



सत्यमेव जयते

**MANUAL**  
**POST DISASTER**  
**NEEDS ASSESSMENT**  
**INDIA**  
**(VOLUME - I)**



Resilient India - Disaster free India

**National Institute of Disaster Management (NIDM)**  
(Ministry of Home Affairs, Government of India)



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**MANUAL**  
**POST DISASTER NEEDS ASSESSMENT INDIA**  
(Volume - I)

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नित्यानन्द राय  
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## संदेश

मुझे यह जानकर अत्यंत हर्ष हो रहा है कि राष्ट्रीय आपदा प्रबंधन संस्थान, गृह मंत्रालय ने आपदा से हुए नुकसान का वैज्ञानिक तरीकों से आकलन सम्बन्धी अंतर्राष्ट्रीय स्तर का साधन विकसित किया है।

भारत विश्व में प्राकृतिक आपदाओं से सबसे अधिक प्रभावित होने वाले देशों में से एक है। हमारी भौगोलिक स्थिति कुछ इस प्रकार की है कि आपदाओं का प्रकोप और इसका प्रभाव तीव्र एवं अत्याधिक होता है। हमारे देश में आपदा के पश्चात इससे होने वाले नुकसान का आकलन पारम्परिक तरीके से होता रहा है। इसका सही आकलन वैज्ञानिक तरीके से होना चाहिए।

माननीय प्रधानमंत्री, श्री नरेन्द्र मोदी जी ने एशियन मंत्रीगण सम्मेलन में आपदा प्रबंधन को वैज्ञानिक आधार पर करने हेतु 10 बिंदुओं को चिन्हित किया। अभी हाल ही में राष्ट्रीय आपदा विमोचन दल द्वारा आयोजित कार्यशाला में माननीय गृह मंत्री, श्री अमित शाह जी, ने उन्हें दोहराते हुए सभी प्रतिभागियों से उसे सुनिश्चित करने तथा इन नीतियों पर कार्य करने को कहा।

मुझे विश्वास है कि वर्तमान प्रकाशन, जो चार भागों में प्रकाशित हो रहा है, का लाभ प्रत्येक राज्य और केंद्र के मंत्रालयों को मिल सकेगा। इस प्रकाशन को आकलन हेतु संदर्भ स्वरूप प्रयोग में लाया जा सकता है। वर्तमान में देश के कुछ राज्यों में इस विधि को आपदा के पश्चात होने वाले प्रभावों का आकलन किया है और इसके आधार पर दीर्घकालीन पुनर्निर्माण की नीति विकसित करके आगे बढ़े हैं। इस ओर राष्ट्रीय प्रबंध संस्थान का यह प्रयास सराहनीय है।

मैं एक बार पुनः इस अंतर्राष्ट्रीय स्तर का कार्य करने हेतु राष्ट्रीय आपदा प्रबंधन संस्थान को हार्दिक बधाई देता हूँ।

दिनांक : 16 सितम्बर, 2019

स्थान : नई दिल्ली।

  
(नित्यानन्द राय)





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3<sup>rd</sup> September, 2019

## Message



Over the last twenty years, the practice of post-disaster recovery has undergone significant transformation. This change is characterized by three features: first, there is much greater focus on multi-sectoral, comprehensive recovery; second, there is much greater focus on “building back better,” not only in physical terms but also in terms of better socio-economic conditions; and third, there is much greater focus on recovery outcomes rather than on inputs. For example, in the education sector, we measure success in terms of enabling access to a safe and healthy learning environment as opposed to the number of classrooms built.

This transformation in the practice of post-disaster recovery is underpinned by the development of post-disaster assessment methodologies. We have come a long way from assessing only the damages and losses from disasters to assessing the needs of the affected communities. In this context, I congratulate NIDM in systematizing the practice of post-disaster assessments in the form of this volume. This is an important contribution to the practice of disaster risk assessment and ultimately post-disaster recovery.

I am sure this will go a long way in meeting the needs of multiple stakeholders – local governments, non-governmental organizations, academic institutions – who are supporting post-disaster recovery in the country.

Kamal Kishore





Resilient India - Disaster free India

**Maj Gen Manoj Kumar Bindal**  
VSM

**Executive Director**



सत्यमेव जयते

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## Foreword



Disaster disrupts development and the dividends of development get seized. For regaining the growth gaps, created due to disasters, long term recovery becomes the only choice. In the light of understanding the disaster impact on economy Post Disaster Need Assessment is required to be done. PDNA also facilitates in understanding the impact of disaster in terms of direct and indirect loss. In resource gap scenario, PDNA is a good tool to be adopted by the states.

National Institute of Disaster Management has developed PDNA tool customized to Indian conditions under the National Cyclone Risk Mitigation Project of Government of India which was implemented by National Disaster Management Authority and funded by The World Bank. I would like to mention that it's a very pragmatic and easy to use tool. NIDM has also developed a user manual and professional development Modules for using the PDNA tool.

This is going to be the new beginning in the area of disaster management impact assessment for understanding the real impact of disaster event holistically. It will not be an exaggeration in saying that this process would help in setting new era of development environment of the disaster affected states in the post disaster scenario and in development planning by the sector.

I complement Prof. Santosh Kumar and Shri Shekher Chaturvedi, NIDM and other team members who have facilitated the process.

**Manoj Kumar Bindal**

**आपदा प्रबंधन महाविचारः पूरा भारत भागीदार**



## Acknowledgement

Indian states are submitting their memorandum of loss assessment in the post disaster scenario. The assessments are done with a conventional tool while applying across the sectors. The memorandum of the states are based on the direct loss basis which is largely calculated on the replacement cost basis on current price. The memorandum does not cover the indirect loss i.e loss in flow or revenue loss basis (indirect cost). NIDM has completed the tools for calculating indirect loss, opportunity cost loss and its impact on the macro economy of the affected state. The current tool is an improvisation on the international tool initially developed by UNECLAC (United Nation Economic Commission of Latin American Countries). It has been customized to Indian system and procedure and been made easy to use by the officials at the local levels. The study was proposed by NIDM to National Disaster Management Authority and subsequently examined and proposed by NDMA to DM Division of MHA and the World Bank for its approval and the funding support. The World Bank funded the study and NIDM hired the services of Asian Disaster Preparedness, Bangkok. I got the opportunity of leading and coordinating the study and Shri P. G. Dhar Chakrabarti, the then Executive Director of NIDM guided the team extensively. I am also grateful to subsequent executive directors of NIDM Dr. Satendra, Mr. Bipin Mallick, Mr. Sanjeev Jindal, Mr. B. H. Anil Kumar, Ms. Rajini Sekhari Sibal and Maj. Gen. Manoj Kumar Bindal for continuously supporting for its implementation and its institutionalization.

NIDM acknowledges the support by all the former members of NDMA – Gen. N. C. Viji, Vice Chairman, NDMA, Mr. K. M. Singh, Mr. Vinod C. Menon, Mr. V. K. Duggal, for approving the proposal. We extend our thanks to Shri Bramha, the then Additional Secretary of NDMA. NIDM also acknowledges the support provided by Shri S. Vasudeva, Ms. Mamta Kundra, Mr. Pradeep Kumar, Shri Pradhan and Shri S. S. Jain. NIDM also acknowledges the support of Shri R. K. Jain, Shri Kamal Kishore, Gen. N. C. Marwah and Shri D. N. Sharma members of NDMA.

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Mr. Aslam Parvez, ADPC, and his team members who were engaged for the study and contributed.

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NIDM acknowledges the support and suggestions provided by Members of Technical Steering committee Mr. M. P. Sethy, Mr. Govindrajan, Mr. T. N. Gupta.



# CONTENTS

<b>Rationale for the Indian PDNA Tool</b>			
<b>Acronyms</b>			
<b>1</b>	<b>Introduction to PDNA Manual</b>		<b>1</b>
	1.1	Concepts and definitions	4
	1.2	Guiding principles of PDNA	5
	1.3	The core elements of the PDNA	6
	1.4	Special concerns in undertaking a PDNA	11
<b>2</b>	<b>Disaster Effects, Impact Assessment, Needs Estimation</b>		<b>13</b>
	2.1	Estimation of total disaster effects	13
	2.2	Disaster impact assessment procedures	19
	2.3	Macro-Economic impact estimation	21
	2.4	Social impact assessment	45
<b>3</b>	<b>Estimation of Post-Disaster Recovery and Reconstruction Needs</b>		<b>63</b>
	3.1	Modalities for Recovery and Reconstruction	67
	3.2	Procedures for estimation of recovery and reconstruction needs	68

# Post Disaster Needs Assessment (PDNA) Tools India

National Institute of Disaster Management, Ministry of Home Affairs, Government of India has developed the **Post Disaster Needs Assessment (PDNA) Tools for India** under the National Cyclone Risk Mitigation Project assisted by the World Bank. The objective of these tools is to establish a standardized mechanism based on scientific approach for conducting post disaster needs assessment for long term recovery and reconstruction. The newly developed tools are based on the existing damage assessment system in India and an internationally-accepted methodology which has been used worldwide and adopted by the United Nations Development Group (UNDG), the European Union (EU) and the World Bank (WB) which signed a joint declaration in 2008 on Post-Crisis Assessments and Recovery Planning.

The ADPC team worked by Mr Aslam Parvez.

The tools have been prepared with the technical assistance of the Asian Disaster Preparedness Center (ADPC). The PDNA India tools have three parts as follows;

1. **PDNA India Handbook**
2. **PDNA India Manual**
3. **PDNA India SoP**

## **Disclaimer**

This document is developed based on the inputs received during various consultative meetings, state visits, individual interviews, and the literature review by the PDNA India Consultants. Any discrepancies are unintended. Care has been taken in factual descriptions and data sources. The document remains open for any corrections in facts, figures and visuals.

## Rationale for the Indian PDNA Tool

The Post Disaster Needs Assessment (PDNA) has been adapted for India, on the basis of best current international practices and customized to local conditions, which will enable the comprehensive and scientific assessment of recovery and reconstruction needs on the basis of a thorough analysis of disaster effects and impacts. This methodology should not be seen as a replacement or substitute for the existing approach which States use for the development of the Relief Memorandum. It should be noted that the methodology treats recovery and reconstruction following a disaster while building resilience to future events, as a separate and additional area of disaster management. To undertake this new methodology, a core team of sector specialists from State and National levels must be trained, which will also result in not increasing the burden of work for the Revenue Commissioners..

A thorough analysis has been made of the strengths and weaknesses of the existing system for estimation of disaster effects and impacts and of recovery and reconstruction needs assessment in India. This analysis, conducted in light of current international practices, reveals that the existing system in India may be described as relief-centered. While the existing system is efficient in defining the amounts of relief assistance to be provided to affected population in accordance to previously-defined criteria as well as enables the prompt disbursing of such assistance to disaster-affected people, however, it does not enable the comprehensive and systematic estimation of overall disaster impact nor the scientific estimation of recovery and reconstruction needs and the estimation of financial requirements for such purposes. The data collected for such response assessments is insufficient to enable a full and scientific analysis of the consequences of the disaster on living conditions, quality of life and on the socio-economic development of those who are affected. As a result, recovery is left almost exclusively to the initiative and the capacity of each affected person and takes an unnecessarily long time, thus frustrating people's aspirations and delaying their return to normal levels of wellbeing.

In addition, relief assistance at the present time is only provided to part of the affected population – i.e. mostly to the poorer strata of the affected population – and not all affected sectors of the economy are included, which is not conducive to a prompt recovery. Furthermore, the amounts of response assistance are clearly insufficient for affected families to enable them to rebuild their destroyed assets; in the absence of other sources of capital for reconstruction, people resort to rebuild their homes and other assets applying lower standards of quality and using inadequate construction materials and disaster risk – rather than being reduced – is increased after disasters.

Sectors of economic activity under private ownership are not included in the existing system of disaster assessment, apparently because it is assumed that they have sufficient savings and/or insurance to meet post-disaster requirements. This assumption is evidently only partially valid since not every enterprise – especially small to medium size companies – has such a capacity and insurance is only held by one out of seven such entities. Leaving out such large portions of the economy – and it is to be remembered that

publicly-owned activities represent only 20 per cent of all activities in the economy – further limits recovery efforts and have a negative bearing on people’s livelihoods, since many jobs are under the purview of the private sector that is unable to recover promptly. Households thus lose employment and income for a longer time after disasters.

Data on disaster effects collected on the basis of the existing system is insufficient to enable a full analysis of disaster impact in macro-economic and macro-social terms, despite the fact that India has an excellent database on socioeconomic indicators. Thus, assessments do not include an examination of social and economic disaster impact, which may be used as the basis for defining needs for recovery and disaster-resilient reconstruction.

Analyses conducted under the India PDNA study reveals that overall socio-economic growth in the country and in the disaster-affected States is hindered by the impact of disasters. In many cases, gross domestic production slows down and the State and central government fiscal position deteriorates after disasters in view of disaster-induced diminishing tax receipts and increased expenditures. At the personal or household level, disasters induce significant reductions in income through losses in employment and livelihoods, increase costs of living due to scarcity and inflation, thereby worsening quality of life and human development.

Therefore, there is a need for India to be more recovery - and reconstruction-oriented, and the government should be more concerned about achieving a prompt and all-inclusive recovery as well as disaster-resilient reconstruction that involves reduction of disaster risk. This does not require that the government should assign financial resources to cover private sector needs; it only means that the government (at central and state levels) should endeavor to assess disaster impact for the entire economy and society, so that both public and private sectors may (simultaneously and in a concerted fashion) define and finance recovery and reconstruction after disasters.

## Acronyms

<b>ADPC</b>	Asian Disaster Preparedness Center
<b>ASSOCHAM</b>	Associated Chambers of Commerce and Industry of India
<b>CDRN</b>	Corporate Disaster Resource Network
<b>CII</b>	Confederation of Indian Industry
<b>CRC</b>	Central Review Committee
<b>CSO</b>	Central Statistical Organization
<b>CWC</b>	Central Water Commission
<b>DaLA</b>	Damage and Loss Assessment
<b>DDMA</b>	District Disaster Management Authority
<b>DES</b>	Directorates of Economics and Statistics
<b>DM act</b>	Disaster Management Act
<b>DRR</b>	Disaster Risk Reduction
<b>FC</b>	Finance Commission
<b>FCI</b>	Food Corporation of India
<b>FEMA</b>	Federal Emergency Management Agency (USA)
<b>FICCI</b>	Federation of Indian Chambers of Commerce and Industry
<b>GAR</b>	Global Assessment Report
<b>GSDMA</b>	Gujarat State Disaster Management Authority
<b>GFDRR</b>	Global Facility for Disaster Reduction and Recovery
<b>GIDM</b>	Gujarat Institute of Disaster Management
<b>GIS</b>	Geographical Information System
<b>GOI</b>	Government of India
<b>GSDP</b>	Gross State Domestic Product
<b>GSI</b>	Geological Survey of India
<b>HAZUS</b>	Hazard in the USA
<b>HVS</b>	Higher Vulnerability States
<b>IDA</b>	International Development Association (World Bank Group)
<b>IDD</b>	International Disaster Database
<b>IIASA</b>	International Institute for Applied Systems Analysis
<b>IMD</b>	Indian Meteorological Department

<b>IT</b>	Information Technology
<b>LVS</b>	Lower Vulnerability States
<b>MHA</b>	Ministry of Home Affairs
<b>MOA</b>	Ministry of Agriculture
<b>NCRMP</b>	National Cyclone Risk Mitigation Project
<b>NDMA</b>	National Disaster Management Authority
<b>NDRF</b>	National Disaster Response Funds
<b>NHRA</b>	Natural Hazards Risk Atlas
<b>NIBS</b>	National Institute of Building Sciences
<b>NIDM</b>	National Institute of Disaster Management
<b>NSSO</b>	National Sample Survey Organization
<b>OM</b>	Operations Manual
<b>PC</b>	Planning Commission
<b>PDNA</b>	Post Disaster Needs Assessment
<b>PIU</b>	Project Implementation Unit
<b>POC</b>	Project Oversight Committee
<b>PONJA</b>	Post-Nargis Joint Assessment
<b>PSC</b>	Project Steering Committee
<b>RC</b>	Relief Commissioner
<b>RF</b>	Relief Memorandum
<b>SATI</b>	State Administrative Training Institute
<b>SDMA</b>	State Disaster Management Authority
<b>SDMC</b>	SAARC Disaster Management Centre
<b>SDRF</b>	State Disaster Response Funds
<b>SNA</b>	System of National Accounts
<b>SOP</b>	Standard Operating Procedure
<b>ToT</b>	Trainers of Trainers
<b>TSC</b>	Technical Steering Committee
<b>UN-ECLAC</b>	United Nations Economic Commission for Latin America and the Caribbean
<b>UNISDR</b>	United Nations International Strategy for Disaster Reduction
<b>UT</b>	Union Territory

# 1: Introduction to PDNA Manual

The assessment of disaster effects needs to be conducted in a bottom up approach that involves the estimation of the value of destruction of physical, durable assets and of the value of the disaster-induced disruption of production flows in all affected sectors of economic and social activity, and their subsequent aggregation to ascertain total disaster effects and impacts.

To obtain a fully representative and valid estimation of total disaster effects and impacts, all affected sectors of economic and social activity are to be fully assessed, despite their respective ownership: i.e. those under the ownership by public and private entities. Leaving specific sectors out of the assessment constitutes a guarantee that certain parts of the affected society and economy would be left on their own and may not achieve recovery and disaster-resilient reconstruction or face longer periods of unnecessary suffering, in view of the existing inter-relations between sectors of the society. In addition, in order to achieve a holistic view of disaster impact and post-disaster recovery needs, the procedures to be adopted should be systematically applied across the board of all sectors to ensure their subsequent valid aggregation for the desired objectives. Using different words, each and all sectors of economic and social activity should follow the same coherent procedures to ensure that the subsequent impact analysis and needs estimation are valid throughout.

Needless to say, the estimations – at sector, macro and micro levels – should be based on available and reliable quantitative information, supplemented where appropriate, by parallel qualitative considerations that are no substitute for the former; only this can ensure reliability of the assessment results in the minds of those responsible for the assignment of financial resources for recovery and reconstruction, whether they are government officials or representatives of international assistance and financial institutions.

In order to ensure comparability of assessment results with those of other disaster events that may have occurred in the past or in other countries, it is essential that the sectorial structure adopted for the exercise be made in accordance to international standards of classification. For that purpose, it is essential that the sectors of economic and social activity included in the assessment follow the classification of the worldwide System of National Accounts. Furthermore, it is to be recalled that the System of National Accounts is a tool that has been generated and agreed upon by all countries of the world as a tool that enables the estimation of, inter alia, the effects of external crises on an economy and society (such as that caused by a disaster) as well as the results of adopting and enacting alternative public policies for development (including those adopted under post-disaster recovery and reconstruction).

## **Sectors of Activity under National Accounts versus Government Organization**

It is widely known that the list of social and economic activities or sectors used in the System of National Accounts in India does not coincide with the organizational structure of the central and State governments. In fact, in some sectors defined in the national accounts, several ministries and departments may be involved in the discharge of government duties. Since the use of the national accounting system is a

pre-requisite for the valid application of the procedures for estimating disaster effects and impacts, the following table shows the mapping of government ministries and departments that are included within the boundaries of the sectors of activity as per the national accounts.

	<b>Sectors as defined in the System of National Accounts</b>	<b>List of Activities carried out by Different Government Ministries and Departments<sup>1</sup></b>
1.	Agriculture, Forestry and Fisheries	Rural Development Agriculture and Allied Activities Irrigation Animal Husbandry Environment and Forestry
2.	Mining and Quarrying	Oil and Gas Mining of Minerals
3.	Manufacturing	(Commerce) and Industries Small Scale Industries
4.	Electricity and Gas	Power Sector Water Resources
5.	Water Supply, Sewerage and Waste Management	Public Health Engineering
6.	Trade, Hotels and Restaurants	Tourism Commerce
7.	Transportation and Communications	
8.	Financing, Insurance, Real Estate and Business Services	Housing (Rural, Urban as well as Public and Private)
9.	Community, Social and Personal Services	Education Health Labour Women and Child <sup>2</sup> Social Welfare Urban Development Gol Installations at State Level Municipal Corporation

The reader should be clearly aware that in the sections that follow describe sectorial procedures for disaster effects and impact assessment for the nine sectors included in the second column of the above table, plus that of the environment that, although not formally a sector of activity under the National Accounts, is to be included in assessments. In that sense, the sectorial assessment team may include experts that normally work under one or more central ministries or State Departments. Also, whenever the assets of a particular ministry are destroyed, the values of damage to such premises or equipment are to be included within the formal sector where they belong, and not separately as belonging to a specific ministry or department.<sup>3</sup>

<sup>1</sup>The list under this column was provided by NIDM as list of sectorial activities to be included in assessments.

<sup>2</sup>Women and child is in fact a cross-cutting issue that is covered in all sectors across the board.

<sup>3</sup>As an example, any destruction of the buildings or equipment of the ministry or department of agriculture is to be included as damage to the sector of agriculture, although breakdowns of damage for central and State governments are to be included as well to facilitate their location in the estimation of disaster effects.

The following sectors describe the procedures to be used in the assessment of disaster effects and impact for each institutional sector of activity (Figure 1-1).

