



सत्यमेव जयते

HANDBOOK

POST DISASTER

NEEDS ASSESSMENT

INDIA



Resilient India - Disaster free India

National Institute of Disaster Management (NIDM)

(Ministry of Home Affairs, Government of India)



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**HANDBOOK
POST DISASTER NEEDS ASSESSMENT INDIA**

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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।

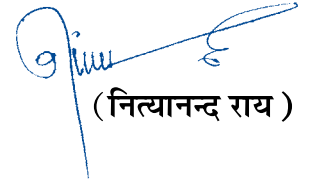
माननीय प्रधानमंत्री, श्री नरेन्द्र मोदी जी ने एशियन मंत्रीगण सम्मेलन में आपदा प्रबंधन को वैज्ञानिक आधार पर करने हेतु 10 बिंदुओं को चिन्हित किया। अभी हाल ही में राष्ट्रीय आपदा विमोचन दल द्वारा आयोजित कार्यशाला में माननीय गृह मंत्री, श्री अमित शाह जी, ने उन्हें दोहराते हुए सभी प्रतिभागियों से उसे सुनिश्चित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



कमल किशोरे
सदस्य
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3rd 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

nidm

Resilient India - Disaster free India

Maj Gen Manoj Kumar Bindal
VSM

Executive Director



राष्ट्रीय आपदा प्रबंधन संस्थान

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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 महाविचार: 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. Vij, 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.

NIDM also acknowledges the support and guidance provided by Ministry of Home Affairs especially Shri R. K. Singh, the then Union Home Secretary and subsequent home secretaries Mr. L. C. Goyal, Mr. Rajiv Goswami Mr. Rajiv Mahrishi. NIDM also acknowledges Mr. Rajiv Guaba for his support.

NIDM is thankful to the team of The World Bank Shri Saurabh Dani, Shri Deepak Singh, and Shri Anup Karanth for their continued support in the completion of the study.

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

NIDM acknowledges Dr. K. J. Ananda Kumar, Capt. Vandana Srivastava, Ms. Rubal Saroha, Mr. Shekher Chaturvedi, Ms. Priyanka Chowdhary, Shri Priyank Jindal and Mr. Rajesh Kumar Singh who supported for the completion process of the study. NIDM extends thanks to our Secretarial support from Ms. Rani Dhakad, Mr. Ramesh Kumar, and Mr. S. S. Bisht, Mr. A. K. Pandey, Shri Santosh K. Tiwari, Shri Rajiv Kumar and administrative support staff. NIDM also acknowledges support of state governments for supporting the endeavor of NIDM.

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

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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 as a separate and additional area of disaster management, while building resilience to future events. To undertake this new methodology, a core team of sector specialists from State and National levels must be trained. In this way, the burden of work of the Revenue Commissioners will not be increased.

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, and enables the prompt disbursing, such assistance to disaster-affected people, 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 purpose. 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 well being.

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 which 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

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

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

1: Introduction

Disasters that negatively affect living conditions of the population and slow down overall socio-economic development arise from the combined action of natural phenomena of extraordinary magnitude and the existing vulnerabilities of human settlements and the environment. Such disasters produce the destruction of capital and physical assets, generate interruption and decline in the production of goods and services, and slow down human development.

National governments strive to assist the affected population to overcome the negative impact of disasters and implement recovery and reconstruction programs. These programs often require significant and unexpected amounts of financing, which, in the absence of sufficient resources, are deducted from normal development expenditures and investment. For that reason, the estimation of costs involved in post-disaster recovery and reconstruction activities needs to be made in the most objective and reliable manner, utilizing evidence-based and quantitatively reliable information to ensure the minimum disruption of on-going development programs.

Methodologies for estimation of post-disaster recovery and reconstruction financial requirements have evolved significantly in the past forty years. Methodological tools that enable the estimation of the value of disaster effects and impacts on the economy and social well being, and the subsequent identification and quantification of needs for recovery and reconstruction, have been developed, tried, proven and adopted in the world.

In the case of India, that faces frequent natural disasters, efforts have been made to reduce the population's vulnerability to disasters. However, the procedures for estimating disaster effects and impact and the requirements for recovery and reconstruction have lagged behind in comparison to other countries. Furthermore, the differences in the procedures used in different states of India make it difficult to adopt a uniform methodology.

The Authorities are keen to close such gaps through the implementation of a World Bank sponsored technical cooperation project entitled National Cyclone Risk Mitigation Project. Under this project there is a component to adapt the current international procedures for disaster impact and post-disaster recovery and reconstruction needs assessment to Indian conditions, which the country and its different States may adopt in the very near future. The Asian Disaster Preparedness Center (ADPC) has been entrusted to develop such undertaking, in direct cooperation with the National Institute of Disaster Management (NIDM).

The present document describes the results of such adaptation processes and presents the procedures for the assessment of disaster effects, the analysis and quantification of disaster impact at macro-economic, macro-social and personal and household levels, and the estimation of post-disaster financial requirements to achieve recovery and disaster-resilient reconstruction.

2: Evolution of Post-Disaster Assessments

Due to the relatively infrequent occurrence of disasters, their social and economic impacts were not often assessed by the middle of the twentieth Century. Whenever disasters occurred, governments would make an estimation of the cost of reconstruction based solely in the value of destroyed physical assets, mostly buildings, roads, bridges, etcetera. Little, if any, attention was paid at that time to the social and human development impacts caused by disasters and the recovery costs to achieve normalcy after such events.

In 1965, however, in view of the increased occurrence of major disasters in the world, a decision was adopted at the General Assembly to increase the UN's ability to help people stricken by disasters. In 1971, the General Assembly established the Office of the United Nations Disaster Relief Coordinator (UNDRO), with headquarters in Geneva, in view of the magnitude and extent of the disasters that occurred in 1970 (See list below) which brought about international concern for the provision of assistance to the affected population.

Date	Location	Disaster	Effects
January 5, 1970	Yunnan, China	7.7 MS earthquake	15,600 deaths
May 31, 1970	Ancash, Peru	7.7 MS earthquake	67,000 deaths, 50,000 injured, 1,86,000 buildings destroyed
November 13, 1970	Bangladesh	120-mph cyclone	About 5,00,000 deaths and widespread destruction

While UNDRO was not intended to assume all the responsibilities of meeting disasters from its own resources, its main function was that of catalyst and coordinator of donors of aid and services. UNDRO had the capacity to define the specific assistance needs arising from a disaster and to respond rapidly by identifying and mobilizing potential sources of relief. UNDRO's mandate also included assisting governments in preventing disasters or mitigating their effects by contingency planning, in association with similarly concerned voluntary organizations. It promoted the study, prevention, control, and prediction of natural disasters and gathered and disseminated information relevant to disaster relief.

Furthermore UNDRO defined the general conceptual framework for assessing disaster effects and impacts. In 1979 it published a volume of its series on current knowledge on disaster prevention and mitigation entitled *Economic Aspects* that outlined the definitions of disaster damage, indirect losses and macroeconomic or secondary impact.¹

After the Christmas earthquake, that devastated the capital of Nicaragua in 1972, the United Nations Economic Commission for Latin America (UN-ECLAC) undertook the first-ever full assessment of

¹ Office of the UN Coordinator of Disaster Relief (UNDRO), *Disaster Prevention and Mitigation, Compendium of Current Knowledge; Volume 7, Economic Aspects*, United Nations, Geneva and New York, 1979.

disaster impact that comprised not only the value of destroyed assets but an estimation of changes in economic flows (indirect production losses) for the affected Central American economy, and assisted the Nicaraguan Government in preparing a plan for economic recovery and reconstruction. Subsequent similar assessment of other major disasters in the Latin America and Caribbean region enabled UN-ECLAC to develop a standard methodology to comprehensively estimate the socio-economic impact of disasters, which was first published in 1991 with support from the Government of Italy.² This methodology, which was informally called DaLA methodology, enabled the assessment of direct and indirect disaster effects across all sectors of economic and social activity and provided a basis for estimating macro-economic impact (or secondary effects) of disasters of every kind, and provided inputs for formulating economic recovery and reconstruction plans.

During the 1990s UN-ECLAC, in cooperation with other United Nations agencies with which it had joint units or with which it had established close working relations, such as the Food and Agriculture Organization (FAO), UN-HABITAT, the United Nations Environment Program (UNEP), the Pan-American Health Organization (PAHO/WHO), the United Nations Industrial Development Organization (UNIDO) and others, further developed and expanded the methodology to include the analysis of disaster impact on the environment, and applied it in a relatively large number of disaster cases that occurred in the Latin America and Caribbean region, assisting many of its member States in defining post-disaster recovery and reconstruction programs. This resulted in an expanded and updated version of the methodology that was published in 2003 with the support of the Government of The Netherlands and the World Bank.³

In 2001, after the Gujarat earthquake in India, the World Bank and other international agencies assisted in the assessment of disaster impact, in which the UN-ECLAC methodology was partially applied for the purpose of defining recovery and reconstruction requirements and plans.⁴

Through the auspices of the Asian Disaster Preparedness Center (ADPC) the ECLAC methodology was disseminated in the Asian region. A technical assistance project financed by the World Bank and executed by ADPC enabled the methodology to be adapted and transferred to the State of Gujarat, India, in 2004-2005, in which the Gujarat State Disaster Management Agency (GSDMA) was the official government counterpart. The methodology was also used to estimate the economic impact of the Severe Acute Respiratory Syndrome (SARS) epidemic that occurred in Singapore in 2003.⁵ The impact of the Indian Ocean earthquake and Tsunami that affected Indonesia,⁶ Thailand,⁷ India,⁸ Sri Lanka,⁹ and the Maldives

² Economic Commission for Latin America and the Caribbean, *Handbook for Estimating the Socio-Economic Effects of Natural Disasters*, United Nations, Santiago, Chile, 1991.

