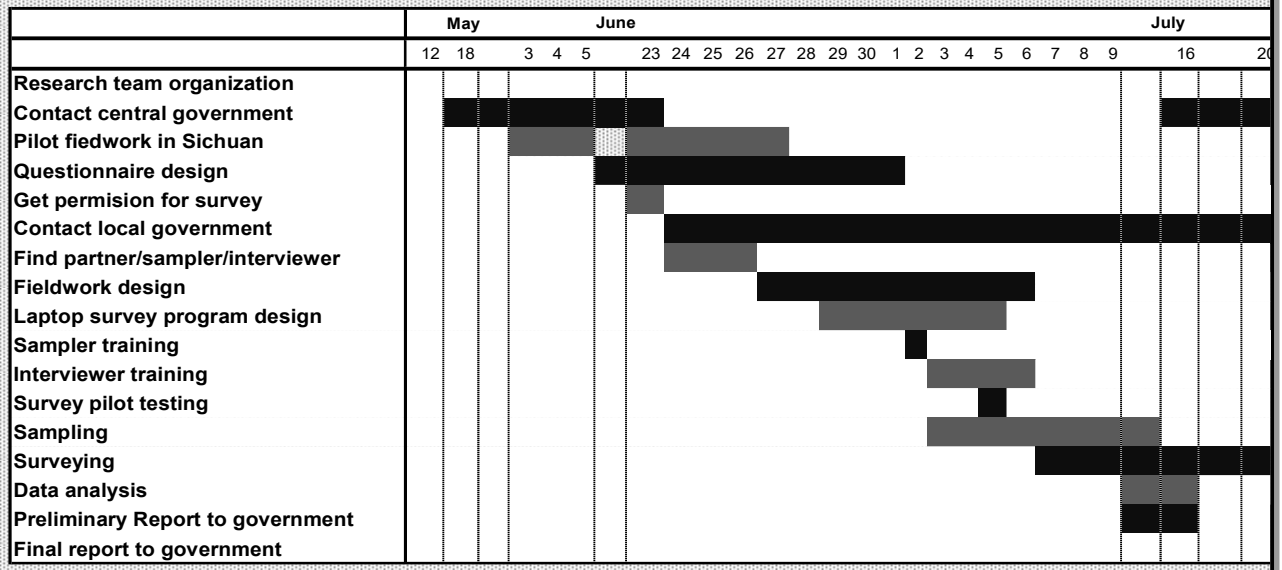
Since many people living in seriously affected areas had moved into re-habitation camps, it proved very difficult to obtain a sampling frame. A list of the populations of all re-habitation camps in 26 sampled counties was finally completed by July 2nd, after the local partner had contacted every county-level government in order to obtain the necessary information. The first stage sample, consisting of villages/communities, was drawn one day before samplers were trained. The trained samplers were then sent to each sampled village/community for conducting second stage sampling - that is, to sample households by random linear systematic sampling from local household lists or by random walking sampling when lists were not available.

Training of interviewers started on July 3rd and lasted for four days, including one day for survey pilot testing. Although the survey had to be conducted within a very limited time period, it proved worthwhile to spend a relatively generous amount of time on training. This ensured that interviewers were well-prepared for the task and mitigated the risk of errors in sampling and data collection; in addition, it left some time for correcting questionnaires, drawing second stage samples and coordinating with local authorities in villages/communities.

Survey fieldwork started on July 7th. Every interviewer was equipped with a laptop. Using CAPI (computer assisted personal interviewing) proved to be extremely helpful as it enables survey data to be sent back to the project team every day. Thus the project team could start statistical programming and writing the framework of the report already on July 9th, and gradually conduct statistical analyses and report writing as data accumulated. On July 16th, a report based on 3000 completed questionnaires was submitted to the Chinese government's "leading group of overall planning for post-Wenchuan earthquake restoration and reconstruction".

The example of the Post-Wenchuan Earthquake Needs Assessment clearly shows that, as the POPNA is a "rapid" assessment in terms of its duration period, work procedures need to be somewhat flexible. The POPNA framework allows the project team to conduct several tasks simultaneously.

Figure 8: Timetable of the 2008 Post-Wenchuan earthquake rapid needs assessment



3.3 How to coordinate with local authorities

POPNA aims at providing policymakers with information on the needs of disaster affected people. Thus, it is of crucial importance to involve decision makers, including national and local authorities, from an early stage. By doing so, the project team will learn about what information policy makers are most interested in, and about the organization and performance of emergency rescue work. In order for the results of the survey to be put to practical use, it is highly valuable to take such knowledge into account in the survey design.

The main reason for coordinating with local authorities is that it is usually necessary in order to obtain official permission for conducting POPNA. In many cases conducting a survey without permission is simply impossible; in others, going ahead without one will make sampling, field organization and interviewing very difficult. In cases of chaotic disaster areas and restricted entry, permission from local authorities can be a prerequisite for entering the disaster area.

Example 4: Coordinating with local authorities in Sichuan

In the case of the Sichuan post-earthquake needs assessment, we found cooperation with local authorities to be helpful in a number of aspects. First, by communicating with central and local government in the designing phase, the project team obtained information about what issues policy makers were most interested in, and could take this into account in the questionnaire design. This ensured that the survey could be directly linked to post-disaster policy making.

Second, it helped the project team obtain required permissions, thereby ensuring that the survey was officially recognized as legal and legitimate. The project team established initial contact with responsible officials in the central and provincial governments already in the early planning phase. Before fieldwork commenced, an officially stamped document approving the legitimacy of the survey was issued by the central and the provincial government. This document proved to be very helpful later in the survey.

Finally, coordinating with local authorities may be indispensable for practical reasons:

- In disaster situations, pre-disaster population registration information often becomes invalid. Often, updated sampling frames can only be obtained through local authorities.
- Residence patterns in disaster areas usually change significantly after disaster. Without the help from local authorities, it may be very difficult to locate sampled respondents.
- Chaotic post-disaster situations may amplify the problem of 'trust'. Affected people may distrust strangers, including interviewers, which increases the difficulties of interviewing work. Obtaining permissions and cooperating with local authorities might help make respondents perceive the survey as legitimate.

Although local officials may be helpful in conducting POPNA, possible negative consequences of cooperating with authorities should also be noted. Local governments and officials are stakeholders in post-disaster reconstruction, with their own interests and perspectives. Therefore, their involvement could cause skewed results. For example, local cadres might want to take troublesome communities or households out of the sampling frame or obstruct interviewers from locating

Third, local authorities were very helpful for obtaining sampling frames. Our survey adopted a two-stage sampling procedure in earthquake areas. After the earthquake, many people were relocated. Registries of the relocated population were only available at local administrative levels. Thus, the only way to obtain a complete sampling frame which covered the entire affected population was to coordinate with local authorities. With help from Sichuan's provincial government, the project team obtained a complete list of villages, urban communities and relocation camps which included the population size of each community. First-stage cluster samples were drawn from this list. In the second stage, samplers obtained lists of households from local cadres in each sampled community and re-location camp. From these lists, samples of households within each cluster were drawn.

Last but not the least, local officials provided useful practical assistance during the survey. In many communities, local cadres would accompany interviewers in search of sampled respondents. In some very remote and isolated districts, local cadres even provided interviewers with transportation and food.

However, involving officials in fieldwork was in some cases perceived as a double-edge sword. For example, some cadres insisted on staying throughout the interview. This might put pressure on respondents and reduce the credibility of their answers.

them. As described in Example 4, involving officials in fieldwork was in some cases perceived as a double-edge sword in the post-Wenchuan earthquake needs assessment. In many cases, cooperation with local authorities is indispensable and unavoidable for practical and legal purposes. But it is also necessary to be aware of the challenges such cooperation presents.

3.4 How to recruit and train samplers and interviewers

Coordinators, supervisors, samplers and interviewers are indispensable in the fieldwork of a large-scale social survey. Coordinators are mainly in charge of logistics and coordination with local authorities. The main task of samplers and interviewers is to implement sampling and interviewing work in the field. Even the best research design can be distorted without high-quality performance of samplers and interviewers.

When household lists in sampled clusters are not immediately available before fieldwork starts, and have to be obtained at the local level, teams of samplers can be trained and deployed before the interview teams. An alternative option is to train interviewers to select the sample in the field. The first alternative is preferable, because if interviewers are responsible for sampling, they may tend to select households that are

easily reachable. This may introduce extra bias to the sample. Furthermore, if sampling is time-consuming and the houses are far apart it is time-efficient to send a separate sampler team to concentrate on sampling work.