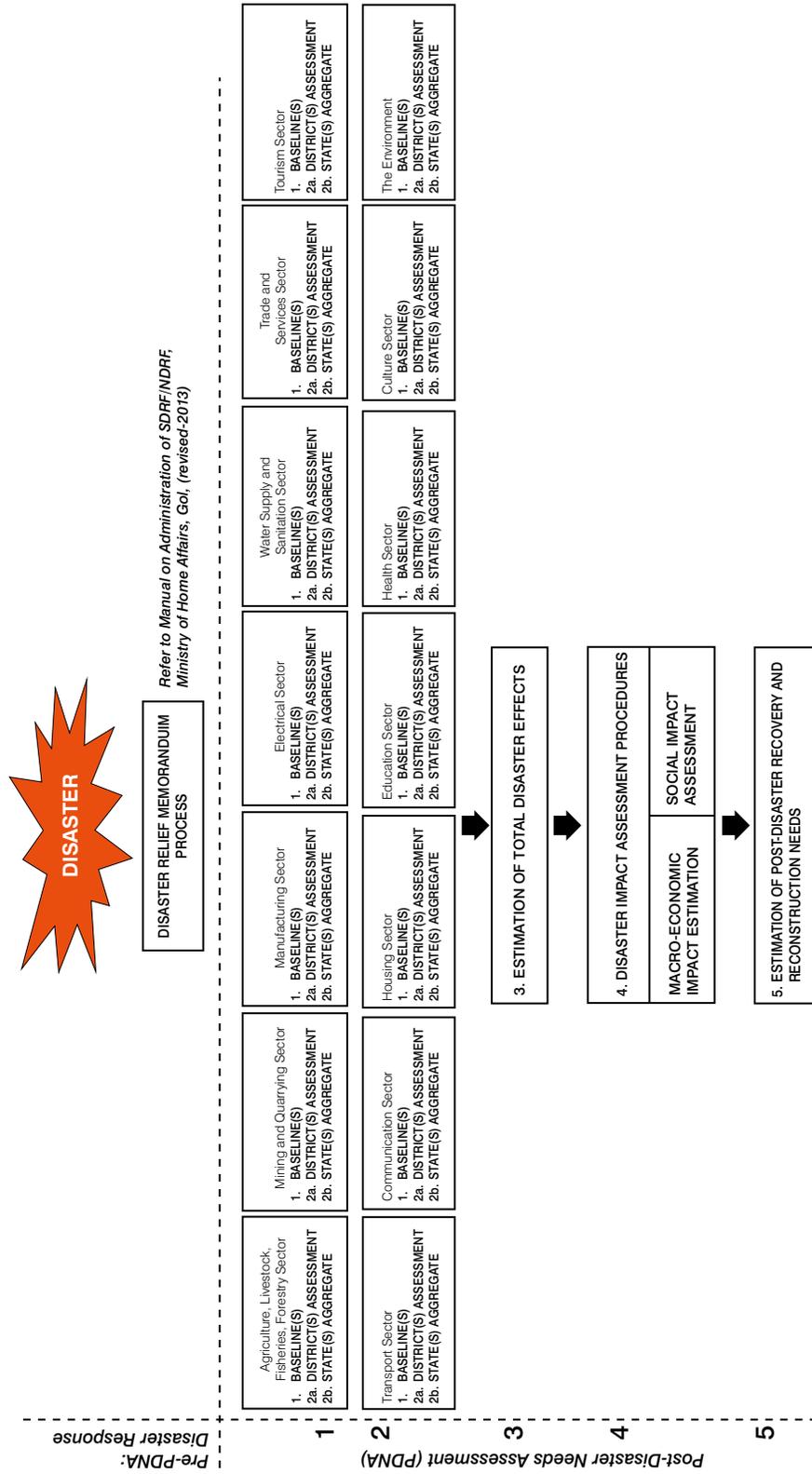


Figure 1-1. Summary Process of the India PDNA Methodology

## 1.1 Concepts and Definitions

The PDNA is a multi-sectorial and multidisciplinary structured approach for assessing disaster damages, losses, impacts and needs that will lead to the development of a recovery and reconstruction plan.

As a tool for recovery and reconstruction planning and implementation, a PDNA is normally undertaken after the emergency phase or during the time when the post-disaster emergency operations are winding down and longer-term recovery is about to start.

The following are the important features of a PDNA:

1. It should be led and undertaken by the government after a disaster with the collaboration of international development partners and even the private sector.
2. PDNA is intended to identify and/or estimate:
  - a) Damages caused by a disaster to physical infrastructure and the losses (changes in economic flows) in the various sectors of the economy, including an assessment of its macro-economic impacts or consequences as well as changes in the social or human development indicators.
  - b) Define the framework, strategies and financial requirements of programs and projects to achieve overall post-disaster recovery, reconstruction and risk management.
3. The sectors assessed in a PDNA are those contained in the national accounting system such as agriculture, industry, trade and services etc. and the corresponding sub-sectors under them.
4. Various experts like engineers, economists, finance specialists, statisticians, etc. who have knowledge on the valuation and estimation of damages, losses and needs in a certain sector should be members of the assessment team for that given sector.

With a standardized assessment procedure across sectors, the priorities for post-disaster recovery and reconstruction can be determined by the government in terms of the affected sectors of the economy, the geographical areas and social or population groups. Specifically, a PDNA should show the following:

1. Total value of destroyed physical assets (damages) and of changes in the flows of production of goods and services (financial losses);
2. Ownership of the above, whether public or private in nature;
3. Identification of most affected sectors;
4. Spatial or geographical distribution of disaster effects;
5. Impact of disaster at macro-economic, sectorial, personal/household levels (social impacts) and cross-cutting issues/concerns;
6. Estimation of post-disaster needs for recovery, reconstruction and other cross-cutting issues like disaster risk reduction measures, environment, etc.; and
7. Suggested framework and strategies in implementing the recovery and reconstruction activities.

The PDNA process typically follows the structure as depicted in Figure 1-2..

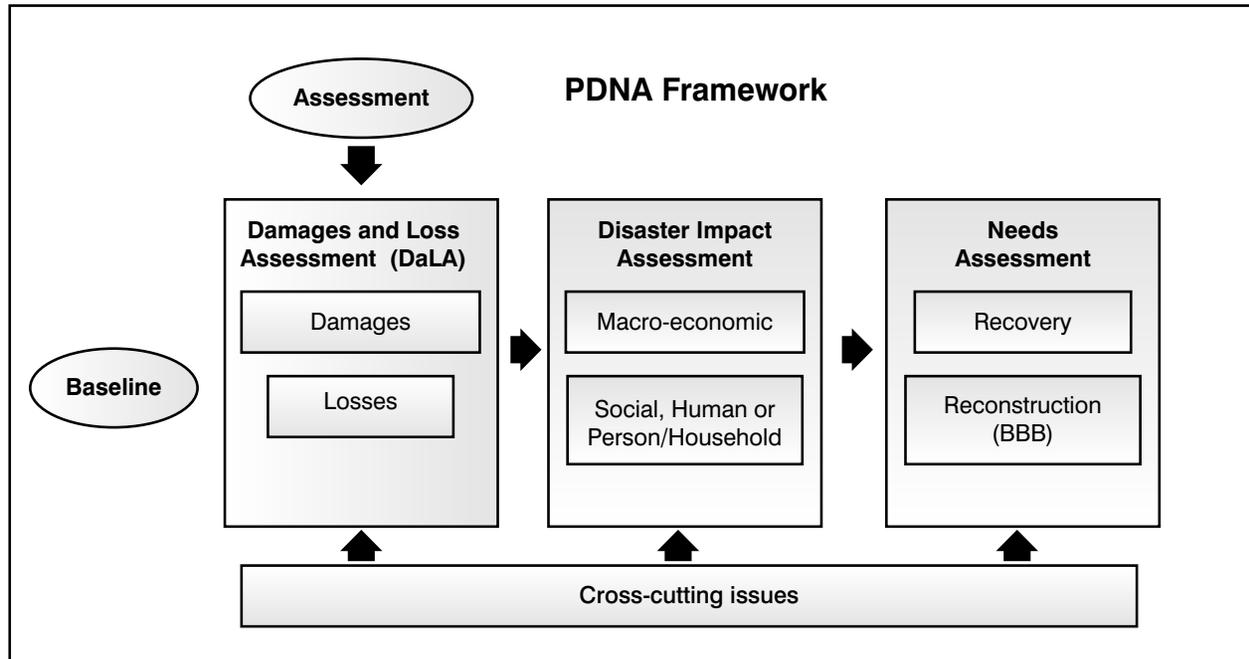


Figure 1-2. Conceptual Framework of the PDNA

## 1.2 Guiding Principles of a PDNA

All PDNAs should be guided by the following core principles:

1. Adhere to the core principles of humanitarianism, impartiality, and neutrality.
2. Acknowledge the national ownership of PDNA and ensure that it is a demand-driven and country-led process, with the fullest possible leadership and engagement of national authorities in assessment, recovery planning and implementation, from the highest political levels to local levels, and at the level of technical expertise.
3. Support local ownership and the fullest possible engagement of local authorities and community-based organizations in the planning and execution of recovery, and building specific capacities where needed.
4. Provide coordination at all stages of the process and at all levels, ensuring collaboration and partnership between the UN, the WB and the EU, as well as with the National Government, donors, NGOs, civil society, and other stakeholders engaged in the PDNA.
5. Ensure one team, one process and one output.
6. Adhere to the principle of Primum non nocere – ‘first, do no harm’ -- ensuring that the process does not have a detrimental effect on life-saving relief to the affected population and on the country.
7. Adopt a conflict-sensitive approach and ensure that the assessment does not exacerbate existing tensions, and that the recovery strategy takes into account potential disaster-related conflicts.

8. Support and strengthen national and local capacities to lead and manage recovery and reconstruction.
9. Ensure transparency and accountability in the PDNA process as well as in post-disaster recovery and reconstruction.
10. Integrate DRR measures in the recovery process to enhance the resilience of affected populations and countries with regard to future disasters.
11. Develop a recovery plan that addresses the gap created by the disaster, and which effectively helps people in building back better and reduce future risks without expanding recovery needs and priorities into a full-fledged development plan that goes beyond the disaster.
12. Ensure the participation of the affected population in the assessment of needs and priorities and in the recovery process, at the same time providing support to their spontaneous recovery efforts.
13. With a gender perspective, focus on the most vulnerable sections, including female-headed households, children, orphans, the landless, people with special needs, the youth and the aged.
14. Promote equality to prevent discrimination of any kind on grounds of race, color, nationality, ideology, sex, ethnicity, age, language, religion, disability, property, and birth, among others.
15. Mainstream cross-cutting issues such as gender, environment, governance, human rights, HIV/AIDS, among others.
16. Ground recovery in the principles of sustainable development.

### 1.3 The core elements of the PDNA

At its core, the PDNA consists of four main elements:

1. Pre Disaster context and baseline information;
  2. The assessment of disaster effects;
  3. The assessment of disaster impacts; and
  4. The Recovery Strategy and determining sector recovery needs.
1. **Pre Disaster context and baseline information.** The first step in the PDNA process is to examine the general pre-disaster conditions - social, economic, cultural, financial and political, which serve as a baseline to compare with post-disaster conditions in the affected country. Pre-disaster baseline information includes national, socio economic, demographic and geographical data relevant to the affected areas, including development indicators such as literacy rates, malnutrition and food insecurity, poverty levels, access to potable water and sanitation facilities, education facilities and school enrolment, and the incidence of communicable diseases, among others. Where possible, all relevant data should be disaggregated by sex, age, ethnic or cultural/religious characteristics if relevant to the identification of specific vulnerabilities and opportunities that women, girls, boys and men, and different ethnic and cultural/religious groups may encounter, and which require to be acted upon.
- Sector teams gather data on pre-disaster baseline conditions pertinent to their sector. In situations where the baseline data is not available in the census, sector or local surveys or sector and disaggregated reports, it may be necessary to:

- Estimate a baseline data on the basis of discussion with key informants;
- Visual impressions of unaffected areas and its comparison with the affected areas; and
- In certain situations where satellite imagery of pre-disaster situations is available, these images could be interpreted to develop sector-wise baseline data.

Generally, the information collected includes the following:

- Pre-disaster demographic, socio-economic, geographic, ethnic and cultural information;
- Pre-disaster data for each sector;
- Nature and extent of pre-disaster hazards, vulnerabilities and risks;
- National as well as regional (or local) development plans, socio-economic goals in the short term, and poverty reduction strategies.

2. **Effects** are the immediate results brought about by the disaster, which are normally reported just after it has occurred. These effects that should be assessed for PDNA are:

**a. Damage to infrastructure and physical assets**, which are the quantified value of public and private sector infrastructure and assets damaged or destroyed in the disaster. They include:

- Social infrastructure such as the number of homes, education and health facilities, government buildings, community infrastructure, cultural and religious centers;
- Basic infrastructure such as transport and communications (roads, bridges, ports, airports, and train lines, among others), water and sanitation systems, power or energy supply;
- Assets in the productive sectors such as agricultural infrastructure, irrigation systems, industrial and commercial installations, and businesses including tourism and service-based industries;
- In addition, damages include the physical assets damaged or destroyed in those buildings and infrastructures, such as furnishings and equipment, farm machinery and tools, among others.

**b.** These damages are expressed in physical terms (number, extension in terms of area or surface, as applicable) and then in terms of their monetary value, expressed as the repair or replacement costs according to the market price prevailing just before the disaster. This is to be seen as the pre-disaster baseline cost. The recovery and reconstruction costs would take into account post-disaster price alterations and improvements associated with risk reduction and the concept of build back better in the preparation of the Recovery Framework.

**c. Damages** refer to the value of affected assets (stock) like physical assets or infrastructure, final goods, raw materials, equipment and other properties. They would occur at the time of the disaster or shortly after the disaster and estimated in terms of physical units of assets that may be totally or partially destroyed. Damages are valued as either the:

- **Replacement cost** of totally destroyed assets. Replacement cost is the value of the asset before it was totally destroyed (pre-disaster value). The valuation of replacement can be estimated by the market value of the asset before destruction. In instances where it is difficult to determine the market value of a certain asset, the acquisition or construction cost less depreciation or insurance value may be considered.

- Repair cost of partially damaged assets. Repair cost is the amount required to put the asset back into its condition just before its partial destruction.

Hence, the damages are the costs of bringing back the affected structures, equipment, machinery and other assets up to their pre-disaster levels or condition. The following can be taken as a general guide for classification:

- **Totally destroyed.** Structures, equipment, educational materials, etc. which are completely destroyed or unusable and needs replacement. Included also are structures that have suffered irreparable structural damage and need total rebuilding or new construction.
- **Partially damaged.** Affected structures, equipment, materials, etc. that can be repaired or reused and whose structural integrity has not been compromised. Examples are damaged roofs, windows, walls, vehicles, etc. that are repairable or wet books that can be used after drying.

The engineers in the assessment team could decide whether a structure or equipment is totally destroyed or partially damaged while for instance, educators can determine the extent of damage to instructional materials.

- These effects are expressed both in quantitative and qualitative terms by geographical divisions and sociological characteristics of the population such as gender, age, ethnicity, disability, etc.

**d. Disruption of access to goods and services** which are the assessed effects on service delivery, including the availability and quality of services, and on the population's access to goods and services that are required to support lives and livelihoods. It evaluates the effect on service delivery across all relevant social sectors and population groups, in particular the availability of basic services and the quality of service delivery like education, social security, housing, health care, culture, availability of safe drinking water and sanitation facilities, and public administration services, whether provided by the public or the private sector. New demands for services or goods arising from the disaster also have to be considered.

**e. Losses** refer to the value of changes in economic flows (usually lower income or revenues, higher operating costs, and unexpected expenditures) due to the adverse effects of a disaster. Losses can be manifested as production declines (thus reduced revenues), increased expenditures over a time period which include unexpected expenses until the pre-disaster levels are recovered. Losses, whether public or private, are the values or the amount in pre-disaster prices, of:

- Foregone income opportunities, like:
  - Total loss of crops or reduction in farm output (production / yield);
  - Income reduction from businesses, rent, etc.
  - Income losses from public facilities and companies like airports, ports, state-owned enterprises, etc.
- Higher operating costs which are additional expenses to produce same output of goods and/or services during the recovery phase, like:

- Higher prices of inputs, labour, etc.
- Investment costs in crops that were washed away by floods or cost of replanting new crops;
- Cost of temporary power and/or water supply; rent of temporary offices by suppliers, higher transport costs, etc.
- Unexpected expenses, like:
  - o Cleaning up of debris;
  - o Unexpected expenses on temporary shelters, water supply, medicines, food supply, etc.

**f. Governance and decision making processes** which are the assessed effects on social and decision-making processes including people's ability to exercise their citizenship and priority development policy objectives. These include:

- The effect of the disaster on government functions and administrative processes;
- The disruption of basic community functions, social services provided by community-based organizations, and disruption of cultural and community life; and
- The effect of disasters on the sectorial, national, and local capacities to manage services that support life and livelihoods and lead the recovery process itself.

To know the existing capacity, governance should be assessed both on functional and technical terms.

**g. Increased risks and vulnerabilities** are the added risks as a result of the disaster and focus on how, and what additional threats or deteriorating conditions increase the vulnerabilities of people. The assessment should include pre-existing risks that become apparent during the disaster, and new risks and vulnerabilities enhanced by the disaster, which should be integrated in the recovery planning process. Disaster risks generated by the disaster should be assessed to avoid emerging threats and/or deteriorating conditions. Disasters may increase the vulnerabilities of certain sectors, areas and population groups. For instance, the destruction of dikes may increase the vulnerability from floods of factories or a community in the next typhoon season. Other risks include the possible exposure to sexual and gender-based violence; child labour; human trafficking, potential disease outbreaks or chronic malnutrition and risks of conflict which can increase after disasters and during crises.

3. **Impacts** are the longer-term consequences brought about by the effects (damages and losses) of the disaster, which is analyzed on short-, medium-, and long-term bases. It combines a quantitative assessment of the macro-economic impact of the disaster with a quantitative and qualitative impact assessment on human development (social impacts).

**a. Macro-economic impacts**

Depending on the nature of damages and losses caused by a disaster and the size and structure of the affected economy, economic growth may be affected at varying degrees. The following macro-economic impacts will be assessed in the PDNA:

- Impact on gross domestic product or gross regional domestic product (GDP or GRDP), including an assessment of relative impacts on various sectors.
- Impact on Fiscal Budget due to disaster as government revenues may decline (lower economic activity resulting in lower tax collections), while expenditures will increase.
- Impact on Balance of Trade and Payments as exports may decrease due to production losses, while imports may increase to replace lost assets and production.

It should be noted, however, that losses in production and revenue may be partially compensated by government intervention for economic recovery and investment in reconstruction.

If government post-disaster activities are implemented quickly, losses over a longer period may be averted. Recovery of growth varies over time depending on the severity of losses, the speed of reconstruction and recovery program implementation, and the size and diversification of the affected economy. Massive reconstruction, however, may affect budget deficit and balance of payments, among others.

#### ***b. Human and social development impacts***

The impact on human development is the disaster's impact on the overall quality of human life in the medium and long term. It is the difference between pre-disaster and post-disaster levels of the quality of life or human development based on social indicators, which can happen until the economy and community have recovered and return to the pre-disaster levels.

It is important to assess the social human development impacts accurately so that recovery strategies can be put in place to mitigate development reversals. The link between initial humanitarian efforts, recovery measures and longer-term development should be established to overcome the adverse social impacts and ensure that recovery strategies restore the situation, at the very least, to pre-disaster levels.

Therefore, recovery efforts should continue for as long as necessary until human development is restored and/or enhanced.

4. **Needs** are the estimated values of activities required for post-disaster recovery and reconstruction. The PDNA and the analysis of disaster impacts provide the basis for the identification and estimation of recovery and reconstruction needs.

The needs identified in the PDNA should also include possible measures to mainstream Disaster Risk Reduction (DRR) in post-disaster recovery and reconstruction plans. The following are the classification of needs (Disaster Recovery Framework Guidelines 2015):

- a. **Recovery** is defined as the restoration, and where appropriate, improvement of facilities, livelihoods, and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. As such recovery needs are programs and projects that are required to restore personal and family income; essential services or lifelines; and production activities in affected sectors, among others. The recovery needs are determined by sectors and they are usually urgent, short-term activities that will restore pre-disaster conditions as soon as possible, such as:

- Restoration of basic services (housing, water, power, etc.)
- Enabling farmers to start replanting
- Resumption of transportation facilities
- Re-opening of businesses

b. **Reconstruction** focuses primarily on the construction or replacement of damaged physical structures, and the restoration of local services and infrastructure. As such reconstruction needs are longer-term activities, such as:

- New infrastructure like relocation of buildings, airports, houses; new road diversions, etc.
- Preparedness and mitigation like dikes, weather forecasting, development of new building codes, land use plans, etc.

In addressing the post-disaster needs, resilient recovery (which builds resilience during recovery and promotes resilience in regular development) should be adopted. Resilient recovery with the build-back-better principle is a means to sustainable development. (It should be noted that the general term “recovery” in the PDNA guidelines encompasses both “recovery” and “reconstruction”).

5. **The Recovery Strategy** defines the vision for recovery, identifies priority interventions as well as results and costs for recovery within a given time frame. The primary objective of recovery is to enable all people to improve their overall well-being by restoring their physical assets, livelihoods, socio-cultural and economic status. It provides:

- The critical link between assessment results and a comprehensive Recovery Framework.
- Information on the policy and institutional arrangements, financial mechanisms, monitoring and evaluation systems for recovery.

All activities undertaken as part of the recovery strategy must take into account the principle of building back better (BBB).

## 1.4 Special Concerns in Undertaking a PDNA

There are peculiar issues that should be noted in undertaking a PDNA, in case of specific disasters and sectors, to ensure that proper assessments of the affected sectors are inclusive and have a higher level of accuracy.

### ***Drought***

Drought is a natural hazard that differs from other hazards since it has a slow onset evolving over months or even years which could affect a large spatial extent but could cause more losses but little structural damage. Although its start and end may often be difficult to determine, its economic, social and environmental impacts can be severe, but since drought is a slow onset disaster, its impacts can be reduced through mitigation and preparedness.

The management of drought in India is covered by the Management of Drought Guidelines of the National Disaster Management Authority (NDMA). The Guidelines have identified the sectors (agriculture, industry, power, and water supply, among others) that will be effected by droughts and their potential impacts on the people, food supply, raw inputs to industry, financial position of the government and well as on security issues. However, the Guidelines do not provide the methodology for quantifying the effects and impacts of droughts.

The PDNA Guidelines fully complement the Drought Guidelines. While the Drought Guidelines provide the mechanisms for the overall management of drought (assessment, risk analysis, and monitoring among others), the PDNA Guidelines provide the methodology on how to quantitatively assess the effects (damages and losses) and impacts (economic, social and environmental) of droughts if and when they occur. The methodology in the PDNA Guidelines can also be used for assessing the impacts of government projects that are related to droughts as well as in cost-benefit analysis of proposed drought preparedness and mitigation measures. Finally, since the PDNA Guidelines provide the quantitative methodology to assess the effects of droughts, the PDNA training modules can be included in the list of training needs under the Drought Guidelines.

To provide guidance to the user of the PDNA guidelines, drought-related reminders are included in the sectors that are vulnerable to droughts.