³ Economic Commission for Latin America and the Caribbean, *Handbook for Estimating the Socio-Economic and Environmental Effects of Disasters*, United Nations, Santiago and Mexico, 2003.

⁴ See India, *Gujarat Earthquake Recovery Program Assessment Report*, World Bank and Asian Development Bank (ADB), 14 March 2001.

⁵ See Jovel, Roberto, *Estimation of the Economic Impact of the Severe Acute Respiratory Syndrome (SARS) in Singapore*, Asian Disaster Preparedness Center (ADPC), Bangkok, 2005.

⁶ See Indonesia, *Preliminary Damage and Loss Assessment, the December 26, 2004 Natural Disaster*, World Bank, Jakarta, 19 January 2005.

⁷ See Jovel, Roberto, *The Economic Impact of the 26 December 2004 Indian Ocean Tsunami in Thailand*, Asian Disaster Preparedness Center (ADPC), Bangkok, August 2005.

⁸ See India, *Post-Tsunami Recovery Program; Preliminary Damage and Needs Assessment*, Asian Development Bank (ADB), United Nations and World Bank, 8 March 2005.

⁹ See Sri Lanka *Post-Tsunami Recovery Program; Preliminary Damage and Needs Estimation*, Asian Development Bank (ADB), Japan Bank for International Cooperation (JBIC), Japan International Cooperation Agency (JICA), and World Bank, Colombo, January 2005.

Islands¹⁰ was also estimated using the ECLAC methodology. A comparative analysis of the socio-economic impact of the Indian Ocean Earthquake and Tsunami in the five affected countries was made by the Asian Disaster Preparedness Center (ADPC) to highlight commonalities and differences among the countries,¹¹ and to foster recovery.

When the World Bank established the Global Facility for Disaster Reduction and Recovery (GFDRR) in 2006, a decision was taken, after an in-depth analysis of existing assessment methodologies had been conducted, to adopt the UN-ECLAC methodology for disaster impact and post-disaster needs assessment. Efforts were made to further refine it to include the analysis of impact at the personal or household levels and to standardize the quantitative estimation of recovery and reconstruction financial requirements across all sectors of social and economic activity. Additional procedures were designed to enable the estimation of personal and household income decline arising from sectorial production losses after disasters. Recovery needs were to be systematically estimated to ensure restoration of personal income, availability of minimum levels of basic services (including education, health and nutrition, transport, water and sanitation, electricity, etcetera), focusing particularly on important need for recovery of production levels (in agriculture, livestock, fishery, manufacturing, commerce, tourism, mining, etcetera). Reconstruction requirements would be estimated on the basis of the cost of rebuilding destroyed assets with inclusion of disaster-resilient standards to reduce disaster risk.

The GFDRR produced a set of Guidance Notes for the application of the expanded UN-ECLAC methodology that now enabled the estimation of not only the value of destroyed assets and of the changes in production flows of goods and services, but the overall macro-economic impact and the preliminary estimation of disaster impact on personal or household levels of income and costs of living.¹² In addition, more than 800 World Bank staff and more than 1,500 government officials from disaster-prone developing countries in Asia, Africa and Latin America and the Caribbean were trained on the application of the expanded methodology.

Simultaneously, the GFDRR, in cooperation with the United Nations System and the European Union (EU), was assisting many national governments located all over the world in estimating disaster impacts and the financial requirements for post-disaster recovery and reconstruction. Utilizing the information obtained since 1972 in the assessment of disaster effects and impact through the application of the methodology, a damage-and-loss database was established at GFDRR, which provides all existing information on those cases of disaster. The database provides information on the value of destroyed goods and production decline caused by disasters in each affected sector of economic and social activity, as defined in the world-wide system of national accounts.

¹⁰ See *Republic of the Maldives, Tsunami: Impact and Recovery, Joint Needs Assessment*, World Bank, Asian Development Bank (ADB), and United Nations, February 2005.

¹¹ See Jovel, Roberto, *Regional Analysis of Socio-Economic Impacts of the December 2004 Earthquake and Indian Ocean Tsunami*, Asian Disaster Preparedness Center (ADPC), Bangkok, January 2006.

¹² See Jovel, Roberto, Mudahar, Mohinder, et al, *Guidance Notes for Damage, Loss and Needs Assessments*, 3 Volumes, Global Facility for Disaster Reduction and Recovery (GFDRR), World Bank, Washington, D.C., 2010 (Available in English, French and Spanish).

Table 1. Estimation of Damage and Losses Caused by Disasters in Asia (2000 to 2013)

(Inflation adjusted to 2010)

Year	Disaster	Location and Country	Million US Dollars		
			Total	Damage	Losses
Disasters of Geological Origin					
2001	Earthquake	Gujarat, India	3,522.9	2,694.7	828.2
2004	Earthquake & Tsunami	Indonesia	5,115.3	3,357.4	1,758.0
2004	Tsunami	India	1,406.4	660.7	745.7
2004	Tsunami	Sri Lanka	1,670.6	1,314.5	356.2
2004	Tsunami	Maldives Islands	692.8	517.1	175.8
2004	Tsunami	Thailand	2,526.7	584.8	1,941.8
2005	Earthquake	Kashmir, Pakistan	3,194.5	2,549.6	644.9
2006	Earthquake	Yogyakarta, Indonesia	3,375.7	2,636.6	739.1
2009	Earthquake	West Java, Indonesia	212.3	202.8	9.5
2009	Earthquake	West Sumatra, Indonesia	2,293.0	2,060.0	233.0
2010	Volcanic Eruption	Mt. Merapi, Indonesia	469.6	126.5	343.1
Disasters of Hydro-Meteorological Origin					
2007	Cyclone Sidr	Bangladesh	1,751.9	1,211.3	540.6
2007	Floods in Jakarta	Indonesia	601.8	205.2	396.6
2008	Cyclone Nargis	Myanmar	4,101.8	1,773.3	2,328.5
2009	Typhoon Ketsana	Lao PDR	58.1	41.9	16.1
2009	Typhoon Ketsana	Cambodia	133.4	58.7	74.7

2009	Typhoons Ketsana & Parma	Philippines	4,429.3	1,467.1	2,962.2
2010	Floods	Sri Lanka	50.6	23.4	27.2
2010	Floods	Pakistan	10,056.1	6,496.2	3,560.0
2011	Floods	Thailand	44,247.4	19,565.5	24,681.9

In the Asia region, many cases of disasters were analyzed taking advantage of the methodology since 2001.¹³ Table 1 summarizes the estimated total values of damage and losses in the disasters that were assessed using the expanded UN-ECLAC methodology.¹⁴ Data is available in each of those cases of disaster in a dis-aggregated fashion, for each and all of the standard sectors of economic and social activity as defined in the worldwide system of national accounts, which fact enables comparisons between disasters in different countries.

Table 2 provides information on the sectorial dis-aggregation for the estimation of disaster effects (damage and production losses) that is followed in the expanded UN-ECLAC methodology, for one of the cases of disaster analyzed in Asia. The same pattern is followed in all assessments that are included in Table 1, which allows for comparisons between disasters at any given location and time of occurrence.

¹³ It needs to be pointed out that the originally-envisaged list of assessed disasters to be analyzed, as shown in the ADPC-NIDM contract of services, is shorter than the number of cases actually analyzed for this study, and that the ADPC project experts participated directly in the assessment of all but two of the cases so that they have a thorough knowledge of their scope, limitations and accuracy of results.

¹⁴ Needless to say, not all disasters that have occurred in the Asia region have been assessed using the UN-ECLAC methodology. Those shown in the table are the few ones that occurred in the Asian developing countries that have requested such type of assessment to be implemented.

Table 2. Detailed estimation of disaster effects after 2009 Typhoons in the Philippines

	Million US Dollars		
	Total	Damage	Losses
Social			
Housing	730.40	541.60	188.80
Health	123.80	105.50	18.30
Education & Culture	64.90	59.50	5.40
Infrastructure			
Electricity	33.90	15.20	18.70
Water & Sanitation	24.30	7.90	16.40
Flood-control works	15.30	15.30	
Transport	159.90	138.70	21.20
Communications	4.10	4.10	
Public Administration	7.20	6.30	0.90
Productive			
Agriculture	849.30	80.10	769.20
Manufacture	403.30	209.20	194.10
Trade	1,900.60	256.20	1,644.40
Tourism	66.30	12.30	54.00
Total	4,383.30	1,451.90	2,931.40

The data included in Table 1 can be best understood or visualized when some comparators are used: first, the significance of a disaster may be observed when the value of damage and production losses is compared to the size of the affected country's economy; second, a comparison can also be made of the value of destroyed assets (or damage) with the value of fixed gross capital formation (GFKF) of the affected country, to provide a measure of the domestic capacity to rebuild after the disaster; third, the value of production losses may be compared to the value of the country's gross domestic product (GDP) to provide a first indication of whether overall economic growth may be affected; and fourth, the value of per capita damage and losses yields a first idea of the possible impact at personal level. Table 3 shows the values of such comparators for the disasters included in Table 1.