Most of the qualifications required from interviewers and samplers are the same as in normal social surveys, such as honesty, interest, responsibility, and patience (Babbie, 1998; Feng, 2001). Beyond this, some qualification requirements are particularly important in POPNA:

- Interviewers and samplers should know the local culture, customs, language/dialect, etc well. They should also have first-hand knowledge about the disaster and its impact.
- Interviewers and samplers' physical and mental health status must allow for them to work under demanding conditions, travelling around in disaster areas and conducting highly-intensive survey work in a relatively short period of time and to cope with possible extreme situations in a post-disaster context.
- Interviewers and samplers should inhibit the social skills needed to connect and cooperate with respondents, local officials and other people they encounter in the field.

In many cases, local students would be good candidates for conducting POPNA interviews. Not only do they fit the abovementioned requirements well; they can also easily be identified and organized into groups according to existing classes, departments, etc. with the help from their teachers in the university.

Interviewers and samplers should go through a training course before the start of fieldwork. The courses would include all contents common in social survey training:

- Description of the project;
- Principles and requirements of sampling/interviewing;
- Detailed explanation of sampling procedure and questionnaire;
- Communication and interviewing skills;
- Recording and data entry techniques;
- How to behave during fieldwork.

In addition, some specific training on dealing with the disaster context should be included:

- The principle of "safety first" should always be emphasized. Samplers and interviewers should learn about possible secondary disasters in disaster area and about how to deal with them.
- In the aftermath of disasters, social tension and conflicts may be prevalent in disaster areas. Hence, training should include discussions on how fieldworkers can avoid getting involved in social conflicts.
- Finally, interviewers and samplers should also be prepared psychologically for dealing with the difficult situations and human suffering they may encounter in disaster areas. If they are subject to traumatizing observations or incidents, they may also have need for psychological debriefing during and after fieldwork.

Training materials including a sampler manual, an interviewer manual, and a data entry manual should be well prepared. The sampler manual should provide a detailed description of sampling

Example 5: Recruiting students for the post-Wenchuan earthquake survey

In the post Wenchuan earthquake assessment survey, around ninety students were recruited, including ten samplers and eighty interviewers. All were enrolled in Mianyan Normal University, which is located in one of the most seriously affected disaster areas. The university had to call the students back in, as they had been forced to go home after the earthquake destroyed their dormitories.

Most students were natives of the earthquake disaster area. They had good knowledge of local dialects and customs. They also proved to be highly motivated and exceptionally hard-working.

These students were given a five days training course, consisting of half a day training for samplers; one and a half day lectures on the background of the survey, interview requirements and techniques, and the content of questionnaires; one day training in computer survey operation; one day for a pilot survey in a seriously destroyed village; and one day for summing up and questions and answers.

Although the training consumed around one third of the total survey time (5 out of 17 days), it proved to be worthwhile because it ensured data quality and gave the survey team considerable influence on how fieldwork was conducted (Pedersen et,al. 2010).

procedures and technical requirements. The interviewer manual should include information on the background of the survey, procedures for survey fieldwork, requirements for interviewing and data recording, and a detailed explanation of the questionnaire. Data entry manuals are needed when Computer Assistant Personal Interviewing is used. The data entry manual should provide interviewers with clear introductions on how to use the computer to record respondents' answers. These manuals are useful not only in the training phase, but also during the sampling and surveying phase.

In POPNA surveys, when samplers are to select the households in sampled clusters, extra sampler training and field organization needs to be conducted as well. Samplers must be trained in techniques for evaluating the quality of existing lists and techniques of random household selection from local lists, such as mapping, listing, segmenting or random walking in the field. A sampling form for registering sampling information needed for second stage household interviews and for weight calculations should be designed. As the time frame for conducting POPNA surveys is usually very limited, it will in many cases be preferable to conduct sampling and interviewing work in parallel. Carefully designed field organization is needed to ensure that sampling information can be rapidly and smoothly transferred from samplers to interview teams.

During the training course, at least one pilot interview test should be conducted in order to provide students with real-life interview experience. Such pilots also provide the project team with a last opportunity to discover errors in the research design, such as errors in questionnaire language or skip pattern, in computer programming, and in the process of information flow, etc.

3.5 How to organize fieldwork

3.5.1 Information flows and data transmission

During fieldwork, a set of procedures that can maintain orderly and timely information transmission between samplers, interviewers and the POPNA project team should be designed and distributed to everyone involved. The document should include information on sampling, survey data, and other fieldwork management information.

Example 6: Communication and data transmission in the post Wenchuan earthquake POPNA

In the Wenchuan needs assessment survey, ten samplers were sent to all sampled villages, communities and camps five days before large scale interviewing commenced.

The samplers were charged with filling out a sampling sheet for each cluster. On the sampling sheet, they recorded the name and location of the cluster in addition to information on sampled households. These sheets were handed over to the supervisors of interviewing teams in various ways, including leaving it in village cadres' homes, sending SMS, etc. When interviewers arrived in the village, they localized and interviewed the households listed on the sheet.

Eighty interviewers were divided into twelve groups, each consisting of a supervisor and five or six interviewers. Each interviewer was equipped with a notebook computer. Every evening, the supervisors would collect all completed survey data from his or her team members and send it back to the project team by e-mail. The project team would check the data immediately, and if any errors or peculiarities were found, they would call the supervisor or the interviewer directly and work out a way to deal with the problem.

During fieldwork, the project team frequently communicated with interviewers via mobile phone, SMS, and e-mails. Those who made mistakes in sampling and data collecting were asked to go back to the village/communities and correct the mistakes, if that was still possible.

In most cases, samplers should be sent to the clusters (i.e., the villages, communities and camps selected in first stage sampling) a few days earlier in order to conduct households sampling there before the interviewers arrive. Procedures for transmitting the completed lists of household samples in each community to interviewers should be worked out in advance.

POPNA presents strict requirements for timely transmission of survey data. Preferably, completed survey data should be sent back to the project team on the same day or one day after they were collected. Doing so has two major advantages. First, it enables the project team to conduct daily checks of incoming data. When errors or suspected errors are found, the project team can confer with the interviewers who are still at the surveying spot. This will greatly improve the quality of data, as it will give interviewers a chance to correct errors at an early stage. Second, timely transmission of data will also ensure that the project team can start data analysis and report writing very early in the process.

CAPI (computer assisted personal interviewing) greatly simplifies timely transmission of data, as it allows for data to be transmitted via Internet or mobile phone. If paper questionnaires are used

instead, a plan for transportation of questionnaires must be set up. In such cases, a number of data entry centers can be established across the survey area in order to reduce the time used for questionnaire transportation.

Samplers and interviewers should report to the project team every day. Based on the reported information, the project team or the fieldwork coordinator obtains an overview of the progress of sampling and survey work, and can make overall plans for what to do in following days. Information can be reported in various ways, including telephone, SMS, fax, and email.

3.5.2 Organization of interviewers

In order to ensure interviewers' safety, they should travel to the village/community in groups rather than individually. Preferably, two interviewers can cooperate on each interview. However, given the strict time limit, this might be too time-consuming; instead, the team might have to settle for one interviewer per interview. A supervisor/team leader should be appointed for each group; he or she would be responsible for contacting local authorities, distributing tasks and transmitting the data and other information to the project team. Documents that identify the authority and responsibilities of group leaders should be provided to interviewers before fieldwork commences.

3.5.3 Quality control

Usually POPNA is implemented in a rather complex and difficult situation. This poses particular challenges with regard to quality control – and also adds to the importance of well-designed quality control routines. Quality control can be inherent in the organization of fieldwork. For example, supervisors/team leaders can be appointed responsibility for checking the quality of interviewing in the fieldwork. If possible, designated quality control teams could be sent to the field to check the work of samplers and interviewers. Quality control can also be performed by the project team by continually checking completed survey data. Needless to say, training is the part of the POPNA procedure that is most important with regard to ensuring high quality. The best quality control lies in ensuring that interviewers know what to do and stimulating their interests and sense of responsibility.