### **The informal sector**

The International Labour Organization (ILO) defines “informal sector” as consisting of units engaged in the production of goods or services with the primary objective of generating employment and incomes to the persons concerned. The units operate at low level of organization, with little or no division between labour and capital as factors of production, and on a small scale. Labour relations are based mostly on casual employment, kinship or personal and social relations rather than contractual arrangements with formal guarantees.

In general terms, the informal sector (informal economy or grey economy) is part of an economy that is neither taxed, nor monitored in any form by the government. Unlike the formal economy, activities of the informal economy are not included in the gross national product (GNP) and gross domestic product (GDP) of a country. The workers in the informal sector (informal workers) are mostly:

- self-employed or work for those who are self-employed;
- not subjected to registration and taxation;
- doing their businesses in unprotected and unsecured places;
- belonging to the lower income bracket; and
- engaged in micro-scale manufacturing (handicrafts, home-based food processing, etc.), selling or trading of goods (retail of assorted goods) and services (barbers, shoe-shine, repair, etc.).

Some of the sectors (manufacturing and trade and services), for assessment in the PDNA, have a considerable size of informal workers within them. Since the informal sector is composed of people who

are mostly poor and marginalized, assessing the effects and impacts of disasters on them would provide decision makers the information necessary to assist them to recover. Thus, the sectors on manufacturing, and trade and services, the two sectors where most of the informal workers are, include their integration in the assessment.

### **Timing and procedure for undertaking a PDNA**

A PDNA is generally undertaken after a disaster of massive scale and scope. The conduct of a PDNA will be governed by the Standard Operating Procedure (SOP), which will be elaborated in a separate document.

## **2: Disaster Effects, Impact Assessment, Needs Estimation**

### **2.1 Estimation of Total Disaster Effects**

#### **a) Aggregation of Total Disaster Effects**

The preceding sections have described procedures for the estimation of disaster effects for all sectors of economic and social activity as defined in the system of national accounts, and on the environment, which form part of the estimation of total disaster effects through a bottom-up approach. Once the separate sector assessment teams have completed their separate but consistent sectorial estimations, their results must be aggregated in order to obtain the total value of effects caused by the disaster in the affected area or society.

During the aggregation process, special care must be exercised to ensure that no double or multiple accounting occurs, since very often the boundaries between sectors may not be fully known to the individual sector assessment teams. There are many possibilities for duplication in the aggregation of sectorial results, among them are:

- A typical of duplication occurs when the production losses in agriculture, livestock and fishery sectors are estimated using unit prices at wholesale or retail market levels instead of the prices paid at the levels of producers<sup>4</sup>.
- Another usual mistake is when the value of damage to the systems of water supply and electricity, located in adjacent streets to the housing units, are included in the value of damage to the housing sector. The value of damage to housing should include only the damage to the water supply, sanitation and electricity components that are located within the housing units. The damage to assets in the systems of water supply, sanitation and electricity distribution – which reach to the street adjacent to the housing units – are to be accounted for under the sectors of water and sanitation and electricity, respectively.
- Another common mistake is to include damage to roads within farms in the road transport sector, when it should be part of the agriculture sector. The transport sector should include only the value of damage to primary, secondary and tertiary.

<sup>4</sup> Using wholesale or retail unit prices to value such losses would result in including parts of the losses of the manufacturing and trade sectors into the losses of the primary sectors of agriculture, livestock and fishery.

- Damage and production flow changes to built-environmental assets and services should be included in the sectors of economic activity that utilize them. The damage and production flow changes to natural environment assets and services should be accounted for under the environment<sup>5</sup>.
- Damage to water and sanitation, electricity, transport and communications systems is to be included under the institutional sectors of water and sanitation, electricity, transport and communications, respectively, even if they are used by the tourism sector<sup>6</sup>.
- Production flow changes in productive sectors that are caused by the interruption of basic services such as water supply or electricity are to be accounted under those production sectors. Losses in revenues of water and sanitation and electricity enterprises that interrupt the provision of those services to consumers due to the disaster are accounted as production flow losses in the sectors of water and electricity, respectively.

It should be noted that in the aggregation of total effects, personal or household income decline and higher expenditures should not be included in the estimation of sectorial damage and production flow changes. It must be recalled that the analysis of disaster impact at personal level represents a different point of view than that of the analysis of macro-economic impact, and that aggregating such personal effects would produce double accounting, as personal losses are already included under sectorial production losses and higher costs.

The aggregation of disaster effects is made for different objectives:

- (i) to learn the value of the global effects of the disaster;
- (ii) to obtain a quantitative basis for estimating the impact of the disaster on overall socio-economic development;
- (iii) to serve as the basis for the design or modification of public policies to lessen or shorten the impact of the disaster in the short to long term;
- (iv) to provide a first idea of priorities for recovery and reconstruction among sectors, and
- (v) to provide a quantitative basis for the estimation of the financial requirements for economic recovery and disaster-resilient reconstruction.

There needs to be no concern about the validity of adding assets and flows, since the aggregated values of damage and production flow changes will be used separately in subsequent steps of the assessment. To be sure, the aggregated values of changes in the production of goods and services flows are to be used for the analysis of macro-economic impact; and the values of destruction of assets are to be used independently to ascertain disaster impact on stocks or capital. Furthermore, the values of changes in production flows will be used separately for the estimation of recovery requirements, and the values of

<sup>5</sup>In this regard, the value of agricultural soils that have been destroyed through erosion or siltation is to be included as damage in the agriculture sector; the value of urban soils that may have sustained destruction is to be included as damage in the housing or urban sector; damage or production flow changes to natural forests are included under the environment.

<sup>6</sup>The only exception to this rule is when the hotels own and independently operate such systems; in this case, damage to such systems should be accounted for under tourism.

damage will be used as a basis for the estimation of reconstruction requirements, as will be described later on in this manual. An example of a summary of total disaster effects is shown in Table 2-1 to illustrate the desired end result of the aggregation.

**Table 2-1. Aggregation of total disaster effects after Thailand floods in 2011, Values shown in million Thailand Baht)**

	Damage			Losses			Total Effects		
	Value	Public	Private	Value	Public	Private	Value	Public	Private
Housing	45,908.0			37,889.0			83,797.0	37,889.0	
Education	13,051.0	8,9110.0	4,140.0	1,798.0	1,654.0	144.0	14,849.0	10,614.0	4,235.0
Health	1,684.0	728.8	954.0	2,133.0	898.6	1234.0	3,817.0	2,861.6	2,189.0
Culture	4,428.8	2,415.0	2,013.8	3,076.0	8.5	3,068.0	7,505.3	5,491.5	5,081.0
Agriculture Crops	5,184.0		5,184.0	31,135.0		31,135.0	36,319.0	31,135.0	36,319.0
Livestock	344.0		344.0	2,771.0		2,771.0	3,115.0	2,771.0	3,115.0
Fishery	137.0		137.0	809.0		809.0	946.0	809.0	946.0
Water Resources Development	8,715.0	8,715.0	17,430.0	37,889.0		37,889.0	46,604.0	46,604.0	55,319.0
Manufacturing	513,881.0	-	513,881.0	493,258.0	74,075.8	493,258.0	1,007,139.0	493,258.0	1,007,139.0
Banking and Finance	943.0		943.0	115,226.0		41,200.2	116,219.0	115,276.0	42,143.2
Tourism	5,134.0	403.1	4,731.3	89,673.4	4,623.8	89,673.0	94,807.8	50,076.5	94,404.7
Electricity	3,185.0	760.1	2,425.1	5,715.6		1,091.8	8,901.4	6,476.0	3,516.9
Water and Sanitation	3,497.0		3,497.0	1,984.0	6,788.0	1,984.0	5,481.0	1,984.0	5,481.0
Transport	23,538.0	23,538.0		6,938.0	6,788.0	150.0	30,476.0	30,476.0	150.0
Communications	1,289.6	506.5	783.1	2,558.3	1,090.6	1,467.7	3,847.9	3,064.8	2,250.9
Environment	375.0	47.0	328.0	178.0	165.0	13.0	553.0	225.0	341.0
<b>Total</b>	<b>631,295.6</b>	<b>46,025.1</b>	<b>556,791.9</b>	<b>833,081.8</b>	<b>89,304.3</b>	<b>707,888.5</b>	<b>1,464,337.4</b>	<b>879,011.9</b>	<b>1,262,631.5</b>

Source: Thai Flood 2011, Government of Thailand, The World Bank and the United Nations, 2012.

Certain types of disasters may sometimes, in addition to their negative effects, bring about positive socio-economic effects. Whenever that happens, the value of such positive effects should be factored in the aggregation of total damage and production flow changes to obtain the net total value of damage and losses.<sup>7</sup>

### **b) Development and Analysis of Useful Comparators and Indexes**

After completing its estimation, the total value of damage and production flow changes must be broken down into its different components.

<sup>7</sup>Examples of such positive effects are the higher-than-normal agriculture crop yields that may be obtained after floods caused by intensive and longer rains or the possibility of increasing hydro-power generation in dams that, due to the same more intensive rains which caused flooding, have filled the dams and enabled the substitution of thermal power generation. The higher crop production obtained may offset, however partially, the losses in production caused by the flooding; and the lower costs of hydropower generation may also partially offset the higher production costs of thermal power generation.

## Public vs Private

One of such breakdowns refers to the ownership of disaster effects, by public and private sector entities<sup>8</sup>, which provides a first indication of the relative weight that each of the two should bear in the execution of post-disaster activities for recovery and reconstruction (See Figure 2-1)<sup>9</sup>.

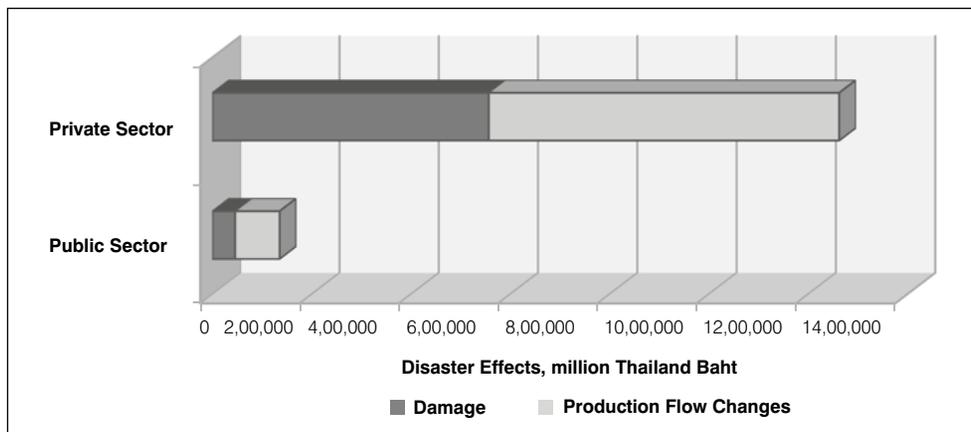


Figure 2-1. Breakdown of Public vs Private Ownership of Disaster Effects, 2011 Thailand Floods

## Damages vs Losses

The **breakdown between damage and production flow changes** is another useful comparison since it will illustrate whether the disaster has caused more destruction of capital or more negatively affected production of goods and services<sup>10</sup>, and would provide a first indication of the possible relation between the amount of reconstruction investment requirements and the required increase in expenditures necessary to achieve economic and social recovery. Figure 2-2 shows such a breakdown between damage and production losses in the case of the Thailand Floods in 2011.

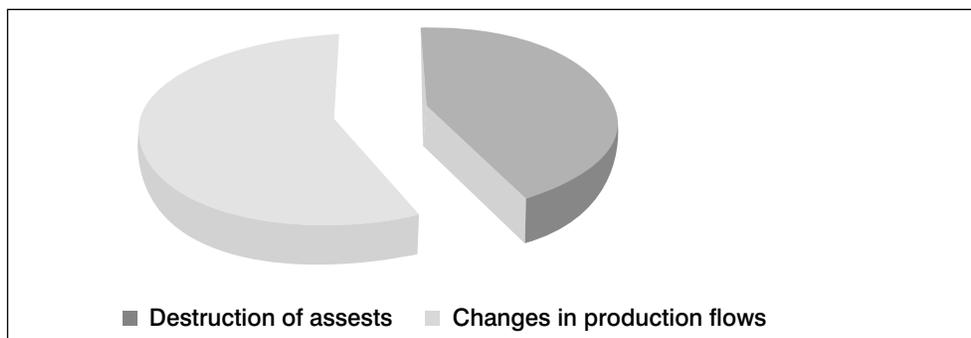


Figure 2-2. Breakdown between damage and production flow changes, 2011 Thailand Floods

<sup>8</sup>Public sector ownership refers to damage and production flow changes that falls within the purview of the central and State governments; private ownership may be held by either individual persons or households or by private enterprises of different size and characteristics.

<sup>9</sup>Since very often national governments would assist private individuals, especially those that belong to the lowest-income strata, through the provision of cash grants, credit, and/or other incentives for recovery of production and for reconstruction of their assets after a disaster, the final breakdown of efforts between public and private sectors for reconstruction may differ from what is indicated in the previous chart.

<sup>10</sup>After conducting many assessments of the effects of disasters, it has been found that the relationship between damage and losses varies roughly in accordance to the origin of the natural event that causes the disaster. The DaLA database available at the Global Facility for Disaster Reduction and Recovery (GFDRR) of the World Bank, which includes disasters assessed during the 40-year period between 1972 and the present time ([www.gfdr.org/](http://www.gfdr.org/)), shows evidence that events of geological origin (such as earthquakes and landslides) normally cause more damage than production flow changes. Disasters of hydro-meteorological origin – such as floods and drought – normally cause more production flow changes than damage.

## Geographical effects

Another desirable analysis of total disaster effects is the **geographical or spatial breakdown of damage and production flow changes**, since it enables the identification of the most affected sub-national political divisions, such as Districts within States, which might help in defining the assignation of resources for recovery and reconstruction later on (See Figure 2-3 below). Evidently, to enable such breakdown, the assessment should consider the collection and analysis of disaster effects at the lowest possible geo-political subdivisions, which would result in the possibility of developing maps showing the spatial distribution of disaster effects, an example of which is shown in Figure 2-4).

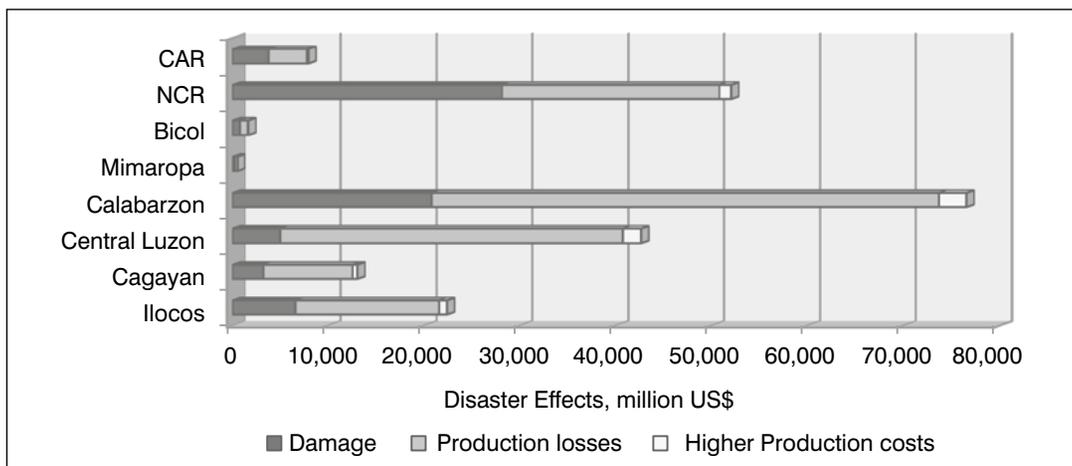


Figure 2-3. Spatial distribution of disaster effects, Typhoons Ondoy and Pepeng, Philippines 2009

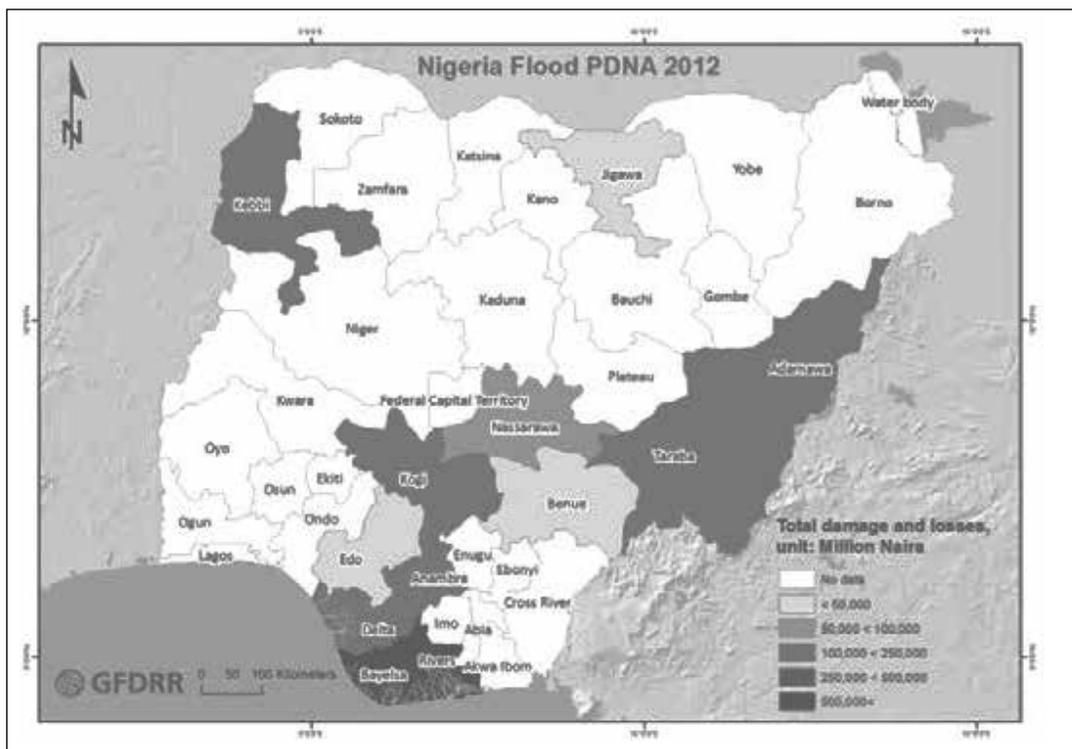


Figure 2-4. Map showing most affected States after 2012 Flood Disaster in Nigeria, indicating the value of disaster effects (in million Naira)

### Per capita disaster effects across areas

One more useful comparison of the effects of disasters is the spatial distribution of per capita disaster effects. This entails the comparison of disaster effects vis a vis the population of each affected sub-national division being analyzed, whether they are states, districts or any other lower level geographical unit, and provides a more meaningful index of the destruction and production decline sustained by the affected population which can be useful for defining priorities for post-disaster interventions and investments.

### Disaster effects on sectors

To better understand the main disaster-affected activities and to provide a first indication of priorities for recovery and reconstruction, a sectorial breakdown of disaster effects may also be required, as shown in Figure 2-5 below.

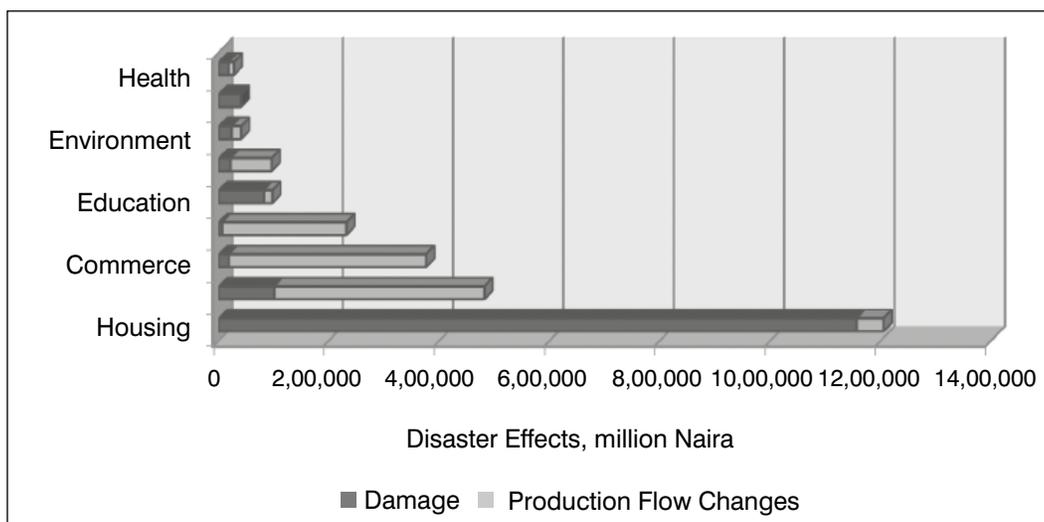


Figure 2-5. Breakdown of disaster effects by sector of social and economic activity, Nigeria Floods, 2012 (In million Naira)

### Disaster effects vs GSDP

In order to understand the significance of the disaster in regard to the size of the economy in the affected area, a comparison is often made of the values of **disaster effects versus the gross state domestic product (GSDP)** in the affected State<sup>11</sup>. While the addition of stock and flow values is debatable in purely economic terms, as has been previously mentioned, the ratio thus developed does provide an empirical measure of the magnitude or significance of a disaster, which may be used to compare the effects of different disasters in the same country and to other disasters in different countries. A comparison of the value of **production flow changes versus the value of the previous year’s Gross State Domestic Product (GSDP)** may provide a first indication of the possible degree of affectation of economic performance, as well as useful comparisons to other past disasters in the same state, country or in other countries. A full assessment of the impact of losses on the growth and GDP, however, is to be obtained through the impact analysis<sup>12</sup>.

<sup>11</sup> Note that the comparison is made to the previous year’s GSDP to avoid comparing to the disaster-affected GDP in the current year.

<sup>12</sup> The comparison of disaster effects is made with the previous year’s GSDP in order to avoid a comparison that already involves the impact of the disaster.

## Disaster effects vs GFSKF

In order to obtain an idea of the capacity of the affected state to rebuild the assets that may have been destroyed and of the possible time required to achieve full reconstruction without outside assistance or participation, the ratio of damage versus gross fixed capital formation (GFSKF) of the affected State can be used.

## 2.2 Disaster Impact Assessment Procedure

### General Comments

The impact of a disaster is defined as the consequences arising from the combination of destruction of physical assets and the disruption to production and access by the population to goods and services. Disaster impacts are to be measured at different levels of analysis, namely:

- (i) the consequences of disaster effects on the overall production and growth of the economy or macro-economic impact;
- (ii) the consequences of disaster effects on the macro-social or human development conditions, and;
- (iii) the consequences of disaster effects on the quality of life of individual persons or families.