Table 3. Selected comparators for disaster effects in Asia 2001 to 2013

Disaster		Effects/GDP %	Disaster		Losses/GDP, %
2004	Tsunami Maldives Islands	87.1	2004	Tsunami Maldives Islands	22.1
2012	Thailand Floods	13.6	2011	Thailand Floods	7.6
2008	Myanmar Cyclone	13.0	2008	Myanmar Cyclone	7.4
2004	Tsunami Sri Lanka	7.7	2010	Pakistan Floods	2.2
2010	Pakistan Floods	6.2	2009	Philippines Typhoons	1.8
2005	Kashmir Earthquake	2.9	2004	Tsunami Sri Lanka	1.6
2007	Bangladesh Cyclone	2.7	2007	Bangladesh Cyclone	0.8
2009	Philippines Typhoons	2.6	2004	Earthquake/Tsunami Aceh	0.7
2004	Earthquake/Tsunami Aceh	1.9	2009	Cambodia Typhoon	0.7
2004	Tsunami Thailand	1.5	2005	Kashmir Earthquake	0.6
Disaster		Damage/GFKF, %	Disaster		Effects/ Person, US\$
2004	Tsunami Maldives Islands	239.4	2004	Tsunami Maldives Islands	2,309
2004	Tsunami Sri Lanka	28.0	2011	Thailand Floods	666
2010	Pakistan Floods	25.2	2004	Tsunami Sri Lanka	85
2011	Thailand Floods	24.8	2008	Myanmar Cyclone	83
2005	Kashmir Earthquake	14.0	2010	Pakistan Floods	59
2007	Bangladesh Cyclone	7.1	2009	Philippines Typhoons	48
2009	Philippines Typhoons	5.7	2004	Tsunami Thailand	39
2004	Earthquake/Tsunami Aceh	4.9	2004	Earthquake/Tsunami Aceh	24
2006	Yogyakarta Earthquake	3.4	2005	Pakistan Earthquake	20
2009	Cambodia Typhoon	3.3	2006	Yogyakarta Earthquake	15

From the above information, it is possible to infer that the most significant disaster included in the assessments conducted in the Asia region was that of the 2004 tsunami in the Maldives Islands since the combined value of damage and losses represented 87 per cent of the value of the country's gross domestic product, followed at a distance by the 2012 Thailand floods (13.6 per cent of GDP) and the 2008

Myanmar cyclone (13 per cent), while the magnitude of the 2004 earthquake and tsunami in Indonesia, while causing over 2,00,000 deaths, only represented less than 2 per cent of the country's gross domestic product.¹⁵ A very similar statement may be made in relation to disaster impact on production (comparing production losses versus GDP).

In addition to the above, it may be noted that when comparing the value of damage or destroyed assets vis a vis the national capacity of constructing fixed capital, the most significant disaster was, again, that of the 2004 tsunami in the Maldives Islands (239.4 per cent), which is a reflection of the degree that the country's capacity for building fixed capital was to be engaged for post-disaster reconstruction. Putting it into different words, this ratio or comparator provides an insight into the kind of efforts and time required for reconstruction. Next in the descending scale of this comparator were the disasters caused by the 2004 tsunami in Sri Lanka (28 per cent), the 2010 Pakistan floods and the 2011 Thailand floods (about 25% each). At the bottom of the scale were the 2006 Yogyakarta earthquake and the 2009 Cambodia typhoon, where damage was equivalent to about 3.5 per cent of the respective countries' annual rate of gross fixed capital formation (GFKF).

In average per capita terms, the most significant disaster was that of the 2004 tsunami in the Maldives Islands (US\$ 2,300/person) followed by the 2011 Thailand floods (US\$ 666/person). The 2009 Philippines typhoons caused per capita damage and losses in the order of US\$ 50/person, and in the 2006 Yogyakarta earthquake this figure was US\$ 15.

The above comparisons are of importance since it can be seen that the disaster that has caused the highest value of damages and losses, i.e. the 2011 Thailand floods with 44.5 billion US Dollars in disaster effects, compares similarly to the 2004 tsunami in the Maldives Islands whose value of disaster effects is only about 1.5 per cent. Worse yet, the value of per capita disaster effects in the Maldives is nearly four times that of the Thailand floods. Such results are of course due to the differences in relative size of the two affected economies, and provide a measure of the intensity of disaster effects.

In the case of India, many large scale and minor disasters have occurred in the relatively recent past. They include: earthquakes in Latur (1993), Chamoli (1999), Gujarat (2001), Jammu and Kashmir (2005), and Sikkim (2011); flooding caused by the Andhra and Orissa cyclones (1991 and 1997), Odisha cyclone (1999), Assam (2002), Bihar (2004 and 2008), Mumbai (2009), cyclone Aila in West Bengal (2009) and many others; droughts such as the one faced by Karnataka (2011) and in other States. In each case the respective State authorities, in some cases assisted by Central Government authorities, conducted relief needs assessments (whose results were presented in the respective relief memoranda); in the case of selected very large scale disasters, such as the Gujarat earthquake in 2001, more comprehensive assessments of disaster impact and post-disaster needs were conducted with assistance from international organizations.

¹⁵ It is to be noted that the above percentage figures are used to indicate the magnitude of the damage and losses caused by disasters in comparison to the size of the disaster-affected economy. These numbers are not to be confused with the possible temporary slowdown of GDP growth that may arise, until recovery programs are put in place.

In more recent years, at least three damage and needs assessments have been conducted with assistance from the World Bank, the Asian Development Bank and the United Nations after the Bihar floods in 2008,¹⁶ the floods in Uttarakhand¹⁷ and Cyclone Phailin in Odisha State,¹⁸ both in 2013. While these assessments went beyond estimating relief stage requirements, the assessment methodologies that were used did not enable to obtain the value of production losses across the affected sectors, nor were all sectors of social and economic activity covered; furthermore, the data collected did not enable to estimate the macro-economic and personal-level impact of such disasters except in the case of the 2008 Kosi floods, or the detailed estimation of recovery of production and personal income levels. Table 4 shows the summarized results of these three assessments.

Table 4. Results of the damage and needs assessments conducted in India between 2008 and 2013.

	Million Rupees		
	Bihar Floods 2008	Uttarakhand Floods 2013	Cyclone Phailin Odisha 2013
Housing	9,900.0 ¹⁹	1,505.0	29,600.0
Education	1,251.0		
Health	730.2		
Public Buildings		1,029.0	6,620.0
Urban Infrastructure		1,268.0	4,700.0
Livelihoods	1,622.5		26,500.0
Agriculture, Fisheries, Tourism		1,668.0	
Fisheries, SMEs			3,960.0
Tourism		1,166.0	
Irrigation		1,393.0	
Road and Bbridges	13,936.0	27,103.0	7,000.0
Electricity		2,662.0	10,480.0
Rural Water Supply		1,305.0	

¹⁶ See Bihar, *Kosi Flood (2008): Needs Assessment Report*, Government of Bihar, World Bank, Global facility for Disaster Reduction and Recovery (GFDRR), June 2010; also, see UNDP-IHD, *Kosi Floods 2008: How we coped and what we need?* Delhi, January 2009.

¹⁷ See India, Uttarakhand Disaster, June 2013, Joint Rapid Damage and Needs Assessment Report, Government of Uttarakhand, Asian Development Bank (ADB) and World Bank, 2013.

¹⁸ See India, *Cyclone Phailin in Odisha, October 2013, Rapid Damage and Needs Assessment Report*, State Government of Odisha, Asian Development Bank (ADB), and World Bank, 2013.

¹⁹ A discrepancy exists between the estimated values of housing damage: the ADB-WB assessment estimated a damage value of 990 crore Rupees, while the UNDP-IHD estimation yielded a value of 880 crore only.

Water Resources	26,828.0		
Forests and Biodiversity		542.0	160.0
Total	54,267.7	39,841.0	89,020.0

It is to be noted that, most unfortunately, the results shown above are not fully comparable between the disasters, due to the fact that the methodologies used for their estimation did not apply the same structure of sectorial composition and because different criteria and procedures were used.

The data obtained in those case studies of disaster impact assessment conducted in India, compared to the data developed in the cases of disaster conducted elsewhere in Asia, already reveals the need to improve the methodology for disaster impact assessment currently used in India, not only standardizing the procedure so that comparisons between disasters are made possible, but also including all affected sectors of social and economic activity in order to obtain the full effects and impact of disasters, and to enable the formulation of comprehensive recovery and reconstruction plans.

Due credit must be given to the fact that in the case of the Bihar Floods in 2008, the United Nations and the Institute for Human development (IHD) conducted a supplemental assessment of disaster impact that focused on the effects and impacts at the personal and household level.²⁰ In this assessment, efforts were made to quantify the values of damage and losses for households in the affected areas and to analyze the coping strategies adopted by them. Unfortunately, the data collected could not enable the estimation of the impact at the macro-economic and macro-social levels. Had a close cooperation been envisaged with the Asian Development Bank and the World Bank for conducting the assessment, more holistic and comprehensive results could have been obtained.

2.1: Scope of Current International Methodology for Disaster Impact Assessment

The scope of assessments for disaster effects and impact and for estimation of post-disaster recovery and reconstruction, financial requirements has been agreed, as a result a tripartite agreement between the heads of the European Commission (EC), the World Bank and the United Nations' Development Group (UNDG),²¹ within the Hyogo Framework for Action. While this is an agreement between major international organizations, many countries are following such lead and have accepted its contents in recent years.