The principles of Total Quality Management (TQM, Oakland, 1989) and Polluters Pays (U.S. Environmental Protection Agency, 1996) can be adopted for quality control in POPNA. Having its origins in organization management, TQM refers to “a total organizational approach for meeting customer needs and expectations that involves all managers and employees in using quantitative methods to improve continuously the organization’s process, products and services” (American Federal Office of Management, cited in Milakovich, 1990:209). The principle can be used in POPNA surveys by emphasizing that quality awareness should be integrated in the culture of the entire project team. Each stage of the survey should deliver according to specified quality standards; if problems are discovered, the person responsible can be asked to make needed improvements while still in the field.

3.6 How to sample

3.6.1 General design considerations in disaster situations

POPNA surveys aim at providing information on the population’s opinions and needs vis-à-vis policymakers. Therefore, sampling of respondents should aim at all victims and be representative of the entire affected population of a disaster area.

Special challenges in survey sampling may arise in post-disaster situations. Different sampling methods can yield estimates with varying precision and accuracy; however, very few studies have been done on how various sampling methods work in disaster situations. This section describes the special challenges related to sampling in disaster situations; which sampling methods may be employed; and how these methods work in practice in disaster situations.

In many rapid acute disasters, such as earthquakes or tsunamis, all households in one geographic area or community are likely to be affected to an approximately similar extent. Such geographic clustering of impact results in particularly high homogeneity within communities or clusters, but large variation between them. In theory, if within-cluster homogeneity is high, one will not gain much by interviewing many households within one cluster. The homogeneity of clusters and unequal allocation of the sample can result in relatively large standard errors and design effects (Pedersen, Zhao and Zhang 2010). A relatively large sample size can improve the precision of estimations despite of high design effects. The desired precision of

the sample result, or the amount of error one is willing to tolerate in the sample estimates, should be considered and determined before developing survey design.

A sampling frame is a list of sampling units from which one can select a sample of the population. Although ideally one might want to include the entire target population in a physical listing of all sampling units in the population, this is seldom possible. A sampling frame, in many cases, is a list of a target population which one considers to best represent the population as a whole (Levy and Lemeshow 2008). Such a list or sampling frame is often not immediately available in disaster situations. Even if a list can be obtained, it can have large errors, either because it was made a long time ago, or because of massive migration or huge demographic changes after the disaster. Therefore, a new sampling frame usually has to be developed for conducting a POPNA.

Furthermore, there is often special interest in POPNA surveys for certain subgroups of the affected population, such as minorities, poor households, women, children, or households residing in the most seriously affected districts. Because POPNA aims at reporting on sub-groups, it usually requires a very large sample size. Hence, a large-scale household survey with a representative sample of the affected population will usually be preferred for POPNA surveys.

For each POPNA survey, sampling must be designed in a way that suits the particular aim and context of the survey to be conducted. A number of options for sampling design can be considered.

3.6.2 Stratification and multi-stage sampling

Stratified sampling is a sampling design whereby the sampling frame is divided in groups or strata, and sampling is conducted separately within each stratum. Stratification is useful in disaster situations characterized by geographic clustering of impact. First, a heterogeneous population can be divided into internally homogeneous subpopulations so as to get more precise estimates from a given sample size than with un-stratified samples. Proper stratification, by optimally allocating the sample, can counteract the homogeneity effect in disaster situations and provide higher precision of the population estimates[15] (Kish 1995). Second, stratification can

[15] Variance can be decreased by increasing the sampling fraction in strata with higher variation or lower

ensure that certain population groups are represented. Third, stratification is also useful for handling sampling problems that differ across strata by employing different methods for different strata (Cochran 1977). Finally, stratification of the sample can provide proper sample allocation for the analysis of sub-group populations in POPNA surveys.

Stratification can be explicit or implicit. In explicit stratification, the sampling units are explicitly divided into strata, and separate samples are selected for each stratum. With implicit stratification, the sampling units or list of clusters are sorted according to certain characteristics, and a sample is selected from the sorted list with a fixed sampling interval and a random start (systematic selection). Such selection processes ensure that two units that are selected after each other in sequence will share certain key characteristics. Thereby, post-hoc strata of adjacent units are created - usually two units per stratum - which contributes to lower variance.

One-stage sampling means to select each subject directly from the sample frame. Multi-stage cluster sampling, on the other hand, means to first select clusters or groups of subjects, and then sample the subjects from the selected clusters. Multi-stage sampling is very often used in practice. This design bases sampling on “a hierarchy of different types of units, each first-stage unit being divided, or potentially divisible, into second-stage units, etc. A frame will be required at each stage for the units that have been selected at that stage” (UN 1950). The first stage sampling units (usually, clusters) are often referred to as Primary Sampling Units or PSU. These are particularly important in variance computations (Kish 1995). The ultimate sampling units are the subjects mainly targeted by the study. These are the units selected in the last stage of sampling (for example household in a typical household survey) (UN 1984).

3.6.3 Cluster sampling

Cluster sampling is the most common sampling method used in post-disaster assessments, and it is also the most suitable for POPNA surveys. POPNA surveys are supposed to be carried out shortly after disasters, and to gather information from a representative sample. Obtaining a representative sample by simply selecting

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sampling cost.

randomly from the whole targeted population is rarely possible: For a survey covering relatively large areas within a limited timeframe, it is not realistically possible to obtain a complete list of the targeted population or, alternatively, to obtain one by mapping and listing the targeted population in the entire area. With cluster sampling, it is not necessary to make a full list of the population in the entire survey area; it is sufficient to obtain lists of residents or households in the selected clusters.

Clusters are complete sets of non-overlapping sub-groups of the targeted population. Often, these are geographic areas. Such areas can be defined by existing geographic features such as main roads, mountains or rivers, or by administrative or political boundaries, such as villages. Using existing boundaries and population estimates defined by an existing census is cost and time efficient as well as convenient.

The first stage of cluster sampling contributes most to the variance. With few clusters and a large sample within each cluster, estimate variance can be high. Therefore, although it costs more to visit many clusters, it is better to select many clusters with a smaller sample within each cluster. The design effect (Deff) is the ratio of the actual variance of a sample to the variance of a simple random sample[16] of the same number of elements (Kish 1995). The design effect in cluster sampling can be calculated approximately as $DEFF = 1 + \rho(n - 1)$, in which ρ is intra-class correlation and n is the sample take in the cluster. When the sample take in the cluster is small, intra-class correlation will increase. The design effect will be high if the sample take in the cluster is high or if intra-class correlation is high. With a certain total sample size, the design effect can be reduced by selecting many clusters with a small cluster take; however, this will increase field costs. Therefore, cost and variance should be considered in order to reach the highest precision of estimation possible under certain funding constraints.

3.6.4 Methods for final stage sampling

In the last stage of cluster sampling, ultimate sampling units must be selected from a list of the population of each sampled cluster. In a household survey, households are the ultimate units. Theoretically, when ultimate units are highly homogenous, the first

[16] Simple random sampling (srs) is to select a sample randomly, so that each possible sample of drawing certain number of the subjects has the same probability to be selected.

stage of cluster sampling contributes most to the variance of estimates. However, it can still be highly important to obtain a good sampling frame in the final stage, especially when heterogeneity within each cluster is expected to be relatively high. As indicated before, a good sampling frame is very often not available, particularly in post-disaster situations.

When a list has been obtained and verified, various sampling techniques can be used for selecting households from the list. For example, as an alternative to simple random sampling, linear systematic selection can be used, by which subjects are selected from a sampling list with random start and equal intervals If a high non-response rate is expected, a relatively high sample take within each cluster might be needed in order to compensate for the loss.

Any pre-existing lists of households within each cluster must be evaluated, updated or even re-generated. When such lists do not exist or are known to be unreliable, mapping and listing of the sampled clusters can be used to create a new list of households.

When a cluster covers a large area, compact segment sampling (Kish 1995) may be used. With this method, the sampler sketches a map of the selected sample cluster divided into sub clusters or segments of approximately the intended size of the sample take for the cluster. Then, one of the segments within the sampled cluster is randomly selected, and all the eligible subjects or households within the sub-segment are interviewed. This means that if needed, one more sampling stage can be introduced in some clusters. However, compact segment sampling can increase variance, especially if there is high homogeneity within the segment. Furthermore, segment sizes may vary significantly, making the total sample size difficult to estimate beforehand. Therefore, compact segment sampling should be avoided if possible.

Finally, a random walk procedure can be used for selecting households when lists are impossible to obtain. With this procedure, the sampler or interviewer follows specific random walking instructions to select households. The potential problem of this method is that samplers may ignore small side streets, footpaths and unobtrusive entrances to houses; therefore, the random walk procedure is not a good choice if many households in the area are not easy to identify or locate. Random walks are inconvenient in disaster areas where streets and houses may have been destroyed.