Needless to say, disaster impact is to be assessed through a comparison of the socio-economic conditions that would have prevailed in the affected areas in the absence of the disaster (i.e. under normal conditions of development) versus those prevailing after the disaster. The comparison should be made in quantitative terms, duly supplemented with qualitative information, so that it may provide the means to estimate the financial requirements to achieve recovery and reconstruction. The disaster assessment methodology currently in use in international circles, and duly adapted to Indian conditions, provides the necessary procedures for estimating disaster impact on the basis of the identification and quantification disaster effects.

For the estimation of macro-economic impact of disasters, an analysis is normally made of the disruptions caused by the disaster on the macro-economic performance of the affected country, state or area. To the expected or foreseen performance of the main macro-economic variables of the country or state in the absence of a disaster, the estimated isolated effects of the disaster on the destruction of physical assets and on the resulting changes in the flows of production of goods and services are to be superimposed. Based on such projections of post-disaster macro-economic performance, a set of activities aimed at restoring pre-disaster economic performance, including disaster-resilient reconstruction standards may be designed, which will be a part of the strategy for recovery and reconstruction.

The macro-social impact of a disaster is also to be measured in reference to the human development conditions that prevailed prior to the event, by measuring the deterioration of a number of social parameters that define quality of life and human wellbeing. Among others, the macro-social impact looks into the possible setbacks or delays caused by the disaster on the achievement of Millennium Development Goals (MDGs) and in the progress of human development indicators. Once disaster impact at the macro-social

level and on human development is assessed, a set of activities is defined to enable recovery of overall human development in the briefest possible time.

Disaster impact at the personal or household level includes the analysis of possible decline in personal and family income, the possible increase in costs of living, and the deterioration of several quantitative indexes or comparators that define quality of life at that level. Such micro-analysis provides the basis for defining and quantifying a set of activities designed with the purpose of recovering personal and family well-being.

### **Important things to consider**

In performing a post-disaster impact analysis, the following must be remembered:

1. Disasters with catastrophic effects may adversely impact all the sectors in the areas affected as well as some sectors outside the affected areas. For instance:
  - Agriculture may be devastated in the affected areas, which will affect the processing plants outside the disaster areas using agricultural products as inputs of production.
  - Closure of airports will adversely affect the tourism sector even outside the disaster areas.
2. Unexpected expenditures of some sectors will translate into gains for the other sectors especially those businesses that are not within the disaster-affected areas. Expenditures on the cleaning of debris, food supply and other needs will be an added income to some sectors.
3. It is possible that the national GDP may not be severely affected by a disaster but the impact on GSDP (state economic impact) and the people may be huge. This can happen if the region affected is not a major contributor to the national economy but has a large population under the poverty line.
4. Not all disasters produce a measurable impact at the macro-economic level because a disaster may cover only a limited geographical area or the disaster may not affect strategic sectors of the economy. However, disasters generally cause significant negative impact at the personal or household level within the affected area. The effects of disasters on certain sectors have adverse aggregate social impacts. For instance, destruction of agriculture causes the loss of employment, which increases poverty; hunger; reduction in school enrolment of the children; migration; human trafficking; etc.

The levels of impact analysis play an important role in defining disaster impacts. Therefore, in order to estimate the economic impacts of the disaster, the sectorial assessments of the concerned agencies must be completed. These sectorial assessments are mandatory inputs in order for the macroeconomic assessment to be undertaken.

This chapter of the PDNA handbook describes the procedures used at the international level, duly adapted to Indian conditions, for estimation of disaster impact at the macro-economic, macro-social and personal/household levels. Needless to say, the estimation of disaster impact must be made following a consistent methodology that is based on the quantitative estimation of disaster effects at the level of formal sectors of economic and social activity and their valid aggregation. Such an evidence-based procedure ensures the reliability of results required for the assignment of post-disaster financial resources for recovery and reconstruction, be they at the state, national or international levels.



## 2.3 Macro-Economic Impact Estimation

### General Comments

Macro-economic impact is defined as the consequences of the effects of a disaster on the overall economic performance of the affected country or States. A number of individual analyses are to be made to define the macro-economic impact of a disaster, as there does not exist a single parameter for that purpose. Indeed, the estimated sectorial values of disruptions in the flows of production of goods and services are to be used to examine disaster impact on the value and performance of the gross domestic product (GDP) at national and State levels (GSDP), the balances of trade and payments, and the fiscal position.

There is a need to carry out a step-wise approach for the analysis of post-disaster impact at the macro-economic level. This is due to the fact that negative setbacks are likely to occur initially at the macro level in response to the decline in sectorial production, and because positive impacts may be obtained subsequently after recovery expenditures are introduced and eventually by reconstruction investments, depending on the effectiveness and degree of inclusiveness of same<sup>13</sup>.

Therefore, macro-economic disaster impact assessment should involve a distinction between the impact caused by the disaster itself and the subsequent impact of post-disaster activities or interventions aimed at recovery, reconstruction and risk reduction. The following are the steps to be followed:

- a. Analysis of isolated disaster impact, bearing in mind that such impact is to be measured immediately after the disastrous event has occurred, and which would remain in place if no recovery and reconstruction activities were undertaken<sup>14</sup>; and
- b. Analysis of the separate and subsequent impact of the post-disaster recovery expenditures and reconstruction investments.

The macro-economic assessment team should be aware, however, that:

- a. Not all disasters may cause a measurable impact at the macro-economic level, which may warrant the introduction of interventions to stabilize the overall economy, since a disaster may only cover

<sup>13</sup>Many persons tend to erroneously combine the negative impact of the disaster itself with the possible positive impact of post-disaster activities of recovery and reconstruction, and as a result may state that disasters bring about (net) positive results on the macro-economic performance of a disaster-affected economy. In fact, such net positive outcome is not likely to occur in all cases of disaster, but only in industrialized countries that have a significant capacity to develop and to face economic crises. In developing countries – and India is no exception – the total effects of disasters are not defined and the national capacity to undertake and finance recovery and reconstruction which fact may lead to the result that the net negative impact of a disaster is never fully overcome.

<sup>14</sup>It is precisely based on such isolated disaster impact – assuming no recovery and reconstruction activities are carried out – how a strategy and goals for recovery and reconstruction are defined right after a disaster occurs.

and affect limited geographical areas of a country or a State, or an event may not affect strategic sectors of economic activity. In fact, many events are likely to have only a localized impact on the geographical areas covered by the natural phenomenon causing the disaster without negatively impacting, in significant terms, the macro-economic position of the country or of the State.

- b. All disasters – whether large or small – may cause significant impact and suffering at the personal or household levels, which would require the undertaking of interventions to lessen such negative conditions in the very short term.
- c. While disasters may have a negative impact on specific sectors of economic and social activity, they also may – directly or indirectly – induce positive effects on other sectors, and thereby affect different population groups in both negative and positive manners.

The impact of the disaster is to be measured with respect to the baseline given by the expected or forecasted performance of the national or State economy if the disaster had not occurred. That is to say, the value of sectorial production flow changes is to be superimposed on the performance of the economy that had been forecasted by the central or State authorities before the disaster occurred for the current and several subsequent years. This superposition would enable measuring the “delta” or change on economic growth caused by the economic shock imposed by the disaster at the national or state level.

## **a) Use of the System of National Accounts for Macro-Economic Impact Assessment**

As has been pointed out before in this handbook, the System of National Accounts consist of a coherent, consistent and integrated set of macro-economic accounts, balance sheets and tables that have been defined on internationally-agreed concepts, definitions, classifications and accounting rules. These accounts provide a comprehensive record of most of the complex set of economic activities occurring at all times in an economy, and of the inter-action between economic agents and groups of agents that goes with it. It may be stated that the National Accounts System is a quantitative macro-economic representation of the national income cycle that uses the principle of double-entry bookkeeping of business accounting as well as several accounts, in order to show existing relationships between the various economic variables.

The System of National Accounts should be used for the estimation of the macro-economic impact of disasters. Experts in the macro-economic assessment team should be fully acquainted with the use of such tool<sup>15</sup>, and should apply their knowledge to convert the data received from the sectorial assessment teams, which will normally include gross production values into added value.

Application of the National Accounting falls within the institutional domain of the Central and State Statistical Offices in India. Therefore, it is advisable that representatives of such government agencies should be part of the macro-economic assessment team.

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<sup>15</sup>Statistics Division of the Department of Economic and Social Affairs, National Accounts: A Practical Introduction, in Handbook of National Accounting, Series F, No. 85, United Nations, New York, 2003.

## b) Baseline Information for Macro-Economic Impact Assessment

The undertaking of the analysis of macro-economic disaster impact assessment requires the availability of baseline information on pre-disaster conditions. Two types of information are required:

- First, historical data on the performance of the main macro-economic aggregates for the disaster-affected country and state, including gross domestic product (GDP or GSDP), balance of payments (BOP), fiscal sector position and consumer price information for recent years;
- Second, the most recent forecasts available on the same variables for the current and subsequent years of the disaster.

On the basis of such information the scenario of macro-economic performance that would have prevailed in the country if the disaster had not occurred is to be developed by the macro-economic assessment team. The economic flow changes arising from the disaster, as estimated in the analysis of sectorial disaster effects are to be superimposed on the “non-disaster” scenario, so that the “economic growth delta” caused by the disaster in question can be estimated, assuming that – as a first stage in the analysis – no post-disaster interventions are to be made. Afterwards, as subsequent steps in the analysis, the estimated positive values of recovery interventions and reconstruction investments are to be superimposed, with the anticipated appropriate time delays, to forecast their positive impact on the performance of the economy.

Another item required as part of the baseline for the assessment of disaster impact is the full list of technical coefficients or ratios that relate value added over output for each sector of economic activity included in the GDP or GSDP figures. These coefficients or ratios are obtained from supply-and-use tables in the National Accounts that are normally developed by the Central Statistical Office and its State equivalent institutions<sup>16</sup>. Table 2-2 shows such values of the technical coefficients, as derived from the most recent published national account statistics<sup>17</sup>.

**Table 2-2. Technical coefficients that relate value added to output for all sectors of economic activity in India for year 2011-12**

Sector and Sub-sector		Technical Coefficient
Agriculture, Forestry and Fishing		
	Agriculture	0.772
	Forestry	0.845
	Fishing	0.861
Mining and Quarrying		0.786
Manufacturing		0.191
Electricity, Gas and Water Supply		0.432
Construction		0.347
Trade, Hotels and Restaurants		0.840
Transport, Storage and Communications		
	Railways	0.592

<sup>16</sup>These value added/output ratios are developed on the basis of detailed census on output and costs which are conducted by Statistical Offices in benchmark years; the same Offices estimate the value of these ratios for non-benchmark years.

<sup>17</sup>See Sequence of National Accounts, India, 2013, National Accounts Division, Central Statistical Office, New Delhi, 2013.

	Other Transport	0.376
	Storage	0.606
	Communications	0.884
Finance, Insurance, Real Estate, Business		
	Banking and Insurance	0.798
	Real Estate, Ownership of Dwellings	0.830
Community, Social and other Services		
	Public Administration	0.758
	Other Services	0.778

Source: Thai Flood 2011, Government of Thailand, The World Bank and the United Nations, 2012.

Annual historical data on the current account balance of the balance of payments is required together with the forecasted balance information for the current and two or three subsequent years after the disaster.

Annual values on both historical and forecasted series of revenues and expenditures, showing the current, fiscal and primary accounts, will be required as baseline for analysis of the fiscal sector. A table showing the current types of taxes is another essential element of baseline required for this analysis of fiscal sector impact.

Baseline data on the historical annual variation of consumer price indexes (CPI), together with forecasted quarterly variation for the current year of the disaster, and annual forecasted values of the same variable for the years after the disaster are also to be obtained in order to enable the conversion between nominal and constant values for the analyses.

Lastly, a set of historical data on official exchange rates between the national currency and that of the United States Dollar may also be required for the assessment, and should be obtained from the proper authorities. The baseline information needed for both the national and state levels can be summarized in the following table.

## c) Procedures for the Estimation of Macro-Economic Impact

### General

The macro-economic assessment team should follow a step-wise approach for the estimation of the possible impact of disasters at the macro-economic level. The UN-ECLAC Handbook provides the required theoretical background for such type of analysis;<sup>18</sup> the practical aspects of the analysis that members of the macro-economic assessment team are described here.<sup>19</sup> It should be recalled that the process first analyzes the impact of the disaster in isolation, and later on examines the possible positive impact of activities designed to achieve economic recovery and reconstruction.

<sup>18</sup>See Handbook for estimating the socio-economic and environmental effects of disasters, United Nations Economic Commission for Latin America and the Caribbean, Santiago and Mexico, 2003.

<sup>19</sup>Advantage is taken here of the detailed procedures prepared by the same author of this document for publication under the macro-economic impact analysis chapter of the European Union (EU)-United Nations-World Bank PDNA Handbook, duly adapted to Indian conditions.

Three stages are required in order to determine any negative or positive impact on the macro-economic performance of a country affected by a disaster:

- (i) Considering only the isolated effects of the disaster in terms of changes in economic flows, and assuming no recovery and reconstruction interventions;
- (ii) Considering the positive impact of economic recovery activities, after the needs for economic recovery have been estimated separately for each of the sector; and
- (iii) Considering the positive impact of disaster-resilient reconstruction, after the needs for reconstruction with risk reduction features have been estimated for each sector.

### Possible disaster impact on gross domestic production performance

The macro-economic assessment team should first estimate the possible disaster impact on the performance of gross domestic production after a disaster, as part of a three stage approach. The first one assumes no recovery and reconstruction activities and enables the estimation of the isolated impact of the disaster, which in fact is a worst-case, post-disaster scenario.

1. Determine the value of gross domestic product that is to be used as baseline for comparison in the analysis of GDP or GSDP impact after the disaster, for the current and for several (1 to 3) subsequent years, depending on the possible duration of disaster effects as indicated by sectorial assessment teams.
  - (i) Obtain the most recent – but as yet not affected by any disaster effects – value of gross domestic product for the affected States, using constant values, in the year of the disaster.
  - (ii) Prepare a table showing gross state domestic product for the year of the disaster and for several subsequent years, for use as the basis for comparison of isolated disaster impact, expressed in constant terms.
2. Using data from the sectorial assessments, already converted into constant values by using deflation coefficients obtained from Central Bank or Bureau of Statistics, develop sectorial tables to estimate disaster impact using the model spreadsheet presented in the next page. These sectorial tables should have three main columns for the estimation of disaster impact per calendar year of the analysis, beginning in the current year of the disaster and continuing on with subsequent years during which disaster impact is expected. Referring to the spreadsheet shown below, fill in the required information and make the following estimations:

A	B	C	D	E	F
1			<b>Non Disaster</b>	<b>Post Disaster</b>	<b>Disaster Impact</b>
2	Gross Production, Rupees		$D2=D3*D4$	$E2= E3*E4$	
3		Quantity Produced, Tons	D3	E3	
4		Producer Price, LCU/Ton	D4	E4	
5	Intermediate Consumption, Rupees		$D5=(1-D6)*D2$	$E5=(1-D6)*E2$	
6		Value-added Coefficient	D6	D6	
7	Post-disaster Higher Cost of Production, Rupees			$E7= E8$	
8		(From sectorial assessment)		E8	
9	Value Added, Rupees		$D9=D2-D5$	$E9=E2-E5-E7$	$F9=E9-D9$

In the column for non-disaster or baseline conditions, again using data already converted into constant values, enter the data obtained from the forecasted performance of each sector for the current year of the disaster:

- (i) Estimate the quantity of production expected (D3) and multiply by the forecasted price paid to the producer (D4) to obtain the non-disaster forecasted value of gross sectorial production (Cell D2);
- (ii) Use the value of sectorial value added coefficient obtained from Table 5-1 (D6), to obtain the forecasted value of intermediate consumption under non-disaster conditions (filling in cell D5 using the formula provided in the spreadsheet);
- (iii) Obtain the non-disaster forecasted value added of production for the sector (D9) by subtracting intermediate consumption (D5) from the value of gross sectorial production (D2) and fill in cell D9 using the formula provided.

In the column for post-disaster conditions, enter the data (again using constant values) obtained by the sectorial assessment team for each sector for the current year of the disaster, and carry out the necessary estimations as follows:

- (i) Estimate the sector-estimated quantity of post-disaster production (E3) and multiply by the estimated price paid to the producer (E4) to obtain the estimated post-disaster value of gross production (fill in cell E2);
- (ii) Estimate the normal value of intermediate consumption, using the same value of the technical value-added coefficient as used for non-disaster conditions, filling in cell E5;
- (iii) Fill in cell E7 with the sector-estimated higher production costs taken from the assessment;
- (iv) Estimate the post-disaster value added of production for the sector (E9) by subtracting the normal intermediate consumption (E5) and the post-disaster higher cost of production (E7) from the estimated post-disaster value of gross production (E2) and fill in cell E9.

Estimate the value of disaster impact in the last column of the spreadsheet to obtain disaster impact (in cell F9), by subtracting the post-disaster value added of production for the sector (cell E9) minus the non-disaster forecasted value added of production (D9), which will yield the impact of the disaster on production for the sector analyzed. Repeat the procedure for all sectors of economic activity that may have been affected by the disaster and for the subsequent calendar years during which impact may still be significant, and aggregate them to obtain the total impact of the disaster.

In preparing this table, the macro-economic assessment team (using their knowledge of national accounting) must ensure that only production losses and higher production costs that are included in the national accounts are taken into consideration.<sup>20</sup> For this purposes, readers are referred to the section on Production boundary and principles of valuation, included in the United Nations Handbook of National Accounts.

3. In addition to the above, the estimated post-disaster higher production costs (as exemplified under cell E8 in the above spreadsheet, and expressed in constant values) are to be taken as increases in production in the sectors where they will be actually produced, and similar spreadsheets are to be developed in order to estimate their value added for addition to the forecasted GDP, as shown in the following additional spreadsheet:

<sup>20</sup>In that regard, higher values of personal consumption (for instance in the sectors of water and transport) should not be included in this analysis

A	B	C	D	E	F	G	H
1	<b>Higher Production Costs</b>		<b>Post-disaster Higher Production</b>				
2	<b>Sector/Item</b>	<b>Gross Value, LCUs</b>	<b>Sector</b>	<b>Item</b>	<b>Gross Value, LCUs</b>	<b>Value-Added Coeff.</b>	<b>Value Added, LCUs</b>
3	Agriculture						
4	Seeds Provision	350.0	Trade	Import of Seeds	350.0	0.35	122.5
5	Fertilizer Costs	650.0	Industry	Fertilizer Production	650.0	0.45	292.5
6	Pesticide Costs	350.0	Industry	Pesticide Production	350.0	0.45	157.50
7	Transport						
8	Fuel Consumption	2,100.0	Trade	Sales of Fuel	2,100.0	0.35	735.0
9	Maintenance Costs	1,800.0	Services	Vehicle Maintenance	1,800.0	0.35	630.0
10	Health						
11	Vaccination Costs	450.0	Industry	Vaccine Production	450.0	0.45	202.5
12	Information Campaign	250.0	Industry	Printing Costs	150.0	0.45	67.5
13			Services	Dissemination Fees	100.0	0.35	35.0
14	<b>Total</b>						<b>2,242.5</b>

In the above spreadsheet, the examples require clarification and explanations to ensure clear understanding.

- First, in the agriculture sector, higher expenditures are required for the post-disaster acquisition of agriculture inputs (seeds, fertilizers and pesticides for replanting of the seasonal crop), which increase the intermediate consumption in the sector. These translate in sales of seeds in the commerce sector and in production of fertilizers and insecticides in the industry sector.
- Second, in the transport sector, the higher costs of transport due to the utilization of longer alternative roads that must be used because of destruction of certain road sections (which again increase intermediate consumption in the transport sector), would translate in additional fuel sales in the commerce sector and in more vehicle maintenance in the services sector.

Third, the requirement of the health sector to conduct a vaccination campaign together with an information campaign to control an increase in morbidity after a disaster, will increase the intermediate consumption in health, but this also translates into higher production of vaccines and information material in the industry sector as well as a sale of consultancy fees in the advertisement or commerce sector.

The value added for each of the activities under the sectors listed under column D is to be obtained from multiplying the value of each activity listed under column F times the value-added coefficient listed for each sector of economic activity under column G. Once each cell of column H is estimated, the total of column H is obtained and filled in cell H14, which is to be added to the value of pre-disaster GDP forecast.

4. Convert the value of houses destroyed by the disaster into value added losses, using the discount coefficients normally included in the GDP component of “ownership of dwellings” or “rental of dwellings”.<sup>21</sup>
5. Prepare a summary table showing the annual values of production losses (as described under point 2 in this section) and higher intermediate consumption production (as described under point 3 of this section), expressed in constant values – by deflating nominal loss values using the implicit price deflator in each calendar year – as estimated by the sectorial assessment teams, ensuring no duplication among sectors exists.
  - (i) Estimated sectorial output losses should be included as having a negative sign (After adding up all sectorial losses as described under point 2 above).
  - (ii) Estimated higher intermediate consumption production should be assigned to the sectors where the additional production are actually going to be made in a proportion defined by the sectorial specialists, and should have a positive sign (As described under point 3 above).

The table should have as many columns as the number of years that each of the negative or positive production flow changes would cover, on the basis of the sectorial specialists’ findings.

6. Estimate post-disaster gross domestic product (GDP), for the year of the disaster and for several subsequent years (See Table 5- 2 in the following page).
  - (i) Subtract the disaster-induced, value-added production losses as given in 5-i) and 5-ii) from the non-disaster forecasted GDP figures, and subtract the value of dwelling ownership destroyed by the disaster as given in point 4), using constant values.
  - (ii) Determine the resulting annual post-disaster GDP growth rates, for the entire period of analysis, and compare them to the forecasted growth rates if the disaster had not occurred, to ascertain disaster impact (as shown in Table 2-3 in the following page), and prepare a time chart showing GDP change over time. In order to do that, if a significant modification has arisen in the labor force due to the action of the disaster – i.e. a sizable number of deaths, and/or of temporary or permanent disability of workers, or of prolonged illness – the additional sudden decline in GDP for the first subsequent year is to be introduced<sup>22</sup>.