There is an agreement that disaster effects and impacts are to be estimated at different levels of analysis that include all sectors of social and economic activity, at personal or household level, and at the macro-economic and macro-social levels. These analyses are intended to provide different views of disaster effects and impact, while keeping in mind that these values obtained are not added together, in order to avoid double or multiple accounting.

²⁰ See *Kosi Floods 2008: How we coped and what we need?, Perception Survey on Impact and Recovery Strategies*, United Nations Development Program (UNDP) and Institute for Human Development (IHD), New Delhi, India, 2009.

²¹ See *Joint Declaration on Post-Crisis Assessment and Recovery Planning*, signed by the European Commission (EC), the United Nations Development Group (UNDG), and the World Bank, 25 September 2008.

The sectorial assessment of disaster effects should cover the entire panorama of disaster-affected sectors of economic and social activity to ensure comprehensiveness of the analysis and to ensure that the post-disaster needs for recovery and reconstruction are duly registered and eventually financed. Furthermore, the analysis should include all activities of the society and economy, owned by both public and private sectors. To ensure comparability of assessment results, from one disaster to another and from one country to another, use must be made of the standard list of sectors of economic and social activity as defined in the world-wide system of national accounts that all countries use.²² For the case of India, the corresponding list is as follows:²³

- Agriculture, forestry and fishing
- Mining and quarrying
- Manufacturing
- Electricity, gas and water resources
- Water supply, sewerage and waste management
- Trade, hotels and restaurants
- Transportation and communications
- Financing, insurance, real estate and business services
- Community, social and personal services

Recent experience has shown two important conclusions in regard to the scope of post-disaster assessments. First, that leaving out one or more sectors of social and economic activity in the assessment would bring about undesired limitations in the overall results of the recovery and reconstruction program, as persons that are employed or involved in the sectors left out from the assessment may only achieve normalcy at much later dates or not recover at all from the event. Second, that leaving out of the assessment those sectors of activity that are mostly in the ownership of the private sector, under the (erroneous) assumption that they generate their own income and have savings, insurance or other sources of financing, would likely result in similar limitations and delays in the overall recovery and reconstruction results.

Disaster effects are defined, at the sector level, as being of two main types: (i) the value of physical, durable assets destroyed by the disaster, which is defined as damage; and (ii) changes in economic flows arising because of the disaster, often called losses, which normally include the value of production of goods and services that will not be obtained and the associated higher costs of production. Needless to say, damages occur at the time of the disaster, while losses would occur over time until recovery or normalcy is achieved.

At the personal level, damage refers to the value of destroyed physical, durable goods or assets owned by individual persons or households; and the changes in flows or losses include personal and household income decline that arises from the disruption of livelihood activities and employment, together with the associated higher costs of living due to difficulties or higher costs of access to goods and services.

²² See United Nations, *International Standard Industrial Classification of All Economic Activities*, Rev.4, New York, 2008. (<http://unstats.org/unsd/cr/registry/>).

²³ See Central Statistical Office (CSO), *National Account Statistics*, 2013, page 15, Ministry of Statistics and Programme Implementation, Government of India, New Delhi, 2013.

Disaster impact arises as the consequence of disaster effects. At the sector level, disaster impact may involve a reduction in the capacity of production of goods or a decline in the capacity and actual provision of services; at the personal or household level, disaster impact may involve a reduction in the access to goods and services by the population as well as decline in personal well-being and possible increase in poverty headcounts.

At the macro-economic level, disaster impact may involve a decline in the value and growth of the gross domestic product (GDP) of the affected country; a deterioration of the balance of trade and payments for the country due to decline in the value of traditional exports and increase in imports; a negative change in the fiscal position caused by disaster-induced, lower government revenues and higher expenditures; and possible, generalized consumer price indexes increases or inflation, arising from the combination of disaster-induced production losses and higher costs of production.²⁴

Recent experience has shown that, in many cases, the macro-economic impact may be very limited in numbers while the sectorial and personal level impacts may be very high, for which high levels of recovery and reconstruction investments may be required. In other cases, the capacity of the government of the affected country may be crippled because of macro-economic impact of the disaster, and limit its ability to lead recovery and reconstruction, especially in the case of smaller developing economies.

At the macro-social level, disaster impact may result in delays for the country to meet Millennium Development Goals (MDGs) or those goals defined in the existing national and State development plans, with regards to education, health and nutrition, and other social protection issues.²⁵

The estimation of post-disaster needs should include the financial requirements to achieve recovery of (i) personal income, (ii) availability and access to basic services for the population, and (iii) production levels, as well as to (iv) rebuild destroyed assets using disaster-resilient standards. Needless to say, the estimation of post-disaster financial requirements is to be based on the quantitative and as-precise-as-possible estimation of disaster effects sustained at the sector and personal levels, as the assigning of resources requires an evidence-based quantification of needs.

It is to be noted here that the value of post-disaster needs is not equal to the sum of disaster effects (damage and losses). Rather, recovery needs represent the value of working capital or current operating expenditures requirements that would enable achieving normal levels of production of goods and services after a disaster; and reconstruction needs are usually higher than the estimated value of damage in view of the introduction of disaster-risk reduction standards for physical assets.

²⁴It has been found that the macro-economic impact may be temporary in nature, depending on the efficiency of the recovery and reconstruction program that is put in place in the affected areas.

²⁵In this case again, the macro-social impact may only be temporary, and its duration would depend on the extent and efficiency of the recovery program activities put in place after the disaster.

In any event, post-disaster needs assessments should estimate the needs of both public and privately owned sectors in order to provide the total picture of the financial amounts required for the entire affected society and economy, and to ensure that no parts of the society and economy are left out of the recovery and reconstruction program. Should only the publicly-owned or managed activities and assets be included in post-disaster needs estimations, only 20 per cent of the affected activities would be covered in the case of India, as this is the proportion of the public sector participation in the overall national economy,²⁶ and the remaining 80 per cent would in fact be left out of the analysis. In this regard, it is to be noted that all activities owned or administered by Central, State and Local governments are considered under the public sector, while all activities owned and managed by individual persons and families as well as by enterprises or corporations are considered under the private sector. It is to be noted also that including both public and private sector needs in the estimation does not imply that the affected government is required to provide the entire funding requirements for recovery and reconstruction for the whole country; instead, the government would be required to provide funding for the recovery and reconstruction of assets and activities that fall under its purview and ownership as well as to assist the poorer strata of the population, and should interact with the private banking and development banking systems to ensure the availability of supplemental funding – provided under soft-term conditions as required by the disaster situation – for the (personal and enterprise) privately-owned recovery and reconstruction activities and assets, respectively. Without this latter function by the government of encouraging and guiding the timely availability of credit resources from the private and development banking systems, full social and economic recovery and disaster-resilient reconstruction may not be achieved, and considerable setbacks in overall development would ensue.

²⁶ See Central Statistical Office (CSO), *National Accounts Statistics, 2013; Statement 24: Percentage share of public sector in value added by type of institution*, page 63, Op. Cit.

3: Conceptual Framework for Post-Disaster Needs Assessments

When a disaster event occurs, the first priority is to save lives, treat the injured people, provide access to basic services, and conduct urgent short-term repairs. These essential activities are conducted during the disaster relief phase. After the disaster relief phase, many countries around the world have found significant value to conduct a post-disaster assessment of socio-economic and environmental effects within the disaster-affected area. The assessment, which normally includes estimation of physical damage and economic losses across development sectors and all the related social impacts, helps ensure that reconstruction and recovery needs are identified, analyzed, and prioritized. A comprehensive assessment is therefore the foundation for subsequent reconstruction and recovery activities in the affected area.

In the case of India, many large scale and minor disasters have occurred in the relatively recent past. They include: earthquakes in Latur (1993), Chamoli (1999), Gujarat (2001), Jammu and Kashmir (2005), and Sikkim (2011); flooding caused by the Andhra and Odisha cyclones (1991 and 1997), Odisha cyclone (1999), Assam (2002), Bihar (2004 and 2008), Mumbai (2009), cyclone Aila in West Bengal (2009) and many others; droughts such as the one faced by Karnataka (2011) and in other States. The most recent disasters include the floods in Uttarakhand and cyclone Phailin in Odisha State in 2013. While the Government and stakeholders have taken many successful measures to mitigate and prepare for disaster in India, the importance is underlined of a systematic and contextual methodology to assess post-disaster needs as a means for successful post-disaster recovery.

The following sections will introduce the conceptual framework for post-disaster needs assessment, key lessons from previous post-disaster needs assessments, the sector-based approach to assessment, and a summary of the methodology process.

The effects of a disaster include the destruction of capital, especially physical, durable assets that have not been built using disaster-resilient standards and/or were located in geographical areas of high vulnerability to extreme natural events. Furthermore, the occurrence of a disastrous event interrupts or slows down the production of goods and services that the population requires for its wellbeing and

AN INTERNATIONAL METHODOLOGY FOR POST-DISASTER NEEDS ASSESSMENT

Originally developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC) in 1972, the post-disaster needs assessment methodology has been used after large disasters across the globe. The methodology offers a Government-led systematic process to quantitatively assess the damage, loss, and needs across all development sectors in a country after a disaster. In 2013, the World Bank, United Nations, and European Commission agreed to standardize the methodology so as to offer more effective support to countries.

human development; in addition, the cost of production of goods and services may rise due to the abnormal situation caused by the disaster.