3.6.5 Weighting and non-response

In probability sampling, each subject has a known nonzero probability of selection. Epsem (Equal probability of selection method) sampling is a sample in which each subject has same chance to be selected. Epsem is a special type of probability sampling, while simple random sampling is a particular type of Epsem. In multi-stage sampling, Epsem can be a sample with equal probability at all stages or equal overall probabilities with different probabilities at several stages. In a probability sample, the known nonzero probability of selection for each subject is also called inclusion probability. Epsem has equal inclusion probabilities for all the sampled subjects, and in contrast to other samples, unweighted sample total and mean are unbiased estimators of population means (Kish 1995).

However, Epsem samples are rarely achieved in reality. In practice, the intentional use of disproportional sample allocation and other factors can very often lead to a sample of unequal probability. Many practical complex sample designs, such as variants of cluster sampling or multi-stage sampling, are unequal probability samples. If inclusion probabilities are not constant, applying weights (i.e., the inverse of inclusion probabilities) should be considered for better accuracy. Subjects with low inclusion probabilities should receive a high weight, and vice versa.

An important aspect of POPNA sample design regards how to deal with non-response households. Non-response can be classified into several categories, which may be mainly attributed to two groups (Hidiroglou and Gray 1993). First, they can be caused by imperfect sampling frames, for example sampling frames that include non-existing households or households that are not eligible for interviews. In post-disaster surveys, such problems can arise for example if all members of a sampled household died in the disaster. Second, the selected household may actually exist but not be available, or household members may be available but unable to provide useful information. After a disaster, temporary or long-term migration is often high, making a number of sampled households impossible to find. A common problem after a disaster is that the interviewer may encounter situations where he or she is unable to find the household, and cannot even get enough information to determine whether the selected household exists or not.

In any sample, non-response may lead to biased estimates. One method of dealing with non-response is the “adjustment cell method” (Lehtonen & Pahkinen, 1995). With

this method, households are grouped according to a characteristic assumed to be related to the non-response, and a non-response rate is calculated for each group. Then, the inverse of the non-response rate is used to weight the group according to the degree of non-response within the group.

3.6.6 Sampling methods

In general, cluster sampling is likely to be the most feasible sampling design for POPNA surveys. When it comes to how to select clusters in practice, a number of methods are available. The most relevant options are discussed here.

Systematic Geographic/ Spatial Sampling

Systematic geographic or spatial sampling is a grid-based equal probability sampling method. This method was used in recent post-disaster assessments such as the Nargis surveys as well as the Inter Agency Rapid Assessments of Haiti (Pedersen, Zhao, & Zhang, 2010). One of the arguments for not using ordinary population-based cluster sampling is that clusters with small populations are under-represented. Each cluster's probability for being selected is proportional to its size; therefore, clusters or communities with low population density are likely not to be sampled. The concern is that these small communities are often remote rural and poor areas in particular need of help and attention. Furthermore, disaster areas are usually characterized by high spatial diversity due to the fact that the disaster affects different geographic areas to different extent.

With spatial sampling, the survey area is divided into non-overlapping squares of equally large areas (quadrats) or hexagons. Communities can be selected depending on how close they are to the center of the quadrats (selecting the closest ones), or one or more communities can be selected at random. Following this, either all households or representative samples of households in the selected communities are selected. This produces a grid sample of communities located at roughly the same geographic distance from each other (Tripartite Core Group 2008, Myatt, et al. 2005). The method is aimed at capturing the spatial diversity of disaster effects, instead of giving each household equal chance of being surveyed. Spatial sampling methods

can be particularly useful for mapping the socio-economic situation across geographic areas and presenting the results in a map. If the topography of the area is flat, the method has the benefit of easy implementation, sampling evenly across a wide area, and adding a spatial dimension to the data.

The limitation of spatial sampling is that densely populated areas are given the same probability of being selected as sparsely populated areas. Therefore, when equal weights are used, estimates will be biased towards the sparsely populated areas, depending on the size of variation across clusters. It also gives relatively low precision of indicator estimations in densely populated areas, because the sample size relative to an ordinary cluster sample is less in areas with large populations. In large, sparsely populated areas, much more time is needed to reach sampled households, reducing the cost effectiveness of the survey. Spatial sampling may not be an efficient method for capturing the opinions, needs and so on of the entire population in affected areas. Furthermore, this method understates boundary issues between areas, and works poorly in districts divided by impassable mountains, ridges or rivers (Myatt, et al. 2005, Pedersen, Zhao and Zhang 2010).

Cluster sampling with PPS selection

Cluster sampling with Proportional Probability Sampling (PPS) selection is a class of cluster sampling designs that use PPS selection in the first stage. Clusters are selected with unequal probabilities proportional to some measure of size. In the second stage, after clusters have been sampled, a fixed number of subjects concerned are selected by simple random selection within the cluster. Due to the fixed sample take in the second stage, the total sample size is fixed by the design and therefore does not contribute to variance. Theoretically, if the size measures used in the first and second stage are same, or if the sample take is adjusted by using fixed sampling intervals, every subject has the same inclusion probability. The sample from cluster sampling with PPS selection can be Epsem or self-weighting. Fixed sample size in the second stage facilitates field organization and logistical arrangements, while another alternative - to use fixed sampling intervals - can also be useful, as this can be a way of dealing with displacement in disaster situations.

POPNA surveys are very often carried out at a time when affected households reside in temporary dwellings. They may still be located in their original community, or have

migrated within or out of the affected area, or be settled in camps. Therefore, constructing a good sampling frame is one of the main challenges in conducting POPNA. Even though close correspondence between lists and actual cluster size is much preferred, most surveys cannot achieve it; instead, efforts should be made to obtain rough size estimations. Cluster sampling with imperfect sampling frames can give rise to higher variance; however, if proper weights are calculated, it can also provide more accurate estimates.

The EPI method

"30 by 7" cluster sampling is a relatively quick, inexpensive sampling method originally developed by the World Health Organization's Expanded Program on Immunization (EPI) in 1978 (Hoshaw-Woodard 2001). The EPI survey uses a two-stage cluster sampling method with PPS selection in the first stage. Its main objective is to estimate immunization coverage (the proportion of children that have received all required immunizations). Strictly speaking, this method uses non-random sampling in the second stage; therefore neither mapping nor enumeration of households is needed. In the first stage of 30 by 7 cluster sampling, 30 clusters are sampled with probability proportionate to the size of the population in the cluster. In the second stage, instead of selecting 7 subjects randomly, only one starting household is randomly selected in each of the 30 sampled clusters. Then, all eligible subjects in the household closest to the first household are selected, until seven eligible subjects have been found. That is, instead of selecting seven eligible households, seven eligible subjects or children are selected, and only the first household is selected by random.

With the EPI method, selected subjects are located adjacent to each other within the cluster. If household characteristics are spatially heterogeneous, precision may suffer. However, it is argued that the potential bias tends to average out when the number of clusters is large enough (Lemeshow, et al. 1985). The EPI method has been used in many post-disaster assessments due to its low cost and simplicity. When applying the EPI methods in post-disaster assessments, many practical modifications have been made. One common variation of the EPI method is to employ a 30 by 30 cluster sample for post-disaster assessment, so that a larger sample can be obtained than with the original method. In order to eliminate the potential bias mentioned above, instead of randomly selecting only the first household, all the pre-determined numbers

of households can be randomly selected within each cluster. This will cost extra effort and time, as it requires obtaining a full list of households in the selected cluster (Malilay, Flanders and Brogan 1996). Some other modifications are, for example, selecting each kth household after a first random selection, or selecting part of the sample from stratified areas within the cluster (Turner, Magnani and Shuaib 1996). The EPI methods select all eligible individuals in the household, and may introduce higher variance on indicators with high homogeneity within one household, such as opinions. Therefore, the EPI method can be modified to randomly select one eligible person in each household (Hoshaw-Woodard 2001).

The 30 by 7 EPI method was designed with the assumption of a design effect of 2, and in that case can provide an estimate that falls within 10 percentage points of the true population percentage (Lemeshow, et al. 1985). While the 30 by 30 method provides an estimate that falls within 5 percentage points of the true percentage, estimations of extremely high and low prevalence can still be relatively unreliable. For example, the confidence interval for an estimation of 1 percent with the 30*30 EPI method is (0.08, 1.92)17, and the relative error is so high that the estimate is quite meaningless. In disaster related surveys, due to the high homogeneity within clusters, design effects can be much larger; therefore the EPI method provides even less precision under such circumstances. Furthermore, The EPI method was designed for presenting a global estimate for the population in question, and cannot reliably provide estimates for sub groups within the sample (Levy and Lemeshow 2008).