The step-wise procedure described above applies to all three stages of the analysis of disaster impact on GDP: the first, to estimate isolated disaster impact, when no recovery and reconstruction activities are included; the second, including the positive impact of recovery activities, once recovery needs have been estimated; and, the third, superimposing the positive impact of disaster-resilient reconstruction investments, after reconstruction needs have been estimated.

<sup>21</sup>In this case, only the damage value of houses for which formal ownership is defined is to be considered; informal housing damage is not to be included in these calculations.

<sup>22</sup>This would imply the availability of detailed information on the number of deaths, in terms not only of number, but of age, sector of employment, etcetera. Should this breakdown of data be unavailable, average values may be utilized and factored in the estimations, as was done in the recent case of the Haiti earthquake in 2010.

**Table 2-3: Example of GDP Impact Analysis after the 2000Mt. Merapi Volcanic Eruption in the Sleman District, Indonesia, 2010 (In Constant-Value, billion Rp)<sup>23</sup>**

	2009	2010	2011	2012
<b>Non-Disaster GDP Performance</b>				
GDP, Real Billion Rp	12,504	13,285	14,133	15,031
Forecasted Annual Growth Rate, %	5.11	6.25	6.38	6.36
<b>Disaster-Induced Losses</b>				
Production Decline, Real Billion Rp		- 229	- 585	--
Intermediate Consumption Production, Real Billion Rp		22	47	--
Losses in Destroyed House Ownership <sup>24</sup>		...	...	...
Net Production Losses, Real Billion Rp		- 207	- 538	--
<b>Post-Disaster Impact on GDP Performance</b>				
Post-Disaster GDP, Real Billion Rp		13,079	13,595	15,031
Post-Disaster Annual Growth Rate, %		4.60	2.33	6.36
Post-Disaster GDP Impact, %		- 1.65	- 4.05	--

### **Possible disaster impact on the balance of payments**

This part of the macro-economic impact assessment should only be conducted only for the case of disasters that affect the entire country of India or significant parts thereof. It needs not be carried out for the analysis of disaster impact at the State or District level.

The following steps are to be followed to estimate the possible impact of a disaster on the balance of payments in India after a disaster.

1. Determine the information on the current account of the balance of payments that is to be used as baseline for the analysis of post-disaster impact, for the current and subsequent years, depending on the likely duration of disaster effects as indicated by the most affected sectors.
2. Obtain from sectorial estimations of production flow changes, those that would have an impact on increasing imports or decreasing exports of both goods and services (on the Balance of Trade), over the current and subsequent years where disaster-induced production flow changes are to be spread over (As a 1-year example of these, see Table 2-4 below).
3. Subtract the higher imports and lower exports obtained in step 2 from the value of the different components of the current accounts in the Balance of Payments, to obtain the resulting post-disaster value of BOP (See Table 2-5 below as a single-year impact example).

The example shown in Tables 2-4 and 2-5, which refer to the impact of the recent swine flu pandemic in a small Caribbean island country, illustrates the procedure described above for the estimation of the disaster impact on the current account of the balance of payments.

<sup>23</sup>See World Bank, Damage, Losses and Needs Assessment, Mount Merapi Volcanic Eruption, Jakarta, Indonesia, 2010.

<sup>24</sup>In this case, most of the houses that were destroyed were of the informal type; thus, losses on home ownership in the national accounts are negligible.

**Table 2-4. From Value of Production flow changes to Impact on Balance of Trade, after Swine Flu Pandemic in a small Caribbean country, in million J\$**

Sector	Production Flow Changes		Imported or Exported Component, %	Disaster Impact on: (million J\$)	
	Type of Flow Change	Value (Million J\$)		Exports	Imports
<b>Agriculture</b>	Plantation Production	23.1	30	6.9	
<b>Manufacture</b>	Large Industry Output	5,479.8	30	1,643.9	
<b>Tourism</b>	Tourism Sales	8,465.0	100	8,465.0	
<b>Mining</b>	Mining Production	144.9	100	144.9	
<b>Health</b>	Anti-viral Medication	142.9	100		142.9
<b>Total</b>		14,255.7		10,260.8	142.9
<b>Goods</b>				1,795.8	142.9
<b>Services</b>				8,465.0	

**Table 2-5. Estimation of Disaster Impact on Current Account of Balance of Payments, in million US\$**

Component		Non-Disaster	Value of production loss	Post-Disaster
<b>Goods Balance</b>		- 545		- 570.8
	Exports	378	23.9	354.1
	Imports	923	1.9	924.9
<b>Services Balance</b>		148	112.9	35.1
<b>Other Income</b>		- 124		- 124.0
<b>Current Transfers</b>		313		313.0
<b>Current Account Balance</b>		- 209		- 346.7

Needless to say, should production flow changes arising from the disaster last for more than one year, the above tables would need to show data for each of the subsequent years.

At the time of the second stage of macro-economic impact analysis – which is to estimate the possible impact of recovery activities – the macro-economic assessment team must include the value of imports that may be required during the recovery period, such as food which may be required if domestic production is insufficient to ensure food security after the disaster. When stage three of the macro-economic impact analysis is carried out – i.e. to ascertain the impact of disaster-resilient reconstruction – the macro-economic assessment team should bear in mind that the value of the imported component of reconstruction investments must be factored in when some construction materials and equipment or machinery are not produced in India, as estimated by the sectorial assessment teams. Furthermore, that the receipt of any re-insurance proceeds coming from abroad and with their estimated delays would also have a positive impact on the balance of payments, only if and after such amounts are received and invested in India.

Any foreseen increase in the amount of family remittances coming from abroad to assist disaster-affected persons or households in their recovery and reconstruction must also be factored in by the macroeconomic assessment team into the analysis of post-disaster impact on the external sector.

## Possible disaster impact on public-sector finances

After a disaster, the normal levels of expenditures and of expected receipts or revenues may be negatively impacted, due to the need to finance recovery and reconstruction, provide temporary tax exemptions to affected individuals and enterprises, and due to the lower revenues collected because of declines in production and sales. A list of such individual impacts on government finances follows:

- i. Decline in current revenues caused by decrease in tax revenues: the tax base, tax rates, possible temporary reductions in import duties, and non-tax revenues;
- ii. Decline in capital revenues due to destruction and damage to property;
- iii. Possible increase in current expenditures: increases in operations outlays, increases in transfers and decreases of interest on public debt; and
- iv. Increase in capital expenditures: increase in direct investment, capital transfers and financial operations.

Some of the items described above would result from post-disaster recovery and reconstruction – such as possible temporary tax holidays to enterprises to assist them in recovery, and increases in capital expenditure that occurs during reconstruction – and should be isolated and dealt with after the first stage of impact analysis.

In India, such fiscal budget disruptions are likely to occur at the State level, and also at the central level. The macro-economic impact analysis should be first conducted at the State level and, if warranted, expanded to the national level.

The fiscal impact of the disaster should be analyzed by estimating the gap between State government operations and their financing, taking into consideration as that of State enterprises.

The first stage of the analysis is intended to quantify the isolated disaster impact on public finances that assumes no activities or interventions to achieve recovery and reconstruction are ever conducted, which in fact is a worst-case post-disaster scenario. Later on, subsequent stages of the analysis involve the quantification of the possible impact of recovery interventions as well as the possible impact of disaster-resilient reconstruction investments.

The following are the steps that the macro-economic assessment team should carry out to estimate the possible isolated impact of a disaster on the State fiscal sector:

1. Obtain the available information on State government revenues and expenditures, referred to the situation before the disaster, that is to be used as baseline for the analysis of post-disaster impact, for the current and for several (1 to 4) subsequent years, depending on the likely duration of disaster effects as indicated by the most affected sectors.
2. Obtain the different prevailing rates of taxes applied to production and sales that constitute the total revenues for the State government. On that basis and in combination with production and sales flow changes estimated during the assessment in each sector of economic activity, estimate the reduction or decline in revenues that arise after the disaster, during the current and subsequent years, as needed.

3. Obtain the extraordinary expenditures that the State government has had to make to face the post-disaster emergency situation (without including recovery and reconstruction activities) that may result in other development activities not receiving their intended funding.<sup>25</sup>
4. Superimpose the value of losses in revenues and of higher, unforeseen expenditures on the baseline on the State government budget, and ascertain how the State government budget has been affected due to the disaster.

An example of estimation of disaster fiscal impact on a small island economy, where a flu pandemic occurred, is given in Table 2-6. First of all, the second column shows the “non-disaster” fiscal situation if the disaster had not occurred; the third column shows the lower revenues on sales taxes and export duties that would not be collected due to lower production caused by the disaster, as well as the bauxite extraction levy that would not be collected for the same reason; as well as the increased expenditures for medical attention and other services that were required. The last column on the right shows the resulting fiscal sector position after the disaster. The impact of the disaster and the fiscal sector may be obtained from the comparison of values from the “non-disaster” and the “post-disaster” columns.

**Table 2-6. Estimation of Flu-Pandemic Disaster Impact on Fiscal Sector**

	Million J\$		
	Post-Disaster	Losses Due to Pandemic	Post-Disaster
<b>Revenue and Grants</b>	<b>41,054</b>		<b>39,246</b>
Current revenues	39,651	-1,807	37,844
Tax Revenues	36,522	-1,798	34,724
Non-tax Revenues	2,399		2,399
Bauxite Levy	731	-9	722
Capital Revenues	711		711
Grants	691		691
<b>Total Expenditures</b>	<b>45,057</b>		<b>46,244</b>
Current Expenditures	39,648	1,187	40,835
Programs	8,716		8,716
Wages and Salaries	13,626	1,187	14,813
Interests	17,306		17,306
Capital Expenditures	5,409		5,409
<b>Current Balance</b>	<b>3</b>		<b>-2,991</b>
<b>Fiscal Balance</b>	<b>-4,003</b>		<b>-6,998</b>
<b>Primary Balance</b>	<b>13,303</b>		<b>10,308</b>

It is to be noted that in the above example, only taxes on production were considered since there was no destruction of assets, as may occur in the case of earthquakes, landslides and floods. Needless to say, when assets are destroyed, property taxes should also decline and be included in the analysis.

The macro-economic assessment team should again conduct the above-described impact analysis in the three post-disaster stages mentioned above: i.e. first, assuming no recovery and reconstruction; second, assuming only recovery activities are conducted; and, third, after disaster-resilient reconstruction is undertaken.

<sup>25</sup>The following are examples of the State government expenditures for the emergency stage after a disaster: costs of setting up and running temporary shelter schemes, providing medical attention to injured persons, providing temporary education facilities and services, re-opening road traffic, emergency food provision, relief assistance to affected population, etc. which are not covered from the State DRF and central DRF funds, and which may have to be financed from the regular development budget.

# STANDARD PROCEDURES FOR MACROECONOMIC IMPACT ASSESSMENT

## MACROECONOMIC IMPACT ASSESSMENT

The following steps should be implemented to assess the macroeconomic impacts:

1. Collect baseline information on sector assets and production flows
2. Estimate Disaster Impacts
3. Summarize the macroeconomic impacts in the State
4. Draft the macroeconomic impacts assessment report

### Recommended Assessment Team

The composition of the sector assessment team may vary by the type of disaster and the extent of the likely damage and production flow changes.

Organization and Personnel	Role in the Sector Assessment
<p><b>Personnel from:</b></p> <ul style="list-style-type: none"> <li>▪ The State department in charge of economic planning</li> <li>▪ Department of Finance</li> <li>▪ State Statistics Office</li> </ul> <p><b>Other personnel of offices in the disaster-affected area who are:</b></p> <ul style="list-style-type: none"> <li>▪ Macroeconomists</li> <li>▪ Statisticians</li> <li>▪ Finance officers</li> <li>▪ Budget specialists</li> </ul>	Lead and coordinate
<p><b>Personnel from:</b></p> <ul style="list-style-type: none"> <li>▪ Ministry of Economic Planning</li> <li>▪ Ministry of Finance</li> <li>▪ Central Statistics Office</li> <li>▪ Central Bank of India</li> <li>▪ Macroeconomists</li> <li>▪ Budget and finance specialists</li> <li>▪ Economic planning specialists</li> <li>▪ Statisticians</li> </ul>	Provide baseline information and facilitate the field assessment of damages and losses
<b>Development partners</b> (if active in the sector)	Participate and provide technical advice

## Introduction

As mentioned earlier, the current list of sectors of economic activity used in the System of National Accounts of India is the following:<sup>26</sup>

- Agriculture, Forestry and Fishing;
- Mining and Quarrying;
- Manufacturing;
- Electricity and Gas;
- Water Supply, Sewerage, Waste Management;
- Trade, Hotels and Restaurants;
- Transportation and Communications;
- Financing, Insurance, Real Estate and Business Services; and
- Community, Social and Personal Services

The sectors that were assessed for the PDNA should be included within the above main sectors as shown below:

- **Agriculture, Forestry and Fishing**
  - Crops
  - Livestock
  - Fisheries
  - Forestry
- **Trade, Hotels and Restaurants**
  - Tourism
  - Trade or Commerce
- **Transportation and Communications**
  - Air Transportation
  - Land Transportation
  - Sea Transportation
  - Rail Transportation
  - Telecommunications

<sup>26</sup>Central Statistical Organization (CSO), National Accounts Statistics, 2013, Page 15, Ministry of Statistics and Programme Implementation, Government of India, New Delhi, 2013.

- **Financing, Insurance, Real Estate and Business Services**
  - Housing
  - Services
- **Community, Social and Personal Services**
  - Health
  - Education
  - Culture
- Mining and Quarrying
- Manufacturing
- Electricity and Gas
- Water Supply, Sewerage, Waste Management;

It should be noted that “**Services**” under the “Financing, insurance, real estate and business services” is part of the assessment under the Trade and Services sector assessment. The results of the PDNA in that sector should be segregated into the Trade on one hand and Services on the other.

### **Important Things to Consider**

In performing a post-disaster macroeconomic impact analysis, the following must be remembered:

- a. Disasters with catastrophic effects may adversely impact on all the sectors in the areas affected as well as some sectors outside the affected areas. Moreover, the effect of one sector can adversely impact on other sector/s. For example:
  - Damages and losses in agriculture will adversely affect the outputs of processing plants using agricultural products as inputs of production.
  - Closure of airports will adversely affect the income from tourism sector even outside the disaster areas.
- b. On the other hand, unexpected expenditures of some sectors will translate into gains for the other sectors especially those businesses that are not within the disaster-affected areas. For instance, expenditures on the cleaning of debris, food supply and other needs will be an added income to some sectors.
- c. It is possible that the national GDP may not be severely affected by a disaster but the impact on GRDP (regional economic impact) and the people may be huge. This can happen if the region affected is not a major contributor to the national economy but has a large population under the poverty line.

Therefore, in order to estimate the economic impacts of the disaster, the assessments of the sector/s under the concerned agency/ies must have been completed. These sectoral assessments will be the inputs for the macroeconomic assessment to be undertaken.

## Step 1. Collect baseline information on sector assets and production flows

Baseline information must be compiled before the field assessment or, if possible, prior to the occurrence of disaster. The following information in Table 1 must be available to enable the macroeconomic impact assessment team to come up with the post-disaster macroeconomic impact assessment.

**Table 1. Pre-disaster national socio-economic indicators**

<b>National and State levels</b>					
<b>Indicators</b>	<b>(Value in Current Prices, Rupees)</b>				
	<b>Past Year</b>	<b>Projection for the Present Year</b>	<b>Projections for the Next Years</b>		
			<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
GDP					
Total Government Expenditures					
Government Revenues					
a. VAT					
b. Income Taxes					
c. Duties					
d. Others					
Total Government Revenues					
Budget Deficit					
Balance of Payments					
<b>Sectors/Sub-sectors</b>	<b>(Output in Current Prices, Rupees)</b>				
<b>Agriculture</b>					
• Crops					
• Livestock					
• Fisheries					
• Forestry					
<b>Trade, Hotels and Restaurants</b>					
• Tourism					
• Trade/Commerce					
<b>Transportation and Communications</b>					
a. Air					
b. Land					
• Sea					
• Rail					
• Telecommunications					
<b>Community, Social and Personal Services</b>					
a. Health					
b. Education					
c. Culture					
<b>Financing, Insurance, Real Estate and Business Services</b>					
• Housing					

• Services					
Mining and Quarrying					
Manufacturing					
Electricity and Gas					
Water Supply, Sewerage, Waste Management					
Other Indicators					
Employment (Number)					
Unemployment (in %)					
Headline Inflation (in %)					
US\$ - Indian Rupee Exchange Rate					

## Sources of Information

The sources of baseline information may vary by state. However, the critical list of the likely sources of information is provided below.

- Information from the Ministry/ies in charge of economic planning, finance and budgeting; etc.
- Central and State Statistical Offices;
- Sector reports conducted by other ministries and development partners;
- Reports of private research institutions and the academe;
- Annual performance reports of the states concerned;
- Project evaluation reports of related sectors;
- Field visits or interviews; and
- Newspaper articles

**Below are some of the important documents that are possible sources of baseline information.**

Ministry of Finance, Economic Survey 2015-2016	<a href="http://indiabudget.nic.in/survey.asp">www.http://indiabudget.nic.in/survey.asp</a>
Planning Commission, Government of India, Vols. 1 and 2	<a href="http://planningcommission.gov.in/plans/planrel/12thplan/pdf/12fyp">http://planningcommission.gov.in/plans/planrel/12thplan/pdf/12fyp</a>
Key Economic Indicators, India	<a href="http://www.eaindustry.nic.in/key_economic_indicators/Key_Economic_Indicators.pdf">http://www.eaindustry.nic.in/key_economic_indicators/Key_Economic_Indicators.pdf</a>
Government of India, data.gov	<a href="https://data.gov.in/catalog/india-macro-economic-indicators-summary-table">https://data.gov.in/catalog/india-macro-economic-indicators-summary-table</a>
Reserve Bank of India, Handbook of Statistics on Indian Economy	<a href="https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy">https://rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook%20of%20Statistics%20on%20Indian%20Economy</a>

## Step 2. Estimate Disaster Impacts

### Step 2.1. Estimate the Gross State Domestic Product (GSDP)

Estimating the macroeconomic impacts in terms of GDP or GDSP after a disaster requires the data collected by the other sectors and plugging them in the national system of accounts. The same data from the various sectors will also enable the macroeconomic team to estimate the effects on other indicators like BOP, budget deficit, inflation and employment.

Normally, the gross domestic product is measured at the state and national levels. Hence, the first level of macroeconomic impacts should be at the state level.

To estimate the impacts on the GSDP, the losses of the sectors should be transformed into value-added terms. Based on the data gathered from the sectors, the table below shows the consolidated value-added losses in the sectors/sub-sectors in current prices. Value-added prices are the value of foregone production multiplied by the value-added coefficient or ratio.

**Table 2. Pre-Disaster and Post-Disaster Estimated Value-Added Production Losses (and Gains)**

State:						
Sector/Sub-sector	Production Losses Within the Year the Disaster Occurred (in Rupees)					
	Pre-disaster Estimates		Estimated Losses		Revised Post-disaster Estimate	
	Gross Value	Gross Value-added	Gross Value	Gross Value-added	Gross Value-added	Constant Price
A	B	C	D	E	F	G
<b>Agriculture</b>						
a. Crops						
b. Livestock						
c. Fisheries						
d. Forestry						
<b>Trade, Hotels and Restaurants</b>						
a. Tourism						
b. Trade/Commerce						
<b>Transportation and Communications</b>						
a. Air						
b. Land						
c. Sea						
d. Rail						
e. Telecommunications						

Community, Social and Personal Services						
a. Health						
b. Education						
c. Culture						
Financing, Insurance, Real Estate and Business Services						
a. Housing						
b. Services						
Mining and Quarrying						
Manufacturing						
Electricity and Gas						
Water Supply, Sewerage, Waste Management						

### Notes for filling Table 2

- Column A is for the sectors/sub-sectors that were assessed after the disaster.
- Column B is for the gross value of the estimated pre-disaster output
- Column D is for the gross value of the post-disaster losses of the sectors/sub-sectors.
- Column C is for the gross value added of Column B, which is Column B x Gross value-added ratio or coefficient.
- Column E is for the gross-value added of Column D, which is Column D x Gross value-added ratio or coefficient.
- Column F is for the revised gross value-added estimate (Column C minus Column E)
- Column G is for the revised post-disaster production estimates in value-added constant prices for the sectors/sub-sectors. This is derived by multiplying the gross value-added value by the price deflator. In formula, this is:  $\text{Column F} \times \text{Price deflator} = \text{Column G}$ .

The estimated losses for the sectors or sub-sectors can occur beyond the years after the occurrence of the disaster. The same process of estimation as in Table 2 must be done for these years and placed in the table below.

**Table 3. Estimated Value-Added Production Losses (and Gains) Beyond the Year the Disaster Occurred, in Constant Values**

Sector/Sub-sector	In Value-Added Constant Values (Rupees)					
	Year 1		Year 2		Year 3	
	Pre-disaster Estimates	New Estimate	Pre-disaster Estimate	New Estimate	Pre-disaster Estimate	New Estimate
A	B	C	D	E	F	G
<b>Agriculture</b>						
a. Crops						
b. Livestock						
c. Fisheries						
d. Forestry						
<b>Trade, Hotels and Restaurants</b>						
a. Tourism						
b. Trade/Commerce						
<b>Transportation and Communications</b>						
a. Air						
b. Land						
c. Sea						
d. Rail						
e. Telecommunications						
<b>Community, Social and Personal Services</b>						
a. Health						
b. Education						
c. Culture						
<b>Financing, Insurance, Real Estate and Business Services</b>						
a. Housing						
b. Services						
Mining and Quarrying						
Manufacturing						
Electricity and Gas						
Water Supply, Sewerage, Waste Management						
<b>TOTAL</b>						

### Notes for filling Table 3

- *It should be noted that during the succeeding years when recovery activities are on-going, there may be some sectors which will experience increase in output on a national scale.*
- *The sectors, which are 'losers' and 'winners' should be considered in this table. For example, increase in production costs in agriculture (loss) may be a gain to the fertilizer producers (manufacturing). Also, the services sector (construction) may experience a higher output if reconstruction activities will be implemented in the transport sector.*

### Step 2.2 Estimate the impacts on other economic indicators and summarize the results

The state must analyze the immediate impacts on other economic indicators as well as the future impacts of the recovery and reconstruction activities identified by the various ministries. The macroeconomic impacts of recovery and reconstruction will depend mostly on the amount, coverage, scope and implementation schedules of the activities that the government will undertake. For instance, the contribution to the GDP or GSDP and employment of the reconstruction of infrastructure may be high but it may have repercussions on the budget deficit and the balance of payments, among others.