Two main effects of a disaster are usually measured during a post-disaster assessment: (i) the cost of the physical, durable assets that are destroyed (normally defined as damage), and (ii) the value of changes or disruptions in the production of goods and services arising from the disaster (normally defined as changes in economic flows or 'losses'). The latter may include a temporary decline or stoppage of production of goods and services, in comparison to non-disaster conditions, as well as possible temporary increases in production costs caused by the abnormal operation of production systems until full recovery and reconstruction is achieved.

The impact of a disaster is defined as the consequences of disaster effects, as described above, and may be measured at different levels of analysis. The destruction of physical assets and the decline and possible higher costs in the production of goods and services arising from the disaster would produce a negative impact on the global or overall functioning of the economy of the disaster-affected country, State or area, slowing down macro-economic growth. Moreover, the combination of damage and production decline or higher production costs would negatively impact on personal or household wellbeing, and reduce income, increase costs of living and slowdown human development.

Therefore, during a post-disaster impact assessment, quantitative measurements of disaster effects are used to estimate disaster impact at the macro-economic, macro-social and at personal or household levels.

GENERAL STEPS AND RESULTS OF AN ASSESSMENT

The following general steps are typically conducted in a post-disaster needs assessment:

1. Collect baseline information for all sectors
2. Assess damages and losses for all sectors (effects)
3. Assess disaster impacts (social, macro-economic, cross-cutting issues)
4. Define recovery strategy (prioritized needs, programs, and projects)

The results of the assessment provide helpful information to understand needs and priorities for recovery, including:

- Total value of destruction in physical assets (damage) and changes (losses) in flows of the economy
- Distribution of damages and losses by ownership (government or private)
- Identification of most affected sectors
- Geographic distribution of disaster effects
- Impact of disaster at macro-economic and at personal/household levels
- Estimates of post-disaster needs for recovery, reconstruction and disaster risk reduction

On the basis of the quantitative assessment of disaster effects and impacts, evidence-based estimations are made of the financial requirements or needs to achieve recovery and reconstruction of the affected areas and population. Recovery needs involve a number of activities that would enable returning economic

and living conditions to non-disaster conditions, including (i) recovery of personal and household income; (ii) rehabilitation of access and supply of basic services (such as health, education, food availability, water supply and sanitation, electricity, transport and communication, etcetera); and (iii) recovery of production (in agriculture, fishery, livestock, industry, commerce, etcetera). On the other hand, reconstruction needs (often called physical recovery needs) involve the amounts of financing required to rebuild or replace all destroyed physical durable assets using disaster-resilient standards with a view to reduce disaster risk of the population and the impact of future disasters.

3.1: Key Lessons of Post-Disaster Needs Assessment

During the past 40 years, the experience gained in post-disaster needs assessment has led to very important lessons:

- First, that each disaster brings about different types and levels of effects whose magnitude is based on the combination of the extent and intensity of the natural phenomena originating the disaster and of the characteristics and vulnerabilities of the human settlements and activities that prevailed in the affected areas. Therefore, the effects, impacts and needs arising after each disaster are not duplicates of previous events; each case of disaster must be analyzed on its own characteristics and needs.
- Second, that the value of post-disaster needs for recovery are usually lower than the total value of production losses or higher production costs, and that only a fraction of their estimated value is required to re-start the production process and eventually achieve normal or non-disaster levels of development. On the other hand, that the value of post-disaster reconstruction needs will always be higher than the estimated value of destroyed assets because improved, disaster-resilient norms are required to avoid their destruction whenever other natural events occur in the future; thus, reconstruction needs will always have a higher value than the estimated value of damage.²⁷

INTERNATIONAL METHODOLOGY ADAPTED TO COUNTRY REQUIREMENTS

In order for countries to strengthen systems for post-disaster assessment and recovery planning, several national Governments in the region have adapted the international PDNA methodology to specific country context and needs. The adaptation process is normally necessary for the following reasons:

- Alignment with national laws, policies, institutions, and strategies
- Alignment with government administrative units/structures and national accounts
- Providing practical sector guidelines and templates in the national language
- Specification of country-specific assets and structures in different sectors
- Strengthening of the government operational systems (e.g. Standard Operating Procedure for assessment)
- Sustainable approach to build the technical and functional capacities of government officials

²⁷ A point needs to be made here is that assigning an average fixed value for relief assistance to be paid to dwelling owners is not conducive on its own to the reduction of disaster risk. Dwellings have different types and costs in different zones of a country, depending on the availability of construction materials and other factors, and the owners need to find additional funds to rebuild their homes. Therefore, providing only a limited amount of relief assistance is not sufficient and may be conducive to the vulnerability of households if no additional financing is made available, since home owners will try to save costs when rebuilding and not follow disaster-resilient standards. When the next extreme natural event occurs, the rebuilt housing units will in fact be less resilient than the destroyed ones, and an undesired vicious circle is started.

- Third, the post-disaster needs for recovery and reconstruction should be estimated for the entire affected society and economy. Failing to do so, post-disaster recovery and reconstruction will not achieve its intended overall targets, and the solution of problems in selected sectors may be impeded or retarded by the non-attention given to problems in other sectors. It has been observed that in some countries, identification of needs is conducted only for selected groupings of the society while the solutions and needs for other sectors of the same society are left to their own initiative. Very often, national or State governments would take care of the needs for recovery and reconstruction of goods and services under their direct purview; that is, of the public sector effects only. Governments also frequently assist the poor in solving their post-disaster needs. And private sector entities are assumed to solve post-disaster needs on their own, assuming that insurance and savings they may have taken, would take care of the post-disaster needs, even though that is usually not the case in most developing countries.

The current international practice requires the estimation of post-disaster recovery and reconstruction needs across all sectors of social and economic activity, in both public and private sector domains. Once the global needs have been identified and quantified, a financing formula is devised that draws the required funding from existing public and private sources, both domestic and external. The Central and State governments are then required to spearhead the formulation of the recovery and reconstruction program, contributing the financing of recovery and reconstruction activities in the public domain, and coordinating the financing required from the private and development banking system for recovery and reconstruction of the private sector needs. It has been found that only in this fashion, it is possible to achieve full recovery and reconstruction after a disaster.

3.2: Sector-Based Approach for Post-Disaster Needs Assessment

The methodology for disaster effects and impact assessment and for estimation of post-disaster recovery and reconstruction requirements must be devised in a scientific, objective and holistic manner and should obviously be evidence-based to ensure its reliability. To comply with such requirements, a number of conditions need to be met by the methodology:

- The sectorial assessment procedures must be conducive to the analysis of disaster impact at macro-economic and macro-social levels, and should provide inputs for separate analysis of disaster impact at the personal or household level;
- The procedures for assessment should follow a bottom up approach that involves the analysis of sectorial effects as a first step, followed by a careful aggregation of sectorial results to analyze overall disaster impact at macro and micro levels;
- A unified approach should be adopted for its design that involves a standard definition of sectors of economic and social activity and their boundaries, and a unified process for the estimation of disaster effects in all sectors across the board should be followed.²⁸

²⁸ Putting it in different words, the overall assessment methodology must not rely on separate and different sectorial assessment tools; rather, the sectorial procedures used at sector level must be defined on the basis of the requirements for the macro-economic and macro-social analysis to ensure comparability and validity in the necessary aggregations that are required.

Any post-disaster needs assessment must be conducted on the basis of a breakdown of social and economic activities that are typical of the affected areas, states or country. In order to facilitate and standardize the assessment, and to enable valid comparisons between different disastrous events that may have occurred at different times in the past in the same country or state or may occur in different countries, it is essential to utilize a common pattern for the entire world that would provide sufficient information for a valid impact analysis. The countries of the world, within the United Nations, adopted in 1948 a common 'System of National Accounts' to measure economic development;²⁹ this system enables measuring on an annual basis the value of capital stocks and of production flows present in any given country, for the country as a unit and also for sub-national or state geographical divisions.

The System of National Accounts is a tool that enables to measure the level of economic growth, changes in consumption, savings, investments, debt and wealth for the total economy of a country within all sectors of activity. The information available in the System permits to, inter alia: (i) forecast the future growth of the economy; (ii) analyze the impacts of alternative policies that may be adopted by the government on the economy and its sectors, and (iii) estimate the possible impact of a disaster or any other type of shock to the economy and its sectors. The Central Statistical Organization (CSO) in the Ministry of Statistics and Programme Implementation (MSPI) of India, is entrusted with the task of keeping up to date the System of National Accounts for the country, and publishes an annual Statistical Yearbook that summarizes the information required as baseline for any post-disaster needs assessment. Equivalent state organizations provide the same information.

The basis to define the scope of sectors of social and economic activity to be included in any post-disaster needs assessment in India, as has been done elsewhere in the world, should be the one used by the CSO and its state equivalent organizations in the system of national accounts; this would avoid subjective classification of activities in the analysis and enable valid comparisons between different cases of disaster within the country and elsewhere. The current list of sectors of economic activity used in the System of National Accounts of India is the following:³⁰

- 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

It is to be noted that the above classification of sectors of social and economic activity does not follow the list of ministries or other institutional arrangements that exist in the country, and that for each of the sectors listed above, more than one such ministry or institution may be involved.