Modified cluster sampling with conventional PPS selection

Even though conventional cluster sampling methods are often viewed as a luxury because it requires extensive household listing work, it generally provides a less biased sample than other methods. When the survey is meant to estimate household or individual characteristics, such as is the case in POPNA surveys, cluster sampling with PPS selection ensures approximately equal inclusion probabilities. Even imperfect estimations can be used, with proper weighting and other modifications of sampling techniques (Kish 1995). For example, size groups can be assigned to the clusters where population size is unknown, or sample size or weights can be left

[17] The 95 percent confidence interval for a sample size of n and an estimate of a proportion is (p-(sqrt(((p*(1-p)/n)*deff))*1.96*100, p+(sqrt(((p*(1-p)/n)*deff))*1.96*100).

uncontrolled so as to obtain equal probability sampling. A two-stage design can also be expanded into a multi-stage one, in which samples of clusters are selected within previously selected clusters.

When time and resources are limited and sampling frames are difficult or impossible to obtain, modified cluster sampling methods can to some extent be employed and combined with the standard method. In many cases, reasonable modifications to conventional PPS techniques can be designed, and will still be more efficient than other methods. Example 7 describes how the POPNA surveys conducted after the earthquake in Sichuan employed a combination of different sampling methods in the second stage of sampling, depending on the information available in different communities (Pedersen, Zhao and Zhang 2010). Compact segment sampling, random walk, and mapping and listing households in the segment, were combined to sample households in different clusters.

3.6.7 Summary: Sampling methods for POPNA surveys

In sum, for POPNA surveys, a representative sample covering a large area is normally required, and policy is quite often related to sub-groups; hence, a large sample is needed. The geographic clustering of disaster impact in POPNA surveys can contribute to high design effects. Despite this, spatial sampling focusing on gathering geographic information is not well-suited, because POPNA rather aims at providing accurate information related to the population. Furthermore, the geographic focus of spatial sampling can lead to higher variation on weights of population estimates.

The EPI method is relatively cheap and easy to implement, and does not require household listing in the ultimate selection stage. However, it was designed with an assumption of low design effect, and can provide estimate of less precision in disaster situations.

In POPNA surveys, when there is apparent clustering of disaster impact, it is more desirable to employ a standard cluster sampling design with low sample take and a high number sampled clusters. While it is often difficult to obtain a good sampling frame for POPNA surveys, approximate estimation and modification in standard cluster sampling can probably still be used to provide better estimations than other

methods. Proper design weighting is particularly important in providing estimates of high accuracy in situations with unequal allocation of the sample, imperfect sampling frames and/or high levels of non-response.

Example 7: Sampling for the Sichuan survey

The Sichuan post-earthquake survey targeted everyone residing in districts that were seriously affected by the Wenchuan earthquake. The very few households who had moved out of the area were not included in the sample. The sample was stratified by type of location (camp/ non camp) and degree of impact from the earthquake. The sample was drawn using linear systematic PPS in selecting clusters and used a fixed sample take of households within each cluster. Classification of impact was based on three categories defined by the Chinese Ministry of Civil Affairs, which were further simplified into very seriously affected areas and seriously affected areas.

In some of China's earthquake affected districts obtaining a good sampling frame proved very challenging. Up-to-date lists of villages and residence committees were not easily available at provincial level in Sichuan. The newest information on the population size of rural towns and urban neighborhood committees available was the 2000 Census of China (National Bureau of Statistics of China, 2002). Estimates of the population of rural villages were obtained from the Planning Group of Post-Wenchuan Earthquake Restoration and Reconstruction under the State Council. Urban population estimates were not available on residence committee or village level; instead, they had to be inferred from the population size of the higher administrative unit neighborhood committees, registered in the 2000 Census (Pedersen, Zhao and Zhang 2010).

At the time when the survey was conducted (about six weeks after the disaster), a large number of homeless households had temporarily settled in camps built and organized by the Chinese government. Lists of camps and camp populations were available, but could not easily be obtained. It took great effort to inquire at all local administrative units in order to obtain usable lists. Rural camps which were located within a community were considered to be part of that community, while camps that were located elsewhere or did not administratively belong to any community were listed separately as an independent stratum for each district.

The primary sampling units were villages in rural areas and residence committees in urban areas in the affected counties. Within each stratum, the primary sampling unit was selected through linear systematic sampling with probability proportionate to size. The very seriously affected stratum was over sampled, so as to give higher precision of estimates in the very seriously affected area. Implicit stratification was employed by ordering the sampling frame geographically by county. The household sample take in each cluster was relatively high due to considerations about possible high rates of migration and non-response in disaster areas (Pedersen, Zhao and Zhang 2010).

In the second stage of sampling, households were selected within each sampled cluster. Lists of the households residing in each community were not available at provincial or district level; instead, they had to be personally inquired about in each local community. As this meant that samplers had to be sent to each cluster, it would be inconvenient to obtain and send all household lists to the project headquarter before field work started. Instead, sampler teams were organized and deployed to the field shortly before interviewer teams were sent to the selected communities.

The samplers were responsible for obtaining and verifying household lists and randomly selecting the households to be interviewed in each cluster. A sampling form was designed to convey information about the selected households and to register sampling information that would be important for weight calculations. One sampling coordinator was available on the phone at all times in order to follow up on problems that arose during sampling, and to supervise the information transfer between sampler teams and interviewer teams.

When complete list of households had been obtained and verified, a random linear systematic sample with fixed sample take was conducted. If a household list was obtained but found to be unreliable in a community, segment sampling was conducted instead. In such cases, the cluster was divided into segments of around 200 households; one segment was randomly selected for mapping and listing of all the households in the segment; and households to be interviewed were selected from that list. In some camps, household lists did not exist at all; there, a random walking procedure was employed. Since households were very well organized and evenly distributed in camp areas, such districts were well-suited for random walk sampling.

In the end, the post-earthquake assessment survey in Sichuan covered 24 counties. 174 clusters and 4526 households were sampled; among them, 3652 households were successfully interviewed. The dominating reason of non-response was no contact; refusals were very few. As discussed above, weights for non-response should be calculated in order to improve estimation. In the Sichuan survey, the “adjustment cell method” was used to adjust weights for non-response in each county (Lehtonen & Pahkinen, 1995). The large and representative sample facilitated collection of reliable information about the entire affected population and provides room for analysis of subgroups.

Table 1: Estimates, standard errors and design effects for selected indicators from Sichuan survey in 2008

Indicator	Estimate (%)	Standard error	95% CI Low	95% CI High	DEFF	Coefficient of variation
Tent	32.1	2.7	26.9	37.7	12.6	8.4
Temporary self-built dwelling	6.5	1.1	4.7	8.9	6.7	16.9
Mobile house	2.1	1.0	0.8	5.5	18.9	47.6
Bungalow	30.1	2.5	25.4	35.3	11.0	8.3
Apartment	7.0	2.0	3.9	12.2	22.6	28.6
Other building	15.0	1.6	12.0	18.6	7.8	10.7
Other	7.2	1.2	5.1	9.9	7.7	16.7
Cannot receive radio programs now	41.2	3.2	35.0	47.7	15.7	7.8
Has electricity	82.8	1.9	78.7	86.3	9.4	2.3
No completed education	18.0	0.8	16.5	19.7	5.6	4.5
Primary education	39.9	1.0	38.0	41.8	4.8	2.4
Secondary	29.6	0.8	28.0	31.2	3.9	2.8
Higher	12.5	1.0	10.7	14.5	10.7	7.8
Very satisfied with current life	16.2	1.2	14.0	18.8	3.8	7.4
Somewhat satisfied with current life	65.3	2.0	61.2	69.2	6.4	3.1
Somewhat unsatisfied with current life	14.8	1.3	12.4	17.5	4.7	8.7
Very unsatisfied with current life	3.7	0.6	2.7	5.1	3.7	16.4

As can be seen from **Error! Reference source not found.**, the survey results indicate particularly high design effects for indicators with apparent geographic clustering of disaster impact, such as post-disaster housing. The population was to some extent relocated after the earthquake, and the available sampling frame in disaster areas was mainly the relatively outdated 2000 census. This resulted in variation of the design weights. Furthermore, unequal allocation across areas with different extent of damage also contributed to variability in the design weights. Although the weights contributed to variance inflation, they are important for obtaining un biased estimates The large sample contributed to relatively precise estimates, despite of high design effects.