The following economic indicators should likewise be assessed or considered:

#### 1. Budget and budget deficit

- If the government decides to maintain or increase the budget after the disaster despite lower expected tax revenues, the budget deficit will rise.
- If the government will contract loans to fund recovery and reconstruction projects under a lower tax revenue scenario, budget deficit will be expected to rise for the year or years to come.

#### 2. Balance of payments (BOP)

The State must be able to quantify the following based on the submitted reports of the various sectors and/or sub-sectors to estimate the adverse impact on the BOP.

- The expected reduction of exports due to the disaster will reduce foreign currency earnings.
- Whatever expected increase in imports that will be needed, such as food supply, medicines, construction materials and other equipment and machinery, will increase foreign currency demand.
- Foreign currency coming in from foreign donors and remittance or donations from nationals outside the country will contribute to the foreign currency receipts after a disaster. The inflow of foreign currency from foreign donors and citizens abroad may offset a portion of lost export earnings.

#### 3. Taxes, unemployment and inflation

The impact on taxes, unemployment and inflation can be estimated using the information gathered from the district and regional assessment.

- The number of earnings from businesses will lower down tax collection.
- The closure of businesses will increase inflation.

- The lower capacity of production of some important sectors will increase demand, which can result into inflation. For instance, damages to agriculture may lower the supply of food items, which will result in increase in prices.

To account for the macroeconomic impacts of massive recovery and reconstruction, the State can undertake a scenario-building analyses with the estimated amount needed for recovery.

### Step 3. Summarize the macroeconomic impacts in the State

The impacts on the state economy can be summarized in the following table.

**Table 4. Summary of macroeconomic impacts in the State**

State:								
Indicators	Money Value In Rupees							
	Disaster Year Estimates		Projections for the Next Years					
	Pre-disaster	Post-disaster	Year 1		Year 2		Year 3	
			Pre-disaster	Post-disaster	Pre-disaster	Post-disaster	Pre-disaster	Post-disaster
Real GSDP								
Nominal GSDP								
Tax Revenues	Money Value in Rupees							
a. VAT								
b. Income Taxes								
c. Duties								
d. Others								
State Government Expenditure								
Sectors/Sub-sectors	Output in Money Value in Rupees							
Agriculture								
a. Crops								
b. Livestock								
c. Fisheries								
d. Forestry								
Trade, Hotels and Restaurants								
a. Tourism								

b. Trade/ Commerce								
<b>Transportation and Communications</b>								
a. Air								
b. Land								
c. Sea								
d. Rail								
e. Telecommunications								
<b>Community, Social and Personal Services</b>								
a. Health								
b. Education								
c. Culture								
<b>Financing, Insurance, Real Estate and Business Services</b>								
a. Housing								
b. Services								
Mining and Quarrying								
Manufacturing								
Electricity and Gas								
Water Supply, Sewerage, Waste Management								
<b>Other Indicators</b>	<b>(in %)</b>							
Unemployment								
Inflation								

**The following important points must be remembered in consolidating the macroeconomic impacts at the national level:**

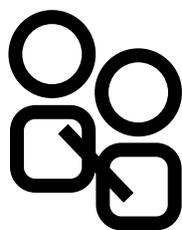
1. States/Regions that were not damaged by the disaster may also incur losses. For example, if and when there is massive death of cattle in the disaster-affected region, there can be huge losses to the meat processing industry in another region if the source of meat for processing comes from the affected region.

2. On the other hand, it must be noted that for the unexpected expenditures of some sectors, there will be some sectors that will gain from such expenditures, especially those businesses that are not within the disaster-affected areas. For example:
  - The cement industry in the other regions may experience gains due to the increase in demand for cement from the damage-affected sector.
  - Cleaning of debris may cause unexpected expenditures for some sectors but it will be a “gain” or increase in income from the services sector.
  - The unexpected expenditures in the procurement of electricity generators as sources of temporary electricity while the power company is under repair will increase the sales in the trade sector.
  - The procurement of fertilizers for those will replant their farms will increase the income of the chemical manufacturing sector.
3. It must be noted that it is possible that a disaster may have a negligible impact on the GDP if the region/s affected do not contribute much to the national economic output. However, it may have huge GSDP impact and greater social impacts on the affected people. (The social impacts will be reflected in the social impact assessment report).

#### **Step 4. Draft the State macroeconomic impact assessment report**

The macroeconomic impact report should be drafted by the State Economic Planning Office, emphasizing the summary of damages and losses by sector and by sub-sectors and their impacts on the macroeconomic indicators. The macroeconomic impact assessment report should be submitted to the Disaster Management Office and be consolidated to form part of the overall PDNA report, which will in turn be one of the basis of the recovery plan that will be drafted by the State.

In cases of major disasters where a number of states are severely affected, the various macroeconomic assessment reports from the States affected will be used by the national economic planning office to summarize the impacts of the disaster on the national economy.



## 2.4 Social Impact Assessment

### Introduction

Following a disaster, individuals and their households usually suffer significant harm. In addition to the destruction of assets there may be unfortunate loss of life, injuries, homelessness and loss of livelihoods. Social protection measures, being provided by the state, may be disrupted.

It is the task of the social assessment team to ascertain the details of the effects of the event on the population, their employment, livelihoods and social protection and make clear the differential impact of the disaster on women and men, including the psycho-social impact, both at the household and personal level. Finally, as far as possible, the impacts, which the event may have at the macro-social level, should be clearly and concisely presented and recommendations for recovery should be made to address the identified needs of the population arising from the disaster.

The social assessment team should comprise, in addition to government officials from the Ministries responsible for people's conditions such as Social Development, Labour, Social Welfare, Gender and Children's Rights, anthropologists, sociologists, gender experts and economists.

### a) Pre-Disaster Situation or Context

The social assessment team should collect and describe the pre-disaster situation of the population in the affected areas. The number of people and households living in the affected areas, disaggregated by age and sex, is essential. Information on the prevailing cultural norms and social structures, living conditions, livelihood patterns and any on-going social protection measures afforded them, should be described.<sup>27</sup> What proportion of the population makes use of such social protection measures and for what period of time in any given year, should be ascertained. All of this information should be disaggregated by the sex of the population, where possible. Special attention should be placed on particularly vulnerable groups such as children, the differently abled or the aged, and the varying positions of scheduled castes.

The Central and State statistical offices should be a rich source of the most recent information about the population. Other information, both quantitative and qualitative, can be sourced from past household surveys, poverty assessments, labour force surveys, reports on women and children, academic studies and other relevant reports prepared by State, national and international agencies.

<sup>27</sup>Some of this information should be available from the sectorial assessment reports.

## b) Post-Disaster Effects

Following a disaster, it is essential to be able to assess the situation of the population as a result of the event. Governments are anxious to know the number of people who have lost their lives, who have suffered injury, who are made homeless, and who may have lost their livelihoods. They want to know the demographic characteristics of the affected population and they want to understand the extent of the effects and the distribution of the affected population, at the level of the State, the Districts and the Panchayats or Talukas (administrative districts) as the case may be.

Usually information on the affected population is collected by the first respondents who are engaged in humanitarian relief efforts. It may also be collected by sector specialists who go into the communities seeking to verify the effects in their particular sector. But it is the duty of the social sector team to verify the data collected and present it in such a manner that the government is able to ascertain the extent or magnitude of the event, its geographic spread, the extent of the State or national level population affected and the socio-demographic characteristics of the affected population.

The PDNA methodology allows for standard definitions of the affected population grouped into the primarily affected, the secondarily and the tertiary affected persons. Such a classification allows the policy makers to be able to set priorities for action with regard to not only relief but recovery and reconstruction as well.

**Primary affected population** is that category of population affected by the direct effects of the disaster and consists of the dead, the injured and the disabled (primary trauma victims), as well as those who suffer material losses as a direct and immediate consequence of the disaster (such as the homeless and displaced). This segment is made up of people who were in the affected area at the time the disaster occurred.

**Secondary affected** persons are classified as those living in the affected areas that have sustained losses in production, income and access to services.

**Tertiary affected** persons are that are sustaining higher costs of services (transport, water, sanitation and electricity) as a result of the disaster but may not be living in the affected areas.

## c) Impact analysis

The social sector team has the responsibility for helping policy makers understand how the event has impacted on the people and their well-being. The results of the impact assessment should be presented concisely and clearly. The team should always make clear the differential impact of the event on men and women. Gender analysis allows for an understanding of gender as a social stratifier similar to other stratifiers such as class, ethnicity, caste and age, which should comprise the analysis.

Impact speaks to **the consequences of the effects** of the event, which may be manifested in the short, medium or long term. Impact analysis can be defined as conjecture based on sound knowledge following a scrutiny of the results of the PDNA assessment, taking into account the pre- and post-disaster situation and the country's development goals. The impact analysis, as far as is possible should be presented at two levels, the micro level and the macro level.

## Micro-level social impact

At the **micro level** the social impact, where data is available, should be presented at the level of the household and that of individual persons. When examining the situation at the level of the household, issues such as the impact of the event on household heads – male and female - with regard to changing roles and responsibilities, increased or decreased dependency (or burden of care) as a result of the disaster, on changing patterns of income and consumption, changing risks to health and on changing housing conditions and geographic location, are to be analyzed fully. In case of individuals, the most significant indicator is change in personal income.

Important for India are the ex-gratia payments, which are made to affected persons and households as a result of a disaster. These payments are expected to support personal and household income and thus reduce the social burdens following a disaster. The extent to which these payments address the full or partial impact of a disaster on the population and allows them to buffer from the worst effects of the disaster or to buffer from the likely long term impact, is difficult to ascertain as extensive assessments of the full effects of a disaster (delineating the estimation of damage and changes in economic flows) might not have been undertaken in each sector following disasters.

### Box 1.

Ex-gratia Payments from Government of Gujarat to the Victims of the 26 January 2001 Earthquake

<b>Relief to next of kin in the case of death</b>	
Death relief:	Rs.1 lakh for a major and Rs. 60,000 for a child
Additional death relief:	In addition to the death relief, Rs.50,000 to government employees and school children.
<b>Relief in the case of injury</b>	
Injury above 40 per cent: (permanent disability):	Rs. 50,000
Less than 40 per cent:	Rs. 25,000
Major Surgery:	Rs. 10,000
Minor Surgery:	Rs. 5,000
Minor Injury:	Rs. 2,000

Source: Economic Consequences of the Gujarat Earthquake. Ashok K. Lahiri, Tapas K. Sen, R. Kavita Rao, Pratap Ranjan Jena. 2001 page 10

In order to understand the actual social impact of a disaster on a given population, sector assessment teams should capture the extent of the change in economic flows and disruption in access to goods and services as a result of the event in each sector of activity. This information, when examined, would provide the necessary information to undertake an impact analysis at the level of the household and the individual.

### The informal sector

Over 90% of India's labor force is engaged in the informal sector, suggesting that following a disaster many informal sector workers may have their income-earning activities disrupted. Since salaried workers (mainly found in the formal sectors) often do not face income disruption as a result of disasters, the social sector team should focus its attention on income earned through wages with special attention to the wages of

the informal workers. As mentioned earlier, informal workers belong to the poor low-income bracket whose livelihoods is their main source of income. Although they may be invisible since they are not registered with the government, data on their earnings, by sector, is available from the labor force survey and other reports.

On the basis of information received from the sectorial assessment teams, the extent and value of production losses and information on how long the activities in a particular sector of activity may have been disrupted (such as roads and transport after flooding), the social impact assessment team should be able to arrive at an estimate of income losses for informal workers (such as those engaged in the transport, trade or other sectors). A gap analysis should be conducted comparing what was their expected normal income before the event and what they actually earn as a result of the event. This should be captured for all sectors of activities. Loss of income will result in deterioration of the living conditions of households and individuals.

### **Box 2. Treatment of Informal Sector in Impact Analysis**

- 1. Establish the average daily, weekly or monthly wages of informal sector workers by the different sectors*
- 2. Collect from Sector Specialists the length of time disruption of process in their sectors are expected to continue*
- 3. Estimate the loss of income earning by the informal workers in the sector*
- 4. Analyze what the social and economic results may be on the well-being of the informal sector workers (identifying which group may be most at risk and which will have the most advantage) as a result of the combination of increased expenditure of households due to possible increased costs of food, transport and medical expenses and decreased earnings over a period of time.*

### **Additional family or personal expenditures**

In addition to lost income, persons and households may be expected to face increased expenditure to cover higher food costs, higher transport costs and possible increased medical costs. The combination of income loss and increased expenditure may have the result of decreased overall well-being for the individual or the household.

Because male and female heads of households have different productive and reproductive roles and burdens, the effect of loss of personal income to a head of household who is male or female differs and may result in differing levels of hardship to the household. Loss of income may in turn, result in increased poverty levels in the areas affected by the disaster.

The social impact assessment team should examine the household incomes and the poverty threshold to ascertain how many households and /or individuals may fall below the poverty levels as a result of reduced income and over what period of time. By undertaking a gap analysis utilizing baseline data from selected indicators from the multi-dimensional poverty assessment surveys such as income and expenditure data, and labor force data, it is possible for the social impact assessment team to ascertain the change in status of the affected population following a disaster; and the proportion of population that may fall deeper into poverty. This information should be presented by geographic areas of the country or state, if data is available.

## Macro-Social Impact

At the macro level the social impact assessment team should consider the utilization of a selected number of indicators available at the national or state level that would be sensitive to disasters for use in measuring the impact of the disaster on the quality of life of the members of the community.

Indicators that may be sensitive to define the macro-social impact would be those whose data sets have been used in sectorial assessments and where a marked change is measurable in the limited time period of a PDNA. The availability of such data sets would enable a gap analysis between the pre-disaster situation as defined by the baseline indicators and the post-disaster situation as captured in the sectorial assessment reports. Data, such as the number of children enrolled in the school system in a specific geographic area, within a specific period of time, is one such data set (it may be presented as the number of days lost to education during the school year). As part of the assessment, the education sector assessment team would collect from the ministry or department of education the post-disaster enrollment data, thus enabling the possibility of calculating a change in the gross enrollment ratio.<sup>28</sup>

The number of families or households whose homes have been destroyed may be another indicator, which can be used. The existing housing deficit could be used as the benchmark for what the country or the State considered as goal for achieving a particular standard in the housing sector. The fact that the disaster may cause an increase in the housing deficit would be cause for concern. The delay in the state or the country meeting its housing goal may provide a sound indicator as a measure of the quality of life.

Another possible macro-social indicator could be the number of households with access to potable drinking water. This baseline indicator is usually available in the national population and housing census, or in the most recent household survey or the report on the MDGs. From the data set produced by the water and sanitation assessment team that examined the effects of the disaster on the water production and distribution in the country or State, the social impact assessment team should be able to ascertain the change in the number of persons with access to potable water as a result of the disaster.<sup>29</sup>

Other indicators that may be sensitive to disasters are those that address population density, the quality of housing as defined by the materials of construction used in the outer walls or materials used in the construction of roofing, or the use of pit latrines. With regards to the use of pit latrines, the population and housing census of 2011 indicates that more than 50% of the households of India did not have a latrine facility within premises, though this was an improvement of 10 percentage points compared to the corresponding percentage recorded during the last decade.<sup>30</sup>

<sup>28</sup>The United Nations Educational, Scientific and Cultural Organization (UNESCO), describes 'Gross Enrolment Ratio' as the total enrolment within a country "in a specific level of education, regardless of age, expressed as a percentage of the population in the official age group corresponding to this level of education. In other words the GER = number of actual students enrolled / number of potential students enrolled (the total number of school age individuals).

<sup>29</sup>The MDG Report 2014, noted that during 2012, in rural India, 88.5% households had improved source of drinking water while in urban India 95.3% households had improved source of drinking water. The prevailing trend over time, suggests attainability of nearly 100 cent percent coverage by 2015, including both rural and urban sectors.

<sup>30</sup>In 2011, the percentage of households with no latrine was reduced to 53.1% from 63.6% in 2001 at all-India level as reported by the MDG Report 2014

Using damage data from the housing sector assessment on the number of pit latrines totally or partially destroyed as a result of a disaster, the social impact assessment team can undertake a gap analysis using the data from the pre-disaster situation to measure the change in number of latrines existing.

Once the social impact assessment team is satisfied with the soundness of the analysis undertaken with regard to the separate indicators, then the findings may be constructed into a composite index, which can represent a post-disaster quality-of-life-measure. Such an index may be constructed with a 0 to 1 scale so that the index close to zero (0) would represent a low impact on the quality of life and close to one (1) would represent a high impact on the quality of life.

It has been argued that a composite index or indicator can summarize complex, multi-dimensional realities with a view to supporting decision makers. Such composite indices may be easier to interpret than a battery of many separate indicators; can assist in the assessing progress on recovery over time; and can reduce the visible size of a set of indicators without dropping the underlying information base.<sup>31</sup> The data that is selected to become part of the composite index should be selected on the basis of their analytical soundness, measurability, country or state coverage, relevance to the phenomenon being measured and relationship to each other. The creation of the said index can be initiated by the national or state government, once they have become familiar with the PDNA methodology.

### **The Psycho-Social Dimension**

Impacts also have a psycho-social dimension, which should be considered. Crises of a psycho-social nature are described as such because they involve situations where the psychological needs of the individual (i.e. psycho) are in conflict with the needs of society (i.e. social).<sup>32</sup>

The literature suggests that most people will recover from traumatic events such as emergencies and disasters without professional intervention. Some will require assistance. A small minority of people (10-20%) is at risk of developing significant mental health conditions and will require specialized mental health care.<sup>33</sup> There are various possible differential responses between women and men as a result of stressors caused by a disaster. The stressors identified are the death of a family member or loved one and personal trauma, which could result from injury or shock caused by loss of home or as a result of experiencing flooding or an earthquake.

<sup>31</sup>See Handbook on Constructing Composite Indicators: Methodology and User Guide. 2008. OECD. In <http://www.oecd.org/std/42495745.pdf>.

<sup>32</sup>Adapted from Erik Erikson. Source: <http://www.simplypsychology.org/Erik-Erikson.html>.

<sup>33</sup>Overview of the Psycho-Social view of Disasters. Source: <http://www.ncbi.nlm.nih.gov/pubmed/15453154>.

### Box 3. Psycho-social dimensions of responses to disasters by distress and gender

Distress	Female	Male
Death	Signs of hopelessness; Suicide ideation	Suicide; Increased Consumption of alcohol; Inability to resume work
Trauma	Weepiness, difficulty in decision making; Unable to engage in loving relationships; Intrusive memories; Nightmares and sleeplessness; Reduced appetite	Sleeplessness Abandonment of family; Dysfunctional behaviors

Source: Study on Psycho-Social Trauma.

The World Health Organization (WHO) has warned that following a disaster, a 'disaster syndrome'<sup>34</sup> may become apparent in as high as 75% or as low as 25% of those affected. The WHO has defined the disaster syndrome as a specific behavioral pattern that is characterized by stunned, dazed and apparently disengaged behavior.

The social impact assessment team should ascertain the quality of services that may be required to support such persons suffering from some level of post-traumatic stress disorder or are affected by the 'disaster syndrome' and over what period of time. In addition, the impact of such responses on the recovery and reconstruction of the community should be considered.

#### d) Recommendations for Macro-Social Recovery

Arising from the social impact analysis and consultation with the affected population and key stakeholders, the social impact assessment team should develop recommendations for a recovery strategy. The government may have its own social goals so it is important to review recent sector, national and state development plans or budget statements. Included a social impact assessment team as part of the assessment, should result in deeper appreciation of the social dimensions of the disaster and will make a profound difference in enabling the authorities to shift the paradigm from humanitarian relief and response to long term resilient recovery and development.

Among the key questions, which the Government wants answered is what is an indicative cost of recovery in the sector and how long is recovery estimated to take. To arrive at the cost of recovery it is important to take into consideration the cost of increasing resilience of the population in order to reduce future risk. Measures that can catalyze livelihoods, offer income generating activities and social protection measures to safeguard the communities to future risks will have to be identified and their costs should be estimated.

How long recovery may take, is a factor of not only the measures for financing for recovery but also of the capacity in related sectors such as the construction and infrastructure sectors, as road or bridges may affect access to education, health, as well as the Government's own financial capacity to meet the demands for supportive social protection measures. When all of these and other measures are taken into account, a realistic time frame can be provided to answer how soon recovery may take place in the sector.

<sup>34</sup>The Psycho-Social Consequences of Disasters. WHO 1992

# STANDARD PROCEDURES FOR SOCIAL IMPACT ASSESSMENT

## Recommended Assessment Team

The composition of the sector assessment team may vary by the type of disaster and the extent of the likely damage and production flow changes.

Organization and Personnel	Role in the Sector Assessment
<p><b>Personnel from:</b></p> <ul style="list-style-type: none"> <li>• <b>The State Department of Social Welfare</b></li> <li>• <b>State Statistics Office</b></li> <li>• <b>Local personnel of offices in the disaster-affected area who are:</b> <ul style="list-style-type: none"> <li>• Social science specialists</li> <li>• Social researchers</li> <li>• Social welfare officers</li> <li>• Statisticians</li> </ul> </li> </ul>	<p>Lead and coordinate</p>
<p><b>Personnel from:</b></p> <ul style="list-style-type: none"> <li>• <b>Ministry of Social Welfare</b></li> <li>• <b>Central Statistics Office who are:</b> <ul style="list-style-type: none"> <li>• Social scientists</li> <li>• Social researchers</li> <li>• Macroeconomists</li> <li>• Socio-economic planning analysts</li> </ul> </li> </ul>	<p>Provide baseline information and facilitate the field assessment of damages and losses</p>
<p><b>Development partners</b> (if active in the sector)</p>	<p>Participate and provide technical advice</p>

## Introduction

While the information for the PDNA focuses on quantifying damages and losses, the social impact assessment (SIA) focuses on social information that is difficult to quantify. In gathering post-disaster information, the assessment team must conduct field visits. The sources of information to enable the team to analyze post-disaster social impacts are generally:

- a. The reports from the assessment teams of the other sectors particularly on the damages and losses on housing, livelihood, basic services (health, educations, water supply) and other government services; and
- b. The findings of the SIA assessment team from the field using various survey tools.