²⁹ See *Resolution 149 A (VII)* adopted by the United Nations Economic and Social Council on 27 August 1948, in *Statistical Papers*, No. 4, Lake Success, New York, 31 October 1949.

³⁰ Central Statistical Organization (CSO), *National Accounts Statistics, 2013*, page 15, Ministry of Statistics and Programme Implementation, Government of India, New Delhi, 2013

Another issue to mention is the fact that the very important subject of the environment is not included separately in the System of National Accounts of most countries, and that India is no exception. In some countries, efforts are being made at present to introduce a “satellite account” on the environment, within the national accounts. Until India is able to build and maintain such satellite account on the environment, it will not be considered as an individual sector of economic activity; and the accounts of environmental assets and services are distributed throughout the individual, formal sectors of economic activity. Having said that, it is possible to include a section on disaster impact on the environment, making a clear distinction between disaster effects and impact on the built and natural environmental assets and services.

Therefore, post-disaster needs assessments in India should follow a scope defined by the list of sectors of social and economic activities as given by its System of National Accounts, with the addition of the environment as a cross-cutting issue. More than one line ministry or department would need to participate in the assessment of each of the sectors listed in the National Accounts.

3.3: Methodology Process for Assessments

The process for successful post-disaster needs assessments normally carries the following sequence of events:

1. Gathering of updated baseline information that describes the existence and availability of capital and physical assets in the affected area as well as the manner in which goods and services are produced and consumed by the population.³¹ This will serve as the basis for comparison of non-disaster to post-disaster conditions.
2. Field visits to affected areas by sectorial assessment teams in order to estimate the extent of destruction of physical assets and the negative effects on the production of goods and services arising from the disaster. This will enable the estimation of the value or cost of the effects of the disaster (damage and production flow changes).
3. Aggregation of sectorial disaster effects, ensuring no double or multiple accounting, to estimate the total value of damage and production flow changes caused by the disaster.
4. Estimation of disaster impact at different levels of analysis:
 - Macro-economic impact analysis, including impact on growth of gross domestic product (GDP), external sector, and fiscal sector, nationally, as well as at the level of states;
 - Personal or household impact analysis, including impact on employment, income and expenditure leading to estimation of disaster impact on human development and on the achievement of Millennium Development Goals (MDGs).
5. Estimation of post-disaster financial requirements or needs for:
 - Recovery of personal income, access and provision of basic services, and of normal production levels of activity;
 - Reconstruction of destroyed assets including introduction of disaster risk reduction measures.

As a tool for planning and monitoring of progress in the recovery and reconstruction programs, a recovery framework to define the scope, specific targets and goals, and calendar of activities may be developed after completion of the post-disaster needs assessment.

³¹ Since the statistical information available is already published in both printed and on-line formats by the respective organizations that produce it on a regular basis, for any post-disaster needs assessment to be undertaken it will only be necessary to obtain the most recent, up-to-date information that may still not be in published form.

4: Development of the PDNA System in India

4.1: Current Procedures for Post-Disaster Assessment

As part of the India PDNA Study, within the National Cyclone Risk Mitigation Project (NCRMP), an analysis was made of prevailing practices for post-disaster needs assessment in 10 selected States of India, together with a comparison with similar practices elsewhere in the world. To develop such analysis, experts from the Asian Disaster Preparedness Center (ADPC), in close cooperation with officials from the National Institute of Disaster Management of India, conducted field visits to the selected States with a view to:

- Collect and review all forms used to gather disaster-related information;
- Analyse the procedures used by State officials to estimate and value disaster effects and impacts, as well as the financial requirements for ensuring recovery and disaster-resilient reconstruction;
- Collect existing reports that describe recent post-disaster needs assessment conducted in the selected states;
- Hold discussions with relevant state officials on possible ways to improve existing disaster assessment procedures; and
- Collect available data on social, economic and environmental conditions prevailing in the States, which may be used as baseline information for future post-disaster needs assessments.

During these visits, consultations and exchanges were made with State Disaster Management and Department officials along with interviews and working meetings with Revenue Department officials that normally collect information for relief needs assessment, down to District levels. Efforts were also made to meet with selected persons affected by recent disasters at Village and Taluka (Sub-District) levels, in order to obtain their views on the suitability of post-disaster assistance required and obtained. Such meetings enabled to collect: (i) existing reports of past assessments conducted in recent years; (ii) standing directives, guidelines and data collection forms presently in use for post-disaster needs assessment for recovery and reconstruction; and (iii) exchange of ideas on possible ways to improve existing practices.

This analysis revealed that two main types of post-disaster assessments are conducted in India at present:

- a) the usual Disaster-Response type of assessment, designed to estimate the amounts of relief assistance to be given to disaster-affected persons, as per directives included in the Disaster Response Fund³² and
- b) In some cases, broader post-disaster assessments of major events carried out by the affected State authorities with support from international agencies such as the Asian Development Bank, the World Bank, and the United Nations, which are aimed at estimating – beyond relief assistance – needs for reconstruction and recovery.

³² Ref. The communication sent on 28 November 2013 by the Deputy Secretary of the Government of India to the Chief Secretaries of all States and to Relief Commissioners/Secretaries, Department of Disaster Management of All States.

Results of the first type of assessment are normally included in the Relief Memorandum prepared by state authorities to quantify the amounts of additional resources required from the central government (National Disaster Response Fund) to supplement the funds available at the state level (State Disaster Response Fund). These numbers are – incorrectly – called damage and losses, when in actuality they just represent the value of disaster response assistance, which is only a fraction of the value of damage and losses or of recovery and reconstruction needs.

Since 2001 more detailed assessments of disaster impact have been undertaken in the case of selected, major events, which subsequently led to obtaining external support for recovery and reconstruction activities. These special, internationally assisted assessments have had some limitations as well. In the case of the Gujarat earthquake in 2001, though adequate estimations were made of the value of damage or destruction in all affected sectors of social and economic activity, production losses were only partially estimated for some sectors, leaving out many of the social and infrastructure sectors. In the more recent assessments conducted in the cases of the 2008 Bihar floods, the Uttarakhand floods and of Cyclone Phailin in Odisha in 2013 – which were called “damage and needs assessments”, the scope of work was limited to the estimation of the value of destroyed assets and of the corresponding needs for reconstruction. Allegedly, due to lack of sufficient information, production losses and social sector changes in flows were not quantified and all the affected sectors of activity were not included in the assessment.

4.2: Need to Strengthen the Assessment System in India

It was inferred that even in the cases of assessments conducted with external technical and financial support, their results did not provide sufficient information on disaster impact, especially as regards to production decline and social impact, which precludes making the subsequent analysis of overall macro-economic and macro-social disaster impact and the quantitative estimation of recovery requirements. There is indication that, because of such limitations, full recovery was not achieved by the affected population and that destroyed assets were rebuilt using design and construction standards that probably have a higher risk than before the disasters occurred.

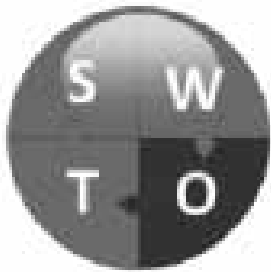
It may be stated, then, that current assessment practices in India do not provide adequate information that (i) may be used by the higher authorities to adopt adequate public policies for recovery and reconstruction, and that (ii) as a result, the affected population faces longer periods of suffering to achieve recovery. In other words, due to the limitations of the assessment methodologies presently in use, there exist limitations to governance (since the Central and State governments do not obtain the full picture of disaster impact and recovery and reconstruction requirements); the overall potential growth of socio-economic development is not achieved or delayed, and the affected population face significant deterioration on their quality of life and human development.

This situation needs to be addressed, especially since the quantitative information required for a full post-disaster effect-impact-and-needs assessment is available in the country, and only the adoption of a scientific, holistic methodology for assessment is required.

The following sections provide an analytical review of the current systems for post-disaster assessment in India. The text is an abridged version of the full review titled “*Post Disaster Needs Assessment in India: Current Practices and Future Recommendations*”.

4.3: Gaps in Current Disaster Assessment Procedures in India

An analysis of strengths, weaknesses, opportunities and threats (SWOT) of the current procedures for disaster assessment and post-disaster recovery and reconstruction requirements in India was conducted. It revealed the internal strengths and weaknesses of the present system, as well as the external opportunities and threats involved in its utilization.



The strengths of the existing system include simplicity and efficiency as well as sufficient data availability. The issue of simplicity involves: first, the amounts of assistance to be provided to the affected population are pre-defined (not determined on the basis of actual field measurements of damage and losses sustained by the affected population); second, assessments can be carried out by non-specialized technical and professional personnel at State levels and below. The system is efficient because, as recent experience shows, the proceeds of the estimated assistance can be delivered to the affected population within 45 days

of the occurrence of a disaster; in addition, the capacity of the system is clearly very high as the recent massive evacuation of population before cyclones in Odisha suggest. It may also be stated that the existing system for estimating disaster response is a good example of optimum utilization of limited – human and financial – resources available for assessment and disbursement of relief assistance requirements.

An examination of the existence of baseline information in the country, by the ADPC expert team, has revealed that sufficient statistical data is available in the country to ensure the applicability of the current disaster impact and post-disaster recovery and reconstruction needs assessment. The implementation of the 'Freedom of Information Act' has made possible to remotely and efficiently access such data, although for an actual assessment it may be required to directly contact primary sources to obtain updated information for the previous year.