3.7 How to collect data

3.7.1 Options for data collection

There are several options for collecting data for survey research. The most commonly used methods are face-to-face interviews in respondents' homes, on the street or at a specific location; telephone interviews; postal interviews; and internet interviews. The face-to-face street interviews are useful for short and structured interviews, but not practical for more comprehensive or open-ended questions; and it might be difficult to reach specific sub-groups using this procedure. Telephone, postal or internet interviews are all relatively cheap and easy to do, but not suitable in districts without sufficient telephone, internet or post service coverage. In disaster areas, pre-existing phone lines, internet cables and post offices are likely to have been damaged. Therefore, although face-to-face household surveys are more expensive and time-consuming, it is by far the dominant quantitative data collection method for needs assessments in emergencies.

There are also several options as to how to register data during a face-to-face household interview. Mainly, the project team can choose between using paper questionnaires or computers for conducting interviews. Traditionally, paper-based questionnaires have been used. When using paper questionnaires, a significant amount of time must be set aside for entering data from the questionnaires on computers and cleaning the data. Furthermore, additional editing is needed both in the field and in the office for dealing with problems such as missing data, out-of-range data values, wrong skips, etc. In most cases, data are registered by two different persons on two different computers (double entry) in order to avoid new data entry errors arising when paper data are registered electronically. Editing work and validation during data entry are time-consuming and might be inaccurate, especially in instances when it is not possible to recall data collectors back to the field.

In addition to traditional paper-based questionnaires, machine readable paper questionnaires can be used. By using such questionnaires, it is possible to save data entry time and avoid data entry errors. Machine readable paper questionnaires are commonly used in mail surveys, but can be used in other kinds of surveys as well. But even though such questionnaires reduce the time spent from data collection to analysis, they do not significantly differ from traditional paper questionnaires. Extra editing work is still needed for controlling for common errors and logic inconsistencies.

3.7.2 Computer assisted personal interviews (CAPI)

With increasing demands regarding the types of data to be collected and the speed required from data collection to dissemination, computerized data collection has gained popularity. Computer assisted personal interviews (CAPI) are face-to-face interviews where respondents' answers are registered directly into Personal digital assistants (PDA), notebook computers, other handheld computers, or Smartphones. Many studies comparing traditional paper-based interviews with CAPI have reported very promising results (Fletcher, et al. 2003, Lal, et al. 2000). Among the reported advantages of CAPI over traditional paper-and-pencil interviews, the most notable one is that CAPI saves data entry time, which normally consumes the bulk of time spent on traditional paper-and-pencil interviews.

Another reason why CAPI is increasingly used is its technical advantages. CAPI can eliminate all errors that commonly arise because interviewers skip questions which are not supposed to be skipped or vice versa. It has also been found to reduce overall errors, such as missing errors and out-of-range errors (Norman M. Bradburn 1991, Palen, et al. 2008, Johannes, et al. 2000). As questions are displayed automatically by computers, skipping and logical branching are strictly managed by the program, without any extra effort on the part of data collectors. As long as the entry program is designed to include internal validity checks, such as range checks and consistency checks, most logic and range errors will be eliminated. While the interval between data collection and validation makes some data unobtainable in traditional paper-and-pencil interviews, CAPI has a significant advantage in that it allows for detecting most errors while interviewers are still in the field. Furthermore, in cases when random selection is used for selecting respondents among household members, CAPI also reduces interviewer created biases in random selection (Zhang and Pedersen 2010).

As indicated before, time is a particular concern in needs assessments after acute rapid disasters. Under such circumstances, CAPI's potential for saving time in collecting high-quality data can be highly valuable. In addition to saving time for data entry, CAPI is also reported to somewhat shorten interview time (D. Forster 1991, Caeyers, Chalmers og Weerdt 2010). Even though use of CAPI requires that extra time is spent on training interviewers in using technological survey equipment, the automatic skips and logical branching in CAPI minimize the effort required from data collectors during interviews.

CAPI does not only have potential for collecting high-quality data; it also enables rapid and continuous quality control during fieldwork. As data collected by computer interviewing can be available for analysis more or less immediately, rapid data analysis and control could be carried out almost synchronously. Therefore, fieldworkers can quickly receive feedback on data quality and team performance. Such quality control is crucial in the early stages of fieldwork. Some studies have also found higher satisfaction rates among CAPI users (Haller, Haller, et al. 2009).

The advantages of CAPI makes it the preferable data collection tool for assessment surveys in emergencies, where rapid and accurate data are to be collected within a very constrained timeline. While the instruments of computerized data collection may often be more costly than traditional paper questionnaires, CAPI surveys can benefit from economies of scale if assessments are to be carried out repeatedly. After the initial investment on the computers has been made, maintenance costs are not high. Furthermore, CAPI will save most of the management costs related to paper questionnaire printing and transportation, data entry operation, and editing.

3.7.3 Challenges in using CAPI

Although using CAPI can in many ways be very convenient, it also comes with particular challenges that need to be taken into account in preparing and implementing a POPNA survey. An obvious issue is that it takes time for data collectors to become familiar with the equipment used for conducting CAPI, and extra training in how to use CAPI equipment will be needed. Yet, as soon as data collectors are familiar with the equipment, the abovementioned advantages of using CAPI will most likely compensate this cost.

Data loss, computer crashes and other technical problems are major challenges that arise from using CAPI. The training needs to provide data collectors with basic technical knowledge about the instrument, and extra technical support will be needed during fieldwork.

Thorough preparations must be undertaken in advance in order to ensure that interviews will not be interrupted by unexpected technical problems. First, even though the probability of computer crashes is usually low, crashes can happen. Therefore, replacements should be at hand. In addition, it is always wise to let

interviewers carry extra paper questionnaires, so that interviews can be completed also in the case of technical problems. A technical expert should be available to all the interviewers in order to ensure that technical problems arising in the field can be solved as soon as possible. Second, data loss might happen due to many different reasons, and it can be catastrophic. Interviewers should be required to transmit and take back-up copies of their data as often as possible. Most netbook and tablets have Wi-Fi wireless internet network connectivity, making it possible to transmit the data right after the interview is completed. This greatly reduces the risk of data loss. Third, any unnecessary use of survey computers increases the risk of technical problems. The settings of computers should be carefully designed in order to ensure that survey computers cannot be used for other purposes; for example, survey equipment can be restricted to only run the data entry application and other necessary applications.

Aside from the abovementioned technical issues, an issue as simple as battery life has been one of the main challenges in computerized data collection. In disasters, power systems might be destroyed; hence, the battery life of the instruments can put considerable constrains on the fieldwork. However, the modern mobile devices for CAPI surveys have much longer battery life than earlier models, and in many cases, extra batteries can normally meet the energy needs of one long day of interviews. Optical reading has also been a problem, especially in bright light.

Even though use of CAPI eliminates data entry errors, missing, logical and inconsistency errors, the risk of errors due to mis-typing remains highly prevalent. In traditional paper-and-pencil interviews, mis-typing during data entry can to a large extent be corrected with double entry. However, with CAPI it is difficult to detected errors due to mis-typing, because most such errors happen on occasions when the mis-typing does not result in evident logical inconsistencies. In disaster assessments, when people work under pressure, interviewers tend to make more mis-typing errors (Haller, Haller, et al. 2009).

Programming the data entry application is more demanding in CAPI than with traditional paper-based interviews. In traditional paper-based interviews, data entry programs do not have to be ready before data entry starts, which is normally a few days or weeks after fieldwork commences Furthermore, with paper-based interviews it is also possible to test and revise the application in the earlier stages of the data entry process. With CAPI, on the other hand, the data entry program has to be ready when training starts. As a consequence, the application usually has to be developed

and tested in parallel with the development of questionnaires. Moreover, with CAPI, after survey teams have been dispatched to various districts, programmers have small chances to revise the data entry application. Hence, in post-disaster assessments with a very constrained time schedule, efficient cooperation and coordination between the programmer and questionnaire designer are critical to the whole process.