The proper choice of instruments or tools in gathering post-disaster information must be determined by the SIA team in consideration of their appropriateness to the prevailing situation and condition. To gather the information required, the following are the possible tools that can be used, as may be determined appropriate by the team.

- Focus group discussions (FGD). This method can gather a wide range of information over a short span of time like impacts of disaster and the effect of relief and recovery across sectors and livelihoods, coping mechanisms, etc. FGDs must be structured to ensure that the opinions/voices of all the people in the sectors across all income levels are represented.
- In-depth interviews. A variety of information especially the sensitive ones like social cohesion, power struggles, corruption, etc. can be generated by this method. In-depth interviews normally cover few issues but delve deeper on these issues.
- Informal discussions and participant observations. Social relations between groups can be gathered by casual talk and observing how people interact in the disaster area.
- Simple surveys. Surveys are reliable in gathering simple and concrete data such as wage, prices, debts and interest rates, among others.

The findings and recommendations in the Social Impact Assessment should be considered as inputs in the greater identification and prioritization of recovery and reconstruction projects across the various sectors.

# Steps in Conducting a Social Impact Assessment (SIA)

## Step 1. Collect baseline information on sector assets and production flows

Pre-disaster baseline social data must be collected prior to the SIA. The following information is required at the District level, which can be gathered from the baseline information available from the different sectors.

### 1. Demography

The data required here will show the total population, the household size indicating the dependency ratio by sex. It is assumed that those below 5 years old and above 60 years old as well as those who are differently-abled are more vulnerable when disasters strike. The bigger the family size, with high dependency ratio (children, elderly and the differently-abled), the more vulnerable the households in terms of evacuation, search and rescue, food shortage, illnesses, etc. The ethnicity of the people must also be taken into consideration if the district is composed mostly of indigenous or ethnic groups. The following table can be used.

**Table 1. Information about the District**

<b>Name of District:</b>			
Poverty incidence (%)			
Maternal mortality rate:			
Infant mortality rate:			
<b>Demography</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
• Total Population			
• Total Number of Those Below 5 years old			
• Total Number of Those Above 60 years old			
• Total Number of Differently-Abled			
<b>Household Description</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
• Average size			
• Average Number of Children			
• Average Number of Those Below 5 years old			
• Average Number of Children in School			
• Average Number of Those Above 60 years old			
Land ownership			
Prevalence of malnutrition (%)			
<b>Total Number of Families/Households</b>	<b>% of Total</b>	<b>Total Number</b>	
• Headed by Male			
• Headed by Female			
• With sanitary toilets			
• Without sanitary toilets			
• With electricity			
• Without electricity			
• Belonging to ethnic minority group			

## 2. Sources of Income

To estimate potential impacts and make a reliable assessment, all the sources of income of the people should be determined. The sources of income per annum of a household from various activities are enumerated in the table below.

Table 2. Main Sources of Income of Households

Name of District					
Main Sources of Income	Number of Households	Average Monthly Income (Rs.)	Average Value of Assets per Household (Rs.)	Number of People	
				Male	Female
<b>Self-employed</b>					
1. Farming					
2. Fishing					
3. Livestock Growing					
4. Poultry Growing					
5. Microenterprises					
6. Trading (Shops and Stores)					
7. Services					
8. Transport Workers					
9. Others					
<b>Employed</b>					
1. Daily wage laborers					
2. Skilled workers					
3. Professionals					
4. Others					
<b>Other sources</b>					
1. Pension					
2. Outside Remittance					

### Notes for filling Table 2

- The total number of people categorized by sources of income can be more than the total population since many people can have multiple sources of income.
- Outside remittance refers to the monthly amount of money sent to the family whether from within or outside the country.
- However, the “average monthly income” must be the total income per month of a family corresponding to their “main source of income”. For example, the “average monthly income” of a family, which earns 80% of their income from farming and 20% from livestock, must be reflected in the row of “farming,” since it is their main source of income.

### 3. Savings, Insurance and Sources of Credit

The possession of savings and insurance coverage of the people in the area can mitigate disaster impacts and improve coping mechanism. Savings can be disposed of to recover from disasters while those with insurance coverage can easily pass on their losses to their insurer.

**Table 3. Possession of Savings and Insurance Coverage of Households**

Name of District:					
Number of Households and Amount of Insurance	Type of Insurance				
	Health	Life	Crop	Property	Others
Number of Households					
Average Amount of Coverage (Rupees)					
Savings					
	Number of Households		Average Amount per Household (Rupees)		
Possession of Savings					

### 4. Medical Services, Education, Power and Water Supply

The basic social services in the areas affected will provide information on the likely situation of the people in times of extreme disasters. The following table can summarize this information

**Table 4. Social services in the District**

Name of District:									
Public Basic Services	Quantity	Capacity	Power Source		Source of Potable Water Supply				
		Persons	Electricity	Others	Type 1	Type 2	Type 3	Type 4	Type 5
Primary School									
High School									
University									
Health Centers									
Hospitals									
Others									

### Notes for filling Table 4

- Capacity of basic services refers to enrolment in schools and the number of patients per day at the medical facilities.
- For water supply source:
  - Type 1 is sourced from a spring;
  - Type 2 is individual well with hand pump;
  - Type 3 is shared community well;
  - Type 4 is community faucet;
  - Type 5 is piped-in faucet.

### Sources of Information

The sources of baseline information may vary by state. However, the critical list of the likely sources of information is provided below.

- Information from the Ministry/ies in charge of social welfare, social planning, poverty alleviation; etc.
- Central and State Statistical Offices;
- Sector reports conducted by other ministries and development partners;
- Reports of private research institutions and the academe;
- Annual performance reports of the states concerned;
- Project evaluation reports of related sectors;
- Field visits or interviews; and
- Newspaper articles

Below are some of the important documents that are possible sources of baseline information, which are common with the other social sectors.

Ministry of Statistics and Programme Implementation	<a href="http://www.mospi.gov.in">http://www.mospi.gov.in</a>
The Registrar General & Census Commissioner, India	<a href="http://censusindia.gov.in">http://censusindia.gov.in</a>
National Institution for Transforming India	<a href="http://niti.gov.in">http://niti.gov.in</a>
Department of Higher Education Department of School Education & Literacy	<a href="http://mhrd.gov.in">http://mhrd.gov.in</a>
National Council of Educational Research and Training	<a href="http://www.ncert.nic.in">http://www.ncert.nic.in</a>
National Institute of Education	<a href="http://www.ncert.nic.in/departments/nie.html">http://www.ncert.nic.in/departments/nie.html</a>
Ministry of Human Resource Development	<a href="http://mhrd.gov.in/statist">http://mhrd.gov.in/statist</a>
Open Government Data (OGD) Platform India	<a href="https://data.gov.in">https://data.gov.in</a>
Ministry of Statistics and Programme Implementation	<a href="http://www.mospi.gov.in">http://www.mospi.gov.in</a>

The Registrar General & Census Commissioner, India	<a href="http://censusindia.gov.in">http://censusindia.gov.in</a>
National Institution for Transforming India	<a href="http://niti.gov.in">http://niti.gov.in</a>
Ministry of Health & Family Welfare	<a href="http://www.mohfw.nic.in">http://www.mohfw.nic.in</a>
Department of Health Research   MoHFW   Government of India	<a href="http://www.dhr.gov.in">http://www.dhr.gov.in</a>
Open Government Data (OGD) Platform India	<a href="https://data.gov.in">https://data.gov.in</a>
Central Bureau of Health Intelligence	<a href="http://www.cbhidghs.nic.in">http://www.cbhidghs.nic.in</a>
NHM Health Statistics Information Portal	<a href="https://nrhm-mis.nic.in">https://nrhm-mis.nic.in</a>

Note 1: Please use similar institutions at the state level for baseline Information

Note 2: For Non-Government information sources, please search suitably

## Step 2. Assess the social impacts of disaster

Estimating the social impacts in terms of the overall quality of life, especially of the poor, after a disaster requires the knowledge of pre-disaster conditions, post-disaster field visits to the affected population and comparing the post-disaster findings including the data collected by the other sectors. Normally, the most affected people are those in the poverty groups whose livelihoods are vulnerable to shocks, women, children, the elderly and the disabled. With the baseline information, the SIA team should conduct field assessment in collaboration with the local officials especially during the direct interviews, FGDs or whatever assessment tools to be used by the team (as enumerated earlier).

To cover the social impacts caused by disasters, it is recommended that the assessment team should determine which areas should be visited. It is very possible that not all areas can be visited especially in instances where the scope and extent of the disaster are widespread. The areas that will be visited must represent the pre-disaster conditions of the affected communities or districts. Examples are poor farming communities, coastal fishing villages, upland dwellers, industrial areas, informal settlers, etc. These selected areas must represent the other similar areas, which will not be visited by the team. After determining which areas will be visited, the team must evaluate the most appropriate tools to be used in generating the information required. Assessment can be also done in evacuation centers as well as in areas outside evacuation centers.

The field visit, together with the data from the reports of the other sectors, will provide the social impact assessment team information that will enable them to assess the conditions of the affected population, which will enable decision-makers to identify activities for recovery. The following are the issues that should be covered during the field visits.

1. **The number of people affected by the disaster and their present situation**, such as:
  - a. The number of people living in evacuation centers and the expected duration of their stay;
  - b. Adequacy of food supply and potable water as well as physical security;
  - c. Prevalence of diseases and availability of medical care;
  - d. The coping mechanisms of the affected people;

- e. The situation of women and children; and
- f. The vulnerabilities of the people due to the disaster.

**2. The impacts on families in terms of:**

- a. Loss of livelihood and income;
- b. Health and nutrition especially the vulnerable groups like pregnant women, lactating mothers, children, the elderly, etc;
- c. Education of children;
- d. Indebtedness;
- e. Family cohesion;
- f. Social institutions including effects on indigenous peoples; and
- g. Safety and security especially of the most vulnerable.

**3. People’s perceptions on:**

- a. The appropriateness of aid/assistance extended in terms of the goods provided, the process of distribution, etc.
- b. Post-disaster leadership and governance;
- c. Post-disaster income, quality of life, poverty and future of children, among others.

**4. The people’s plans and aspirations on:**

- a. Government’s and outsiders’ assistance;
- b. Employment and livelihood;
- c. Duration before their lives will return to normal.

The following table, with guide questions, can be used during the field assessment in a specific area in a district.

**Table 5. Questionnaire on the post-disaster conditions of the people**

Name of District:									
People Affected	Total Number		Children		Elderly		Indigenous Peoples		Remarks
	Male	Female	Male	Female	Male	Female	Male	Female	
Total Number of Affected People									
Number of People Living in Evacuation Centers									
<b>TOTAL</b>									

<b>Living Conditions of the People</b>							
Adequate Supply and Facility?	<b>Food</b>		<b>Water</b>		<b>Sanitation</b>		<b>Remarks</b>
	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	
<b>Health Conditions</b>							
	<b>Yes</b>	<b>No</b>	<b>Remarks</b>				
Prevalence of Disease?							
Adequate Medical Services?							
<b>Education</b>							
	<b>Yes</b>	<b>No</b>	<b>Remarks</b>				
Are Students Attending School?							
<b>Vulnerable Groups</b>			<b>Remarks</b>				
How is the Condition of Women?							
How is the Condition of children?							
How is the Condition of the elderly?							
Are People Safe at the Evacuation Centers?							
Are People Safe Outside the Evacuation Centers?							
Are there Displaced Ethnic Minority Groups?							
<b>Livelihood and Income</b>			<b>Remarks</b>				
What are the Types of Livelihood or Main Sources of Income of the Disaster-Affected People?							
Did the People Lose their Livelihood? Temporarily or Permanently?							
How Much Income per Month is Reduced or Lost?							
How Long Before Income and Livelihood will be Regained?							
<b>Coping Mechanisms</b>			<b>Remarks</b>				
a. Missing Meals							
b. Migration							
c. Quit Schooling of Children							

d. Allowing Children to Work	
e. Borrow Money	
f. Move in with Relatives	
g. Ask for Assistance from Relatives	
h. Look for Temporary Job	
i. Others	
<b>Family and Community Relations</b>	<b>Remarks</b>
How are Family Relations Affected by the Disaster?	
How are Community Relations Affected by the Disaster?	
<b>People's Perceptions</b>	<b>Remarks</b>
Is the type of Aid/Assistance extended Appropriate? (Food Aid, Tents, Medicines, etc.)	
Is the Distribution of Aid/Assistance Equitable? (Reaching those in need most).	
How Long do they Think their Lives will Return to Normal?	
How is Local Governance affected by the Disaster?	
What added Vulnerabilities do you foresee as a result of the disaster?	
<b>The People's Plans and Aspirations</b>	<b>Remarks</b>
What are your personal plans to speed up the return to normalcy?	
What do you wish or hope that the government and aid agencies would do to enable your family to regain your pre-disaster situation?	
Other wish or hope on how they can be assisted to return to normalcy.	

Different groups may have different perceptions, plans and aspirations. The assessment team must be able to note these differences during the FGDs and interviews during the field visit.

### Step 3. Summarize the Social Impacts in the District

Before summarizing the social impacts in the State, the assessment team must ensure that:

- a. The survey results were properly processed; and
- b. The inputs from the other sector teams are considered.

Based on this information, the findings can be consolidated at the district level and eventually at the state and the national level, if necessary. The following issues should be considered in the consolidated social impact assessment in the District.

1. **Livelihood and Income.** Loss of livelihoods and employment is one of the main factors, which reduce the capacity to cope of the disaster victims and recover their normal lives after a disaster. The assessment team must be able to identify the types of livelihoods lost and estimate the number of people who lost their sources of income and livelihood. This information can be sourced from the sectoral assessments of the other agencies. A special focus should be given to the impacts on the poor informal sector workers to provide the necessary information on how they can be assisted by the government. The damages and losses in the informal sector, which are part of the assessments in the Manufacturing, and Trade and services sectors, should be used in assessing the impacts.
  - What will be the impacts on families whose earners have lost their sources of income or worse lost their lives?
  - When will the formal and informal workers regain their levels of income?
  - How will indebtedness affect their recovery?
  - How will indebtedness affect their recovery?
2. **Security.** The conditions of the affected people can be assessed by the adequacy of food supply and potable water as well as physical security in and outside the community and evacuation centers.
  - Are the supplies of food and water enough to keep the people nourished?
  - On the other hand, criminality may also increase if there is massive food shortage. Are there enough precautions to prevent criminality including violence against women and children, human trafficking, among others?
3. **Health and sanitation.** This should describe the present situation and health risks the people face.
  - Did the post-disaster conditions cause the outbreak of diseases? If so, what are these diseases and how are they being addressed?
  - Is there any possibility of long-term effects on the peoples' health? Adverse health impacts can extend on the longer-term in cases where:
    - There are a number of people affected with post-traumatic stress disorder (PTSD), 'disaster syndrome' and other psycho-social illnesses. The social impact assessment should identify the services that may be required to support persons suffering from some level of PTSD over a period of time and the impact of such services on the recovery and reconstruction of the community.
    - Toxic wastes from industries, mines, fuel containers, etc. are leaked into the natural environment, which can cause illnesses that may become detectable only over a longer period of time.

4. **Education.** Some of the possible causes of disrupted education will be the destruction of schools; loss of family, migration and/or students may be forced to quit schooling to look for temporary jobs to augment family income.
  - What will be the effects on the education of children in the areas?
5. **Coping mechanisms.** Coping mechanisms may vary from family to family. Some may have relatives to assist them through financial remittance. Others may choose to relocate. Among poorer families, some possible options are the reduction of expenditures for food, sending children to find work, living with relatives or extended stay at evacuation centers, incurring debts or the use of savings and insurance if they have any.
  - With all the effects of the disaster, what activities do people undertake in order to adjust to their present situation?
6. **Vulnerabilities.** Disasters can cause new physical and social vulnerabilities among the members of the community. For instance, houses near the river-banks may be exposed to flooding due to erosion. Bridges that may have been weakened by floods and strong winds may pose a danger to the people using them. On the other hand, people may become more vulnerable to exploitation such as being source of cheap labor, victim of human trafficking, prostitution, etc.
  - What are the new vulnerabilities that the people are confronted with due to the disaster?

### **Special Concerns**

Considering the above circumstances, a more specific assessment should discuss the following special concerns:

1. **The situation of women, children and the elderly.** With the damages and losses in the community, what are the obvious impacts on women, children and the elderly? Are women having double the burden in terms of work? Do women, children and the elderly receive equal assistance as men? Do more girls drop out of school compared to boys?
2. **Family cohesion and social institutions.** Are there instances where families broke up due to the disaster? What were the main causes? Are religion, traditions and norms respected in post-disaster activities? What are the possible effects on family relations and traditions?
3. **Impact on indigenous peoples and/or other special groups.** There may be some special issues that affect only the indigenous peoples or cultural minorities. For instance, some groups of indigenous peoples consider the mountains or the sea where they stay as sacred. Adverse effects on these areas may have negative social impacts on these special groups. Moreover, the assessment team must be able to discern whether the disaster can affect the traditions and culture of these special groups.
4. **People's perceptions.** The perceptions of the people affected should be reported and include the following:
  - a. Appropriateness of aid/assistance extended. Are the goods provided acceptable to the norms and traditions of the people? Is the process of distribution equitable?
  - b. The perception on leadership and post-disaster governance. Is the local leadership capable of handling emergency operations? Were the people consulted on major decisions? Are there power struggles between and among the government, international development partners, the rich and the poor in the community?

- c. People's perception of their present status. How do people think of their present conditions? Do they feel that they will regain their pre-disaster quality of life and pursue their plans for their family and children?
- d. The people's plans and aspirations. Even in the worst situation, disaster victims have some plans and aspirations for the future. For instance, how do they plan to regain their normal lives? What are their intended actions in order to recover their sources of income and livelihood? What immediate assistance do they hope from the government and other development partners to help them achieve their plans? Is relocation acceptable?

### **Conclusion and recommendations**

Based on the above issues and concerns, the assessment team can make a general conclusion and recommendations emphasizing not only the adverse social impacts of the disaster but also on the potential risks and vulnerabilities that may exacerbate the present situation of the people if the concerns are not addressed immediately. The following can be highlighted in the recommendations:

1. The existing immediate needs of the people which were not fully met during the emergency phase like continuous food supply, improved safety, prevention of human trafficking, etc.;
2. The type of recovery activities that should be prioritized like water supply, those that are related to livelihood restoration, health, education, etc.
3. Other activities that will prevent further deterioration of the existing situation in the disaster-affected areas like preventive health care, disaster mitigation, etc.

These recommendations should be considered as inputs in the greater identification and prioritization of recovery and reconstruction projects across the various sectors.

The social impact assessment of the district affected should be consolidated into a state assessment report both quantitatively and qualitatively. If there are several states affected, a consolidated report for all the states should be the national social impact assessment report. The same outline is recommended for the national SIA report.

## **3: Estimation of Post-Disaster Recovery and Reconstruction Needs**

### **Introduction**

The purpose of a Post-Disaster Needs Assessment is predominantly to undertake an estimation of the financial requirements that will aid in return to normalcy in the life of the affected population and in their socio-economic development process after a disaster. Such estimation of needs should be based on an evidence-based, quantitative process that begins by estimation of disaster effects and impacts at macro, sectorial and personal or household levels, in order to provide a reliable justification for assigning financial resources for recovery and reconstruction.

In the preceding chapters, detailed descriptions have been made of the conceptual framework and definitions involved for the estimation of disaster effects and impacts; in addition, chapter four includes some advance guidance on the estimation of recovery and reconstruction requirements for specific sectors.

This chapter is devoted to a similar description of concepts and definitions as well as procedures for the subsequent estimation of overall recovery and reconstruction needs or requirements, used presently in the international arena and duly adapted to local conditions in India.

## a) Concepts and Definitions

A definition of recovery is essential before entering into the subject, especially because there are several versions of it “floating around” in different circles.

The Merriam-Webster Dictionary (which is part of the Britannica Encyclopedia) defines recovery as “the act or process of returning to a normal state after a period of difficulty”. A further example in the same dictionary applied to the case of medicine, defines recovery as<sup>35</sup> “the act of regaining or returning toward a normal or healthy state”. It is clear from such definition that recovery should involve going back to normal or pre-disaster conditions.

The United Nations International Strategy for Disaster Reduction (UNISDR), however, proposes an alternative definition<sup>36</sup> “the restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors”, which in fact involves the concept of disaster risk reduction and also includes the concept of improvement of socio-economic conditions, which is a function of normal development.

Clearly, introducing the subject of improving socio-economic conditions of the disaster-affected population into the definition of recovery supersedes (at least partially) the normal activities conducted under socio-economic development plans. Post-disaster recovery should not intrude into the scope and normal path of development; rather, post-disaster recovery should concentrate in regaining whatever delays or decline may have been caused to normal socio-economic development without going into improved levels of living conditions. Doing otherwise – i.e. attempting to reach improved development conditions for disaster-affected persons – would involve providing more development attention to these persons at the expense of others that were not affected by the disaster, thereby introducing discrimination; this is especially true for the case of developing countries where, by definition, resources for development are scarce.

In most developing countries, recovery activities are financed through specially allocated budgets, different from those of the regular development budget. International donors have special windows to provide recovery assistance, which are different from (and not interchangeable with) those used for assisting normal socio-economic development.

The introduction of disaster risk reduction features within recovery interventions are normally acceptable for financing under the special recovery window, and should pose no difficulties for inclusion. It is only the improvement of living or socio-economic conditions that should be left outside of the definition and scope of post-disaster recovery.

Thus, the most appropriate definition of post-disaster recovery would be: “the restoration of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors”. This is a combination of the Merriam-Webster Dictionary definition and that of the UNISDR, which removes any possible doubt about improving living conditions.

<sup>35</sup>See <http://www.merriam-webster.com/>

<sup>36</sup>See <http://www.unisdr.org/we/inform/terminology#letter-r>

The scope of recovery also requires clarification to avoid misunderstandings among stakeholders, and it should be made clear that you either recover from a disaster or not, and that there are no immediate stages of, or qualifications to, recovery. Some authors refer to early recovery, medium-term recovery and long-term recovery, and provide respective time frames of less than 1 year, 1 to 3 years, and 5 to 10 years for each of those types of recovery. This is a misconception. In fact, what they mean are the sequence of activities which are part of recovery which are to be carried out in the short-, medium- and long-term after a disaster; but they are not different types of recovery as recovery is a single concept. Furthermore, assigning specific time frame for recovery activities is not valid either, since each disaster or type of disaster – depending on their origin, intensity and extent – brings about different needs for recovery.