The weaknesses of the existing system include limitations and shortcomings in its scope and provision to adjust assistance for inflation. Its scope is limited due to the following reasons: (i) not all affected population is included to receive assistance; (ii) not all sectors of economic and social activity are included in the analysis and some sectors are only partially included; and, (iii) the assessment concentrates on relief assistance and only very partially covers recovery assistance and little or no reconstruction of destroyed assets using risk-reduction features. Finally, as indicated previously, the rates of assistance to be provided have remained at fixed

levels for a number of years, with only minor and partial adjustments for inflation.

Elaborating the above further, it may be said that the first significant limitation of the present system is that it does not provide for the identification of the total value of destroyed assets and of the total production decline that occurs after a disaster. Instead, the result of the assessment is the estimated value of relief assistance to be provided to the affected population as set forth in the Disaster Response Funds guidelines, which in fact represent only a small fraction of the total value of damage and losses sustained by the Indian society and economy.³³ Therefore, the assessment does provide the State and Central governments an

³³ However, official reports and newspaper accounts erroneously equate this assistance to the value of damage and losses, thus misleading the reader, and providing a lower value of the total effects of the disaster. Worse yet, when the estimated values are compared to GDP, they reveal a lesser impact of disasters on the performance of the State and Indian economies, misleading the readers to the relevance of disasters to slow down development in the country.

estimation of the amounts to be given out to the affected persons; but it neither provides an estimation of the total effects and impact of the disaster on social and economic conditions nor of the total needs for recovery and reconstruction.

A second limitation of the present system is that it covers only a narrow fraction of the affected population, concentrating – which is correct but insufficient – on the poorer strata of the population: i.e. small farmers, fishermen and artisans. In addition to this, the present system does not include the analysis of all relevant, affected sectors of economic activity, leaving aside important sectors or sector components and employed population that are involved in activities such as industry, commerce, tourism, mining and others. In the case of agriculture, though losses of food crops are assessed, commercial crops are not considered. Moreover, assistance is provided only to those farmers that lose more than 50 per cent of their crops, and no assistance is given to those that lose less than that value.

A third limitation is that when it comes to the replacement of destroyed assets – buildings, machinery, equipment etc. – the present system includes mainly those under the purview of government-owned activities, leaving aside those falling under private sector ownership (whether owned by individual persons or by enterprises). Industrialized countries have a similar characteristic in that they do not provide coverage for private sector damage and losses because they have insurance coverage; but in developing countries – and India is not an exception – insurance penetration and coverage is still in very early stages of development and cannot provide such assistance to individuals and enterprises.³⁴

A fourth limitation of the present system refers to the fact that the Disaster Response Fund concentrates its assistance in relief operations and only provides partial assistance to achieve recovery of normalcy levels in personal or household income, basic service access and production recovery, and nearly no assistance for reconstruction of destroyed assets under disaster-resilient standards.³⁵ In this regard, it is to be noted that those persons that do receive assistance from the Disaster Response Funds actually receive a fraction of the total they require to achieve recovery of personal income, basic services access, and production, and a very small fraction of the amount they require to rebuild their homes and other assets to standards that will be disaster-resilient. Furthermore, not all affected persons receive any assistance, as is illustrated by the fact that farmers that lose less than 50 per cent of their crops do not get any assistance. In addition, farmers involved in permanent plantation crops do not get any assistance.

Therefore, the disaster-affected persons do not obtain sufficient funding from the Disaster Relief Funds to restore their annual income (recovery) and to rebuild the destroyed home (reconstruction), and must search for additional financing from other sources. When such other sources are not found, or are insufficient to meet the total requirements, the affected families lose income and wellbeing, sometimes falling under poverty conditions, and may resort to rebuild their homes without adequate standards that do not guarantee disaster resilience, and risk is increased to levels above the one prevailing before the recent disaster.³⁶ The situation leads to significantly lower levels of human and socio-economic development, and – when the

³⁴ In the specific case of India, the public sector covers only 20 per cent of economic activities included in the system of national accounts, which means that in any assessment of disaster effects where the private sector impact is not included nearly four fifths of the impact are not considered.

³⁵ An exception to the latter is the reconstruction of government-owned assets that may be funded from the 10% flexible funds available in the plan budget funds, through the Centrally Sponsored Schemes.

³⁶ It is to be noted, however, that in the case of isolated, selected cases of very major disasters, the assistance provided by the Government to disaster-affected population may exceed the standard provisions, and may include further assistance for recovery and reconstruction. Examples of those are the Gujarat earthquake in 2001 and the Indian Ocean Tsunami in 2005, among others.

next disaster occurs – further destruction and much higher human suffering is assured. In addition to the above, overall production levels in all affected sectors of social and economic activity do not recover to pre-disaster levels, and the national economy does not reach its potential level of development and growth.³⁷

The above considerations lead to believe, that in India, the human development and wellbeing of affected population does not recover to pre-disaster levels or that it is only reached after a very long time, with the corresponding long-term suffering of the affected population, and that overall socio-economic development is not reaching its potential. In view of the successive occurrence of disasters, especially in the most disaster-prone coastal States, this might lead to increasing poverty numbers and worsened conditions for the affected population, rendering the current national and state programs unable to fight or reduce poverty.

A last limitation or shortcoming of the existing system for disaster impact and needs assessment in India is that some states use procedures for estimation of damage and losses that do not necessarily fully coincide with the norms of the Disaster Response Fund. Whenever that happens, the published results of disaster effects cannot be validly compared or added together to arrive at a series of total damage and losses for the country. The published data is therefore skewed and does not provide a reliable value for use in further analysis. In fact, some States do not have standard formats for the collection of damage and loss information, and rely on the initiative of its officials for such purposes; when these officials move or are replaced, the manner of data collection is not necessarily maintained. Other States do have specific formats for such purpose, but they are not standardized across the country. Therefore, the results in the estimation of assistance requirements are not fully comparable across all States and over time. On the other hand, however, standard formats are used by all States to report the estimated requirements of relief assistance to the Central Level. Lastly, there are no standard lists or forms for collection of the baseline information and information sources required to conduct full-fledged assessments of disaster effects, impacts and need, such as the ones presently in use elsewhere in the world.³⁸



On the other hand, the very existence and execution of the India PDNA project provides an opportunity to put in place a comprehensive and scientific system of disaster effect and impact assessment for the purpose of ascertaining post-disaster recovery and reconstruction financial needs assessment. The willingness expressed by many State government officials to request and to adopt a scientific and comprehensive procedure for disaster impact assessments, which go beyond the estimation and provision of relief assistance, is an opportunity that should be taken advantage of.



Should those opportunities not be grabbed opportunely, external threats arise that include: (i) full recovery of production, availability and access to goods and services is not achieved by all affected persons after disasters, or is only achieved after a very long time; (ii) overall well-being and quality of life of the affected population worsens after disasters, and poverty numbers may increase; (iii) disaster risk is increased after reconstruction of assets using non-improved standards; (iv) slowdown of overall economic growth and worsening of the fiscal position of the State and central governments; (v) significant delays occur in achieving Millennium Development Goals

³⁷ Saying it differently, while India’s economy has been growing at healthy annual rates in recent years, had disaster recovery assistance been in effect, annual economic growth would have reached higher rates than the present ones.

³⁸ This fact sometimes leads international officials to the erroneous assumption that the baseline data required to conduct full assessments is not available in India

(MDGs); and (v) widespread dissatisfaction and complaints of the population with the amount and coverage of government assistance provided after disasters.

4.4: Recommendations and Way Forward

The analysis undertaken shows a number of significant gaps in the scope of the current system of post-disaster assessments in India vis-a-vis the current international practices that are summarized in the following points:

- The existing system of post-disaster assessments in India is designed to estimate disaster relief response from the Central and State government exclusively, and covers the assistance for recovery needs very limitedly;
- The value of response assistance is erroneously designated as the total value of damage and losses caused by disasters, and thus results in a gross underestimation of disaster effects and impacts;
- From current assessments, it is not possible to derive the total cost of disasters to the Indian society, economy and environment;
- The assessment, in its current form, does not cover the estimation of post-disaster needs for the entire affected population;
- In addition, it does not cover all affected sectors of socio-economic activity. As examples, the industry, trade or commerce, tourism and mining sectors are not included; and, under agriculture, only food crops are covered, leaving out possible losses in the production and export of tea and other commercial crops. In some cases, no estimation is made of the cost of providing psycho-social assistance to disaster-affected persons;
- The estimation of disaster impact at the macro-economic level is not possible to make, as production losses in all productive sectors are not estimated on a systematic basis;
- Only partial estimations are made of disaster impact at the personal or household level – which prevents an estimation of the decline in personal and family income and increases in costs of living – and no estimates are made of the macro-social impact and of the resulting delays in achieving Millennium Development Goals (MDGs).
- The current system does not permit estimation of the financial requirements to obtain recovery in production, personal income, and supply/access to basic services for the population, and thus affected persons do not recover or take a very long time to recover after disasters;
- The current estimation of assistance for house reconstruction and repairs provides only a fraction of the funds needed by home-owners. Therefore, in the absence of savings or other financial contributions, families are forced to rebuild their homes with substandard materials norms and the resulting disaster risks are above those that prevailed before the disaster;
- Furthermore, there is evidence that at least in some cases reconstruction of roads does not follow a disaster risk reduction standard, thus resulting in higher disaster risk for the future;
- The fact that the cost of reconstruction of public property and roads is financed from the regular state budget for operation, results in a reduced availability of funds for maintenance, which in fact reduces the intended life span of existing infrastructure and would induce higher costs of operation of vehicles.