3.7.4 CAPI tools

A number of options are available when it comes to selecting tools for conducting CAPI data collection, such as laptops, PDAs, smartphones, and tablet computers. When a research team decides to embark on a POPNA survey, tools have to be carefully chosen, depending on the survey's requirements, data collectors' knowledge, and the situation in the disaster area.

CAPI was first used in face-to-face interviews in the end of the 1980s and beginning of 1990s (Sainsbury, Ditch and Hutton 1993). These early CAPI surveys used laptops. As laptops run the same operating systems as other computers, the software previously used in data entry of traditional paper-questionnaire interviews could be applied directly on laptops without any adaption. The disadvantage was that conventional laptops were relatively heavy and therefore not convenient in surveys where data collectors had to walk long distances to reach households. Battery life was also for a long time an important limitation for using portable computers in CAPIs. Only in recent years has new technology been developed that considerably prolongs battery life

A Netbook is a relatively small, light-weight, cost- and power-efficient laptop computer. It was first formally introduced in late 2007, when the Asus Eee PC marked a mile stone in the personal computer business. Shortly after, other companies such as Dell and Acer began to produce their own netbooks. Since then netbooks have gained high popularity. Ranging in size from less than 5 inches to more than 12 inches, the typical netbooks are between 9 to 11 inches and weigh only between 0.9 to 1.4 kg (PriceGrabber 2009). Netbooks are highly suitable for CAPI surveys, as they have the advantages of conventional laptops in addition to low weight and long-lasting batteries. Personal Digital Assistants (PDA) are mobile electronic devices that function as personal information organizers. Gaining popularity in the end of 1990s due to its

small-size and portability, PDAs were among the earliest mobile or handheld devices applied in quantitative surveys (Crocker 1999). Even though PDAs have successfully been employed in many surveys of various scales, software for traditional PDAs were either difficult to use, expensive, or too simple to handle a complex questionnaire (Zhang and Pedersen 2010). In recent years, various entry systems have introduced new versions to support mobile operating systems, which modern PDAs now run on. Windows Phone 7 is now one of the main operating systems for PDAs, and most modern PDAs have Bluetooth or Wi-Fi wireless network connectivity.

With the development of Smartphones and other handheld computers, PDAs have been losing ground. Nokia was the first to introduce PDA functions to mobile phones in 1996.Thereafter, mobile phones with PDA functions - nowadays commonly referred to as “Smartphones” - become very popular. Smartphones run on mobile operating systems, such as Apple iOS, Google Android, Microsoft Windows Phone 7, Nokia Symbian, RIM BlackBerry OS, etc. Due to the extra telephone functions Smartphones have taken large shares of the market at the cost of PDAs. As Smartphones incorporate PDA functions, they are ideal tools for CAPI surveys.

Both PDAs and Smartphones are suitable for CAPI surveys which have relatively short and simple questionnaires, and where interviewers have to move quite often from one place to another. These kinds of pocket devices are easy to carry and have long-lasting batteries; therefore they are very often used for street interviews. In street interviews, interviewers have to conduct interviews while standing in the street or other public places. With laptops or netbooks it is more convenient for interviewers to be seated. PDA and Smartphones generally have relatively small screens, and may be less convenient for displaying complex questionnaires or images than tablets and net books.

In a clinical study, handheld PDAs and laptop computers for electronic data collection were compared by randomized cross-over trial (Haller, Haller, et al. 2009). Haller et al. found that both speed of recording and data accuracy were significantly higher when using laptops rather than PDAs. The difference was particularly apparent with regard to missing data problems. Furthermore, users reported that compared to handheld computers, laptops are much easier and faster; and the users reported to be more satisfied in using the laptops than other handheld computers (Haller, Haller, et al. 2009) Since POPNA surveys aim at gathering comprehensive information, its questionnaires can be complex and long. In such cases, PDAs and Smartphones are

probably not the best option in conducting CAPI surveys.

Tablet computers are portable personal computers with a touchscreen. Representing a new class of portable electronic devices, they are different from conventional laptops and netbooks. The traditional tablet PC was introduced by Microsoft in the early 2000s. It ran classic desktop OS and was designed as a mobile computer for fieldwork in business; however, it was not widely used (Crocker 1999). In 2010 Apple released the iPad, running Apple iOS. New tablet computers use mobile operating systems instead of the classic desktop operating systems run by the earliest tablet PCs. The amazing sales of iPad in 2010 induced many companies to produce competing tablets, such as the Xoom tablet by Motorola and the Samsung Galaxy Tab by Samsung. Many are running Google's Android operating system, while some use Windows 7, BlackBerry Tablet OS, HP's webOS etc. The screen size of tablet PCs varies from 7 to 12 inches.

Netbooks and tablet computers all have the benefit of being small, lightweight, and having long battery life, compared to conventional

Example 8: CAPI with notebooks in Sichuan disaster areas

As the Post Wenchuan Earthquake Needs Assessment Survey aimed at providing input for the Chinese Government's early reconstruction planning it had to be conducted within a very tight timeframe. The research team had only 25 days to prepare, organize the survey and prepare the initial report. It was absolutely impossible to complete such a mission with a traditional paper questionnaire; therefore, computer assisted personal interviewing was the only feasible choice.

The Asus Eee-pc netbook, running Windows XP and using Blaise 4.8, was selected as interview tool. In 2008, tablet computers hasdnot yet become very widespread, and the research team considered netbooks to have many advantages that would be useful in conducting CAPI, compared to laptops and DPAs, as indicated before. The choice of Blaise as data entry application was based on positive reports from other researchers (R. E. Rosemary Crocker 1999), and on the fact that the research team had considerable previous experience with Blaise.

In 2008 in Chengdu city in China, the best battery available on the local market for Asus Eee-pcs could only run for three hours. Even though each interviewer was equipped with one extra battery, some interviewers had to use paper questionnaires from time to time. Fortunately, at the time of the survey, electricity had been restored in most disaster areas; therefore, the limited battery life was not a large problem.

In order to avoid data loss, the Blaise application was programmed to automatically save data at one minute intervals. Routines for data backup, data transfer and reporting were carefully designed and

laptops. Touch screens make tablets more flexible and easier to use than keyboards and mice. Compared to PDAs, the relatively bigger screen of the tablets brings higher readability, while maintaining the same portability and flexibility. More data entry software manufacturers are developing implementations to be run on the mobile operating systems run on tablet computers. Therefore, tablets have become a very promising tool in CAPI surveys for POPNA.

However, using tablets in CAPI surveys also brings about limitations. Handwriting or typing on virtual keyboards can be significantly slower than typing on conventional keyboards. Therefore, if typing of open questions is included in the CAPI survey design, tablet computers might not be very efficient. After disasters, open ended questions or open additional information for certain questions can be important, even though they are time-consuming. Furthermore, since the screens of tablet computers also serve as input devices, there is higher risk of screen damage than with laptops.

Some important characteristics of laptops and Netbooks make them

One computer technician and one Blaise programmer were always available on telephone during fieldwork. Netbooks that crashed were replaced immediately by sending a backup netbook to the field.

In order to improve screen readability, the font size of the Blaise application was enlarged. Even though the Asus Eee-pc netbooks used in the survey had 8 inch screens, some long questions could not be displayed within one page, and the interviewer had to scroll to the next page in order to read them. This might increase the risk of under-reporting the "invisible" answers on the first page.

The Blaise program was designed in parallel with questionnaire design; and even though robust tests had been conducted, there was a risk that bugs might show up during field interviews. Since the early stage of fieldwork is normally a critical period for discovering bugs, the research team decided to deploy all survey teams to the same area in the beginning of the fieldwork. Thereby, in case problems were identified, it would be possible to update the program on all field computers. Fortunately, no serious errors were found during fieldwork.

Mis-typing errors are a common but invisible problem in CAPI surveys. In the Post Wenchuan Earthquake Need Assessment, two panel surveys indicated that when interviewers were under pressure, mis-typing was more likely to happen. This indicates that designing applications with the particular aim of avoiding mis-typing is particularly important in emergency situations.

In order to avoid mis-typing, answer categories were assigned values that are far away from each other on the keyboard, such as 0 and 1 instead of 1 and 2 to "yes" and "no" or gender questions.