It must be borne in mind that recovery is not reached when temporary facilities are provided, but only when pre-disaster levels of production, services, personal income and full reconstruction of destroyed assets across the board (i.e. in all affected sectors of social and economic activity) are achieved. In that sense, in the transport sector recovery is achieved when destroyed bridges and road sections have been rebuilt and when the vehicular stock has been replaced, and not when temporary bridges are set up to enable minimum traffic over destroyed bridges. Recovery in water supply is achieved when the destroyed water sources or pipelines are rebuilt, and not when water is distributed to users using tanker trucks. In education, recovery is achieved when destroyed schools have been rebuilt and destroyed education materials have been acquired, and not when temporary schools are set up in tents or in rented, alternative premises. In agriculture, recovery is achieved when the subsequent crop is harvested at the same level of production and when farmers receive the same level of income for their crop, not when in-kind inputs (such as seeds, fertilizer and pesticides) are provided to farmers for planting of the next crop. In the housing sector, recovery is achieved when destroyed houses are rebuilt, and not when temporary shelter facilities are provided to the homeless families; etcetera.

The time to achieve recovery would normally vary from one sector to the other, depending on the degree of disaster effects and impact sustained, and overall recovery would be reached only when all affected sectors and persons have overcome the effects and impact of the disaster. Quantitative indicators should be used in order to define that recovery has been achieved.

Equally important is to realize that the time required for recovery after each disaster will vary depending on their intensity, geographical coverage, and the extent of the sectors affected, and that there are no rules-of-thumb to define such timeframe. The following examples may illustrate this statement. In cases of flooding that occurs at the end of the agriculture season for annual crops, recovery of crop production may be achieved when the next crop is planted and harvested; i.e. within less than one year. In the case of a dry spell occurring in the middle of the growing season for a crop, it may be possible to plant again and still obtain the crop during the same calendar year, thus achieving recovery in the same year. In a similar disaster that involves destruction of fruit trees, recovery cannot be achieved until the newly planted trees mature and begin producing again, which may take up to 5 or 8 years, depending on the type of fruit tree involved. A similar case may be illustrated when floods bring about changes in the quality and yield of agricultural soils, and recovery of production would not be achieved until different types of work (including perhaps removal of silt or additions of fertilizer or other chemicals to restore soil fertility) that may take several years, are concluded. A similar example would be the depositing of salt water from the storm surge of a typhoon or a similar tropical storm in coastal agricultural areas and where recovery may take several years until the salt excess can be removed through either natural leaching by rainfall and/or by the addition of chemicals to restore soil productivity.

## b) Scope of Post-Disaster Recovery

Experience acquired in developing recovery plans in many countries of the world in the past 40 years, reveals that post-disaster recovery activities should be grouped around the following themes or components:

- (i) **Recovery of production** levels in the productive sectors of agriculture, livestock, fishery, forestry, industry, trade or commerce, mining, and tourism;
- (ii) **Recovery of supply and access to basic services** of education, health, housing, transport and communications, water supply and sanitation, and electricity;
- (iii) **Recovery of personal or household income;** and
- (iv) **Recovery of physical assets or reconstruction,** with introduction of disaster-resilient standards.

The world-wide experience in conducting post-disaster needs assessment requires (without exception) that recovery needs be estimated for all disaster-affected sectors of social and economic activity, independently of their ownership. This is because of the inter-relations between sectors of activity, some of which are inter-linked in production chains (i.e. agriculture-industry-trade, as part of the food chain). Leaving some sectors out of the assessment ensures that no full overall recovery is achieved or that recovery is delayed beyond control, thus causing a longer period of suffering to the affected individuals and households.

In this respect, leaving out those activities that are owned by individuals and enterprises of the private sector from the assessment of disaster impact and the estimation of post-disaster recovery needs – assuming that they have the required resources to achieve recovery through having insurance and savings on their own – would invariably result in that important segments of the economy and of the labor force do not recover from the disaster, or take much longer to recover than necessary. This is so because of the existence of the aforementioned linkages among the different sectors of activity and because the insurance market penetration in India (as in all developing countries) is very limited and very often provides coverage only for asset destruction and not for production losses after disasters.<sup>37</sup>

The inclusion of all sectors of social and economic activity in post-disaster needs assessments does not imply that the Government of India (GoI) – at central, state or other levels – should finance recovery and reconstruction for all stakeholders. Instead, the idea behind the universal assessment of needs implies that the total needs for recovery and reconstruction are identified and quantified, that the GoI finances those needs within its purview and that it also interacts with the banking sector to ensure that the required credit lines, under soft-term conditions on both interest and payment period as required under post-disaster conditions, are made available to finance private-sector working capital, rescheduling of disaster-induced non-performing loans, and disaster-resilient reconstruction. Only in that fashion, is it possible to guarantee that full recovery is achieved opportunely by all disaster-affected sectors of social and economic activity and by all affected persons and enterprises.

<sup>37</sup>As an example of the above, it is to be noted that as stated recently by a high government of India official from the Ministry of Agriculture, only about 1 out of 7 farmers have crop insurance against disasters. See the power point presentation made by the Director, Department of Agriculture and Cooperation, Ministry of Agriculture, Disaster Risk Reduction: Role of Financial Institutions, presented during Roundtable Meetings on Innovations in Technologies for Disaster Rescue Efforts amongst ASEM Countries, New Delhi, 5 December 2014.

## c) Procedure to Estimate Recovery Needs

### 1. General Comments

Financial requirements for recovery must be estimated as a function of the values of destroyed assets, of the changes in the flows of the economy, and of the decline in personal or household income, as arising from the assessment of disaster effects.

The needs for recovery in the productive sectors – agriculture, manufacturing, trade, mining and tourism – are represented by the amounts of working capital required by producers to achieve recovery of production levels. The needs for recovery in services sectors – education, health, culture, transport and communications, electricity and water and sanitation – are the amounts required to restore supply to, and access by, the population. The estimation of personal or household income decline, arising from the previously-estimated drop in production at sectorial levels, is used to determine the possible financial requirements for “cash-for-work” and other income-assistance programs for the affected population. Reconstruction requirements are estimated through the estimation of the value of destroyed physical, durable assets duly supplemented to incorporate an additional cost for improved, disaster-resilient standards.

As may be observed, the assessment of disaster effects and impact and the estimation of post-disaster recovery needs is unitary process: the identification and valuation of disaster effects is used for the estimation of disaster impacts at sector, macro and micro levels of analysis, and the results of the effects and impact analyses provide inputs for the quantification of recovery and reconstruction needs.

The value of total disaster effects is not equal to the value of recovery and reconstruction needs. Instead, it has been found that (i) recovery needs have a value that is normally equivalent to a fraction of the value of estimated losses in sectorial production and of higher costs of production combined, and that any possible insurance proceeds must be deducted from them, and (ii) that reconstruction needs are usually slightly higher than the estimated value of damage or destruction of assets since they are to be rebuilt with the introduction of disaster-resilient standards of design and construction, and that the value of any existing insurance proceeds are to be deducted.

In the specific sections of this document, mention is made of the procedures to estimate the values of recovery and reconstruction needs that the sectorial assessment teams are to follow. In the following sections, however, they are presented together to illustrate the overall procedure for needs assessment across all sectors.

### 3.1 Modalities for Recovery and Reconstruction

There exists in the world, a wide array of modalities for recovery and reconstruction. India should examine the different international experiences to define the combinations that it may elect to apply to each type of disaster and its varying requirements, bearing in mind the specific customs and conditions of its population. In most cases, a combination should be made of:

- (i) Direct assistance from the central and State levels of government to the poorer strata of the population, using cash grants and in-kind donations for recapitalization and reconstruction purposes;
- (ii) Provision of softer-term credit – using lower interest rates and longer repayment periods as befits the nature of disasters in comparison to normal development financing – through the banking system to credit-worthy private individuals and businesses for both working capital replenishment and reconstruction purposes; and
- (iii) The introduction of incentives for disaster risk reduction via expanding the role of private and public insurance and increasing its coverage until universal people participation is eventually reached.

## 3.2 Procedures for Estimation of Recovery and Reconstruction Needs

The “Standard Sector Assessment Procedures” describe the manner in which recovery and reconstruction requirements are to be estimated in each individual sector of economic and social activity. In this chapter, further guidance is provided in order to reach the desired values of post-disaster recovery and reconstruction requirements in the case of the four types of recovery as identified previously.

### Production recovery

The value of production recovery requirements across the board all productive sectors (i.e. agriculture, manufacturing, trade, tourism, and mining – is to be estimated as a function of the estimated value of production losses arising from the disaster.

In each sectorial assessment for the productive sectors, the values of production of goods that will not be obtained due to the disruption of production induced by the disaster would have been estimated. While such production losses have in fact vanished from the economy and cannot be replaced, the production recovery needs refer to the amounts of working capital that producers would need in order to restore pre-disaster production levels.

While different in each productive sector, the need for working capital by the producers has been found to be a function of the value of annual losses sustained due to the disaster. That is, producers need a fraction of the value of their annual production as working capital.<sup>38</sup> Thus, based on the characteristics of each productive process and sector, the value of recovery needs may be estimated.

In addition, mention has been made of the additional and parallel needs involving the possible requirement to re-finance or re-schedule (under softer-term loan conditions) pre-disaster loans that producers may have had prior to the disaster, as well as – in some cases – to provide temporary tax relief to individual and business producers after the disaster, by reducing the rates of taxation related to production and sales.

### Service supply and access recovery

The value of recovery requirements for the supply and access to social and infrastructure services (housing, education, health, transport and communications, electricity and water supply) includes two possible types:

- (i) recovery needs by service providers, and
- (ii) recovery needs by individual households.

<sup>38</sup>As an example, farmers require about 18-25 per cent of the value of the crop to use as working capital, depending on the specific crop and varieties.

Service recovery requirements by provider enterprises (public or otherwise) refer to the amounts required to cover higher costs of service operation and provision, arising due to the disaster, which involve expenditures above the normal operations budget of the service providers, which are estimated as higher costs of operation in the sectorial assessments.<sup>39</sup> It is essential that these needs be met as part of recovery to avoid the providers to utilize their normal budget resources to meet them since their use would entail a cost of opportunity for other normal activities that are otherwise left undone.

Service recovery requirements at the personal or household levels may arise after disasters when the enterprise service providers decide to transfer higher costs of operation in the systems to the consumers, which would cause an overall higher cost of living to the affected persons and households thereby leading to a lower quality of life arising from the disaster.

As may be foreseen, enterprise service providers that do not obtain recovery resources to reinforce their financial position may elect to increase tariffs or rates charged to clients, thereby transferring the higher costs to consumers. In some cases, an alternative solution to this, in order not to affect further personal or family finances, is the temporary introduction or increase of government subsidies for the services in question.

### **Personal income**

The value of personal income recovery represents the amounts of income losses sustained by the affected labor force across all affected sectors of economic activity, formal or informal, as a result of the disaster. These amounts may be used to define the scope and financial requirements of special, “cash-for-work” schemes that may be part of reconstruction.

Personal or household income losses are to be estimated across all sectors for the case of vulnerable population . Once all production<sup>40</sup> losses in the productive sectors have been estimated as part of the assessment, an analysis is to be made that estimates income decline on the basis of the disaster impact on production. A comparison of post-disaster versus normal production levels, and the numbers of the labor force and vulnerable labor force, together with the usual wages they obtain, would yield an estimate of the employment and income losses at personal and household levels. Furthermore, using available data on poverty numbers and income thresholds in the affected areas, the above would enable to estimate possible increases in the poverty head count.

Once those estimations are completed, it is feasible to define a program to assist those persons and households that would otherwise face income decline, with special reference to those falling below the poverty-level threshold. The cost of such assistance program – including cash-for-work programs and income-diversification assistance – represents the needs for personal income recovery.

### **Physical recovery or reconstruction**

The value of reconstruction requirements (or physical recovery) is obtained by increasing the estimated value of damage, as obtained in all sectors across the board – by the additional costs involved in introducing

<sup>39</sup>Higher education fees, higher health care costs, costs of temporary housing, higher costs of transport, electricity and water supply, are typical examples of these increased costs of operation in service provision.

<sup>40</sup>This vulnerable population refers to persons whose income does not derive from permanent employment. Government and large private enterprise employees are usually free of such possibility; however, micro-, small to medium size enterprise labour force and the informal traders would normally face income decline after a disaster.

disaster risk reduction, through improved design and construction standards to increase disaster resiliency and, in selected cases where there are no other options, in relocating strategic activities in safer geographical areas where disaster risk is much lower.

In Chapter IV, details are given for the manner to estimate such reconstruction requirements, and examples are given of the possible cost increases involved, for each and all sectors of economic and social activity.

It is essential that such increased costs of reconstruction are made available to affected persons and households to avoid reconstruction with the same or even lower construction standards that would cause an increased or higher disaster risk that what was present before the disaster. For this, reconstruction needs may be channeled through alternative modalities to the affected population:

- (i) Grants and in-kind provision of construction materials for reconstruction to poor individuals and households, together with technical assistance for them to adopt and comply with improved design and construction standards; and
- (ii) Soft-term credit provision (at lower-than-normal interest rates and for longer repayment periods, as befits a post-disaster situation) to credit-worthy individual persons and enterprises, through the development and private banking sector, who did not have insurance on assets or which only had partial insurance;

## **d) Monitoring of Recovery**

It is essential for any post-disaster program to have adequate quantitative indicators to monitor progress implementation and the eventual achievement of recovery. A quality-of-life composite indicator – as mentioned in the section on macro-social impact assessment of this methodology – may be used advantageously for such a purpose.

Such composite indicator of disaster impact on quality of life for disaster-affected people or households would enable both a quantitative measure of disaster impact at personal or household levels, using data that is easily obtainable during post-disaster assessments, and a way to measure progress on post-disaster recovery. This quality of life indicator includes the weighting of pre- and post-disaster levels of a few, quantitative sectorial indexes, such as:

- Housing deficit;
- Number of education days provided to students in the year;
- Number of absence-from-work days due to injury, disease, psycho-social trauma;
- Personal or household income;
- Number of persons below poverty level;
- Direct water supply connection at home; and
- Direct connection to electricity grid.

In addition, for cases of slow-evolving disasters such as drought or health crises, the following additional indexes may be included:

- Number of persons facing food insecurity; and
- Number of persons facing malnutrition.

# GENERAL PROCEDURE FOR ESTIMATING POST-DISASTER RECOVERY AND RECONSTRUCTION NEEDS

The following steps are recommended to be undertaken by each sector after the damages and losses are estimated (The said steps below are integrated in the steps for the sector assessment guidelines). It should be noted that although policy measures for recovery may be common or general in nature, different sectors would have different projects and strategies identified for implementation.

## Step 1. Identify recovery and reconstruction strategies

After the consolidation of the field assessment, the assessment team must identify or recommend the policies and strategies to be followed for recovery and reconstruction for the sector. The following are some of the general policies and strategies that could be considered for the sector.

### A. Policy measures

There are certain policies that can be adopted which can provide incentives to the private sector to reconstruct damaged educational facilities with higher standards of resilience over a limited period.

Among them are:

1. Tax breaks for private schools like real estate and other taxes;
2. Exemption from payment of building permits and other related fees;
3. Duty-free importation of construction materials and equipment during the recovery and reconstruction phase; and
4. Bank guarantees on loans given extension by the government to enable the private sector to rebuild immediately.

### B. Strategies

The following general strategies should be considered for the education:

- a. Building Back Better (BBB).** Design recovery activities based on BBB principles will promote longer-term disaster risk reduction and management. BBB principle should also look at the how to make education facilities safer from future disasters, the advantages of resettlement in disaster-safe areas instead of rebuilding in the same disaster-prone areas, etc.
- b. Focus on the most vulnerable and socially disadvantaged groups such as children, women, and the disabled.** Recovery programming needs to give priority to the most vulnerable groups, including women-children, the poor and those with special needs.
- c. Community Participation and Use of Local Knowledge and Skills.** The participation of the community in all process (identification, planning, design and implementation) of recovery activities will help ensure the acceptability of projects and optimize the use of local initiatives, resources and capacities.
- d. Secure development gains.** Recovery strategies, although may be a separate set of activities, must be supportive of existing development plans and must attempt to re-establish and secure previous development gains.

- e. Coordinated and coherent approaches to recovery.** Projects for disaster recovery must have the full and effective coordination among all involved agencies based on comprehensive information exchange, flexibility in administrative procedures, and uniformity of policies. In some instances, a special new agency may be needed to oversee, coordinate and monitor complex disaster recovery programs. Under this strategy, capacity building activities for the local public administration may be part of the recovery activities, including a well-defined monitoring and evaluation system for the overall implementation of the recovery plan.
- f. Efficient use of financial resources.** The overall strategy should also include the identification of fund sources that are suited for the recovery activities. It should be clear how assistance to the recovery of the private sector would be delivered. Also, some cheaper source of funds from international donor partners should be initially identified for longer-term expensive projects.
- g. Transparency and accountability.** The overall plan and implementation of projects for recovery must be transparent, especially to those affected, through open and wide dissemination of information on all aspects of the recovery process.

## Step 2. Estimate recovery needs

Recovery needs are intended to bring back normalcy in the sector as quick as possible. In the vital sectors, quick recovery efforts must be undertaken to prevent the delay of supply of goods and services to the affected people especially those who are more vulnerable. The government must ensure that goods and services are normalized as soon as possible. Some of the possible recovery related activities are:

- Continued food and supply while affected people are rebuilding homes and their livelihood.
- Setting up temporary housing by using tents, containers or other similar facilities while planning for more permanent solutions.
- Provision to farmers of agricultural inputs inputs to enable them to replant soonest.
- Reactivation of education activities under special conditions such as more intensive utilization of undamaged education facilities, by establishing several daily “shifts” instead of normal ones or rental of alternative premises which can be used as school buildings.
- Repair of schools used as temporary shelter and that may have sustained damage due to overuse.
- Replacement of medicines and other vital equipment in hospitals which cannot wait until reconstruction begins.

## Step 3. Estimate reconstruction needs

Reconstruction needs are generally long-term in nature (3 years or more) and are intended to ‘build back better’ from the ruins of a disaster. The possible reconstruction could include the following:

- Reconstruction of health center and public schools under a building-back-better strategy to ensure future disaster resilience through the adoption and enforcement of improved construction standards;
- Relocation of hospitals, schools, houses and other buildings to safe areas, as necessary. In this case, the additional costs land acquisition, and basic services provision (water, sanitation, electricity, etc.) should be included.

- Soft-term credit for reconstruction of private assets. Such schemes can be accompanied by technical assistance for improved disaster resilient standards of construction;
- Structural retro-fitting of undamaged or partially damaged structures so that they are not affected by disaster event in the future; and
- Other mitigation measures such as construction of support infrastructure to prevent serious landslides and floods and other hazards.

#### Step 4. Prioritize identified projects for recovery

Among the projects identified, relative priorities can be set in order to determine which among them are the more important. Based on the broad strategies for recovery, the assessment team should select the priority projects/activities among the identified needs. The prioritization can be made by using a set of impact indicators and the level by which the projects can achieve said impacts. Examples of the criteria that can be used are the following, among others:

1. Economic impact, which can be evaluated in terms of the relative cost to the government of not undertaking reconstruction or rehabilitation.
2. Equity and social impact, which can be in terms of the number of beneficiaries who are poor and destitute and who could not afford to rebuild on their own without outside support.
3. Sustainability, which can be in terms of the reduction of risks and vulnerability of the people and other economic assets to future disasters.

The criteria above can be placed in a matrix like the one below where the impacts are ranked according to low, medium or high. This matrix can show the relative benefits of proposed projects to the people in the affected areas, which, in turn, will inform and assist the government in determining the priority projects within the sector.

**Matrix 1. Impacts of identified post-disaster projects**

Name of Proposed Project	Expected Impacts and their Levels of Impact on Recovery								
	Economic Impact			Equity and Social Impact			Sustainability		
	High	Medium	Low	High	Medium	Low	High	Medium	Low

### Step 5. Summarize the estimated recovery and reconstruction needs

Based on the prioritized recovery and reconstruction needs, a summary should be created by the assessment team enumerating the post-disaster projects for the recovery and reconstruction. It should be noted that assistance to the private sector, which can be extended as direct assistance or through credit, is purely based on the decision of the government. The following table can be used.

**Table 1. Summary of recovery and reconstruction needs in the sector.**

List of Generic Projects Needed for Recovery and Reconstruction	Amount Needed
	(Rs.)
<b>Recovery Needs</b>	
<b>TOTAL</b>	
<b>Reconstruction Needs</b>	
<b>TOTAL</b>	
<b>GRAND TOTAL</b>	

The final policies, strategies and projects for recovery should be identified by the concerned Disaster Management Office of the State, based on the sector assessment reports.

## **ABOUT THE INSTITUTE**

National Institute of Disaster Management (NIDM) constituted on 30.10.2006 under The Disaster Management Act 2005 has been entrusted with the responsibility for planning and promoting training and research in the area of disaster management, documentation and development of national level information base relating to disaster management policies, prevention mechanism and mitigation measures. Re-designated from the National Centre for Disaster Management of the Indian Institute of Public Administration on 16th October 2003, NIDM is steadily marching towards the mission of making a disaster resilient India by developing and promoting a culture of prevention and preparedness at all levels.

## **FUNCTIONS**

Under The Disaster Management Act 2005, the Institute, has been entrusted with the following functions:

- Develop training modules, undertake research and documentation in disaster management and organize training programmes
- Formulate and implement a comprehensive human resource development plan covering all aspects of disaster management
- Provide assistance in national level policy formulation
- Provide required assistance to the training and research institutes for development of training and research programmes for various stakeholders
- Provide assistance to the State Government and State training institutes in the formulation of State level policies, strategies, disaster management framework and any other assistance as may be required for capacity building
- Develop educational materials for disaster management including academic and professional courses
- Promote awareness among stakeholders including college or school teachers and student, technical personnel and others associated with multi-hazard mitigation, preparedness and response measures
- Undertake, organize and facilitate study courses, conferences, lectures, seminars within and outside the country to promote the aforesaid objectives
- Undertake and provide support for publication of journals, research papers and books as well as establish and maintain libraries etc.



Resilient India - Disaster free India

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