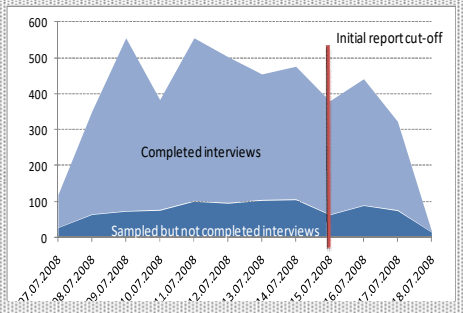
more suitable than tablet computers under certain conditions. First, use of Netbooks requires users to be seated. This makes them less flexible than the tablet; however, in a POPNA survey, which can have relatively long and complex questionnaires, interviewers might find it comfortable to sit face-to-face with respondents, so this is not much of a downside. Second, netbooks run on normal desktop operating systems while modern tablets use mobile operating systems. Therefore, any data entry software used for data entry in paper-based interviews can be directly used in netbooks, but probably not in tablets. While it might be costly or time-consuming to get new software for tablets, it is easier and cheaper to get technical support from internet user communities when using normal desktop OS. Last but not least, tablets are relatively more expensive than netbooks. All these features make netbooks a good alternative in POPNA surveys also when compared to the more modern tablets.

Auto-skip, which has been found useful in data entry of paper questionnaires, was not used in CAPI. Thereby, the interviewer had the opportunity to double check the answers typed.

Finally, in order to prevent interviewers from using the computers for non-relevant purposes, a shell prepared by Python was designed to replace Windows Explorer as the main user interface. The windows registry was changed so that the interface could not be changed back, and the machines were restricted to only functioning as a launcher of the data entry system and other supporting programs.

The careful design of the CAPI survey contributed to a quick and high-quality survey. With 80 interviewers and a complex questionnaire which on average took one hour to answer, the entire fieldwork of collecting, analyzing and reporting data on 4526 households (3652 households completed) took only around 11 days.

Figure 9: Field work in the Post Wenchuan Earthquake Rapid Needs Assessment Survey



CAPI is provided through specialized data entry systems. The data entry system to be used very much depends on the hardware tool utilized in the survey and the types of survey in question. Various mobile devices have specific operating systems, which may or may not run certain types of the data entry or data base systems. Almost all data entry systems can run on conventional laptops or netbooks, while increasingly more systems are integrating

their applications with mobile operating systems, such as Apple iOS, Android and Windows mobile operating system. Pendragon Forms is available for the PDA Palm platform, and has now migrated to Android and iOS devices. SYWARE Visual CE is built on the Microsoft mobility platform, and therefore available for Pocket PCs and smartphones which run windows mobile operating systems. SYWARE Visual CE has also recently been adapted to the Android system. CSPro mobile runs on windows mobile devices as well, but are picky about the devices. Handbase database manager product supports most mobile devices which run on iOS, Android or Windows mobile operating systems. EpiSurveyor has also been developed to support most mobile phones, such as Android and Blackberries phones.

In any case, the preferred data entry systems are those that provide the best interface of questionnaires, so that it can facilitate the interviews in the field. For example, if tools with relatively small screen are selected, the applications should be able to display the questions properly in small screens. In POPNA surveys, programming most likely has to be completed in a very limited time, in parallel with questionnaire design. The research team should choose the application with which they have previous experience, so as to save time in developing the data entry program.

3.8 How to analyze data and write reports

After data collection has been completed, the project team can start data analysis and report writing. A report should in general include the following:

- Introduction: Pointedly describes the aim, content, time period and scope of the study.
- Methodology: Descriptions and discussion of the methods of sampling and interviewing employed.
- Main findings: Summary of the main findings from the data analysis.
- Policy recommendations: Suggest possible policy recommendations related to post-disaster reconstruction.

Example 9: The Wenchuan earthquake report

In the Wenchuan earthquake needs assessment survey, the project team started preparing the framework of the report soon after interviewers were sent to the field. Statistic syntax files were written according to the framework of report, and analyses were conducted as soon as survey data was sent back from the field.

The report firstly answered questions that the Chinese government had raised in the designing phase of the survey, such as affected people's expectations about government subside, their attitudes towards relocation, etc. Beyond that, the report also provided a complete description of people's living condition and needs for future re-construction. In the final part of the report, tabulations of the main indicators divided by age, gender, education, ethnic groups, etc, were presented.

Since the Chinese government had requested a preliminary report at a very early date, the initial report sent to the government was based on the 3000 questionnaires that had been completed within the first week of fieldwork.

POPNA is a policy-oriented assessment tool. Therefore, POPNA reports should at first provide information on the questions that policy makers are interested in. When writing the report, the research team should keep in mind what policy makers wish to know about the affected population. However, issues that have previously not been noticed by policymakers but are prominent in the survey should also be raised.

The section on main findings should focus mainly on the affected population's resources; people's urgent and long term reconstruction needs, and the priority of these needs; people's attitudes towards potential policy measures and options; and people's evaluation of existing policy measures. Based on the findings on these issues, the project team can come up with relevant policy recommendations for the post-disaster reconstruction plan and provide an empirical description of the living conditions and needs of the affected population that can inform other relevant policies.

The report should be completed as soon as possible in order to provide information and suggestions for long-term reconstruction plans. For the readers' convenience, the report should be presented in a way that is clear and easy to understand. For example, results from various geographical locations can be presented as graphs inserted in a map of the survey area; an "atlas" of living conditions, needs and opinions across the survey area

can be produced by compiling such maps for various suitable data. Such visible mapping of the situation in disaster areas has been found to be welcomed by policy makers.

After the first report has been completed and disseminated, more in-depth analyses can be conducted, and more academically oriented reports can be written with the aim of using the POPNA to enhance our understanding and knowledge of disasters and disaster governance in general.

3.9 Expanding POPNA into a longitudinal monitoring tool

As mentioned before, POPNA surveys collect information about a disaster affected population's resources, needs, hopes regarding future reconstruction, and their evaluations of existing policies. This provides data that can be highly useful as a baseline overview of the situation at the starting point of reconstruction. With a POPNA baseline study as starting point, further

Example 10: Following up the Post Wenchuan earthquake needs assessment

One year after the Post Wenchuan earthquake needs assessment survey, a follow-up survey was conducted. The questionnaire design was to a large extent similar to the one used in the initial POPNA survey, as questions that it would be useful to compare over time were repeated. But some questions directly related to the immediate consequences of the earthquake were replaced by new questions related to the reconstruction process.

The 2009 survey took a stratified sample. For respondents who lived in villages and communities, the 2009 survey used exactly the same sample as the 2008 one, thus creating a panel. However, a new sample had to be drawn for households who had lived in camps in 2008. The project team was unable to retrieve camp inhabitants in 2009 because most of them had moved from old camps to new ones during the year that had passed since the earthquake.

A third survey for monitoring post-disaster reconstruction was conducted in 2011, with fieldwork lasting from July 5 to August 15. This last survey was conducted after "The overall plan for post-Wenchuan earthquake restoration and reconstruction" was stipulated to be completed. Therefore the survey emphasized affected people's evaluation of and satisfaction with the reconstruction process as well as their needs and hopes with regard to future recovery. Meanwhile, indicators that were comparable over time were repeated and formulated in the same way in the previous two surveys.

Due to the great difficulties of retrieving earlier respondents from two years earlier, the project team deemed it futile to use a panel design also for the 2011 survey. Instead, a new sample of 5000 households was drawn in the same geographic area as the former two surveys.

assessment surveys can be conducted at different stages of the reconstruction process, thereby upgrading the POPNA survey to a longitudinal survey for Monitoring Post-disaster Reconstruction (MOPR).

In MOPR surveys, some key indicators should be the same as those in POPNA. But the focus of each round of an MOPR survey can vary according to the development of post-disaster situations. MOPR surveys can be conducted in various ways, from undertaking repeated surveys in one disaster area to more strictly defined panel surveys.

In order for panel surveys to be feasible in a post-disaster setting, it is important to take into account that many respondents are likely to relocate between surveys by thoroughly recording of contact information for all respondents. Given the particular complexities and challenges in that characterize the situations in which POPNAs are conducted, it can be difficult to work out arrangements which ensure that respondents can be retrieved for follow-up panel surveys several months or years later.

The follow-up surveys in 2009 and 2011 provided data which were highly useful for monitoring the reconstruction in Sichuan's earthquake affected areas. The surveys were positively evaluated by policy makers in the central and local governments as they provided them with valuable data as for how people evaluate the current reconstruction and policy measures in addition to their hopes for future reconstruction, and thereby were helpful for re-adjusting policies and measures. The project's unique academic value was also appreciated by domestic and international researchers.

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