Based on the analysis, it is recommended that the current methodology for post-disaster needs assessment, used internationally, should be adapted to the specific characteristics of India and utilized to estimate the effect and impact of any future disasters in the country.

5: Estimating the Effects and Impact of Disaster for the Private Sector

Governments are keen to estimate the effects and impacts of disasters with the purpose of being able to assist the affected population in post-disaster recovery and reconstruction. In industrialized, developed economies recovery and reconstruction is usually carried out taking advantage of insurance proceeds that are widely available to nearly all persons, and with only limited government participation. In developing countries, however, recovery and reconstruction may only be conducted under the leadership of national and local governments, working in a concerted fashion with the private sector. Needless to say, approaches to estimate the effects and impact of a disaster and to estimate the technical and financial requirements to achieve recovery and reconstruction should be tailored to the specific socio-economic conditions of the affected country, despite their degree of development.

The effects of a disaster may have impacts on the functioning of the society and the economy of a country, and on entire sectors of economic and social activity. Furthermore, disaster impacts are stronger and easily visible at the level of households.

The typical effects of a disaster that need to be estimated include the destruction of physical, durable assets and the resulting slowdown, absence or higher costs of production of goods and services in a given society and economy. These effects are to be measured first at the level of sectors of activity, following agreed-upon common standards of coverage and accuracy, that lead later on to the analysis of impact or consequences on the functioning or performance of specific sectors of activity and in the overall economy of a country or its different sub-national divisions.

The estimation of asset destruction (damage) and of affectation of the production of goods and services (losses) at the sector level then should follow standard guidelines and procedures to allow their subsequent aggregation that will enable the analysis of disaster impact at the macro-economic level. No sectorial assessment should be attempted unless and until the general guidelines are defined from the macro-economic to the sector level. In other words, the procedures for assessment follow a top-down approach that defines the scope and procedure for the detailed assessment to be conducted at the sector of economic activity level. Having said that, the actual process for assessment is a bottom-up approach whereby damage and losses are estimated for each affected sector of economic and social activity, following the previously mentioned procedure that was developed at the macro-economic level, to enable the estimation of macro-economic impact.

Since the results of any disaster impact assessment must be compared to the normal functioning or performance of the affected society and economy, the estimated values of damage and losses – or disaster effects – must be compared to the existing, pre-disaster conditions in terms of existence of assets and of social and economic performance for the country or provinces. The System of National Accounts that has been developed and adopted world-wide, with assistance from the United Nations, is used as the means for such comparisons, as all countries in the world have such updated quantitative data base at national and, in some cases, at sub-national levels.³⁹

A typical system of national accounts would divide the sectors of economic activity – with minor variations only – into agriculture, forestry, livestock and fishery, industry (of several kinds and sizes), trade (at wholesale and retail levels), transport and communications (several modes), water and sanitation, power supply, government administration, social services, and other services. Some of these sectors of economic activity fall within the purview of the public sector, while many others do so under the domain of the private sector. Thus, any assessment of disaster effects and impacts must provide an adequate breakdown of ownership for both public and private sectors; forms for data collection and analysis under such breakdown must be utilized and working relations must be developed with private sector groupings or associations during the actual assessment.

While the first part of the assessment focuses on each sector of economic activity and the macro-economic and social levels, special attention must be devoted subsequently to estimating disaster impact at the household or personal level, which is in fact where the full impact of a disaster may be felt. After the damage and loss assessment is completed at the sector level, information on the access by households and individuals to the goods and services produced in the affected country or area must be compiled and analyzed. Data on these variables is usually not always available in a systematic fashion as in the National Accounts, and must be compiled during the assessment, resorting to other types of statistical information available in most countries, and supplemented with special field sample surveys of the affected population. In the latter, special account must be made of the population that is not part of what is called the “formal economy” and that instead is part of the informal sector, through conducting special field sample surveys on these persons characteristics.

The purpose of the assessment of disaster effects and impact is to estimate the technical and financial requirements that are needed by the affected country to achieve economic and social recovery and to rebuild or reconstruct all destroyed assets under a “building-back-better” strategy that may include disaster-resilient features, qualitative and technological improvements, and the possible relocation of strategic activities. These financial needs cover the requirements for both public and private sectors which are to be met through resources owned by the Federal and State governments and by private entities, using domestic or foreign resources as required. When it comes to recovery, the methodology enables to estimate the financial requirements that are needed in order to restore the production of goods and services in all sectors across the board, whether public or privately owned; with regards to reconstruction, the needs are the amounts required to rebuild the destroyed assets according to improved norms with

³⁹ In India, the System of National Accounts has information down to the State level, in sufficient detail to enable its use for disaster impact assessment purposes.

disaster-resilient features, again in the public and private domains. The total financial requirements may be channelled through government agencies or through the development banks or privately owned banks, after a financing formula is developed that considers all needs. Specific schemes that include cash grants, in-kind donations, soft-term credits and other possible ways of assistance may be defined as part of the recovery and reconstruction plans. In any case, the National or State government must take the lead in developing such overall plan, and assume a leading role to work with the private sector – including enterprises, banks and insurance companies – to define total needs and the manner in which they are to be met.

It is to be stressed that the quantitative estimation of damage and losses is used as the basis to quantitatively estimate the financial requirements for recovery and reconstruction, to ensure that the correct amounts of resources are assigned to the task, certainly no less and no more than is actually required to overcome the impact of the disaster. Only in this fashion can the success of the recovery and reconstruction scheme be assured of sufficient resources that are actually required, and the affected population – whether operating in the formal or informal economy, in the public and private sectors – may receive what they require in the post-disaster stages.

6: Developing Disaster Recovery Framework for India

The PDNA India tools provide a comprehensive and scientific basis to guide the formulation of a post-disaster recovery/reconstruction framework and to monitor its execution. Post-disaster recovery is best defined as “the restoration of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors”.

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 and 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 that may have been caused to normal socio-economic development, without aiming for improved living conditions at this stage. 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 causing discrimination; this is especially true for the case of developing countries where, by definition, resources for development are scarce.

Furthermore, resources for post-disaster recovery normally come from special budgets that are different from the normal development budget of nations, and are not intended for financing normal development activities. This is also true for recovery assistance provided by the international donor community to disaster-affected countries; such assistance is provided from special windows that preclude funding normal development assistance.

The introduction of disaster risk reduction features within recovery interventions, however, is deemed to be 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.

It can be stated that post-disaster recovery activities can be grouped around the following themes: (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.

Needless to say, recovery is achieved 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) is achieved. In that sense, recovery is achieved in the transport sector 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. In other sectors, for

example, 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; recovery in education 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; recovery in agriculture 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; recovery in the housing sector is achieved when destroyed houses are rebuilt, and not when temporary shelter facilities are provided to the homeless families; et cetera.

The time to achieve recovery would normally vary from sector to sector, 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 is no rule-of-thumb to define such timeframes. For example, 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 still 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 for the case of when floods bring about changes in the quality and yield of agricultural soils; 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) are concluded, and that may take several years. Another example would be the deposition of salt water from the storm surge of a typhoon or a similar tropical storm in coastal agricultural areas, where recovery may take several years until the salt excess can be achieved through either natural leaching by rainfall and/or by the addition of chemicals to restore soil productivity. Such examples illustrate the fact that the so-called early, medium and long term recovery breakdowns proposed in the draft documents under analysis are meaningless in some cases.

6.1: Procedure to Estimate Post-Disaster Recovery Needs

Experience acquired in the past forty years in regard to disaster impact assessment and estimation of recovery needs in many regions of the world has shown that the financial requirements for recovery can only be estimated on the basis of the values of destroyed assets, of the changes in the flows of the economy, and of the decline in personal or household income. Quantitative and evidence-based estimations of the value of destroyed durable, physical assets and of the changes in economic flows are essential to make reliable estimations of post-disaster recovery needs. This is so because the persons entrusted with the assignation of financial resources – at the national, State or local levels of government as well as in the case of donor countries and international institutions – require quantitative evidence to justify the funding that is being required and assigned.

Therefore, it is essential to conduct an assessment of damage and of changes in flows for the estimation of the value of post-disaster recovery needs. Production losses and higher costs of production are estimated in order to determine the amounts of working capital required to enable recovery of production levels in all affected sectors of social and economic activity. The subsequent estimation of personal or household income decline arising from the previously-estimated drop in production at sectorial levels, enables to estimate the financial requirements to restore personal or household quality of life. The estimation of the value of destroyed physical, durable assets (duly supplemented to incorporate improved, disaster-resilient standards) is used as a basis to estimate reconstruction requirements.

The analysis of current practices for post-disaster assessment in selected states of India has been concluded, which provides an overview of the state of the art in assessing the values of damage and of changes in production flows in the country. It reveals that at present, India makes a partial estimation of the effects and impacts of a disaster and that no comprehensive and systematic estimations are made of recovery and reconstruction requirements.⁴⁰ In fact, the current system of post-disaster assessment involves only the estimation of the amounts of disaster response to be provided to a limited number of affected persons, as foreseen in the Disaster Response Fund. The estimated amounts are erroneously labeled as damage and losses despite the fact that they only represent a fraction of the total value of destroyed goods and of the total changes in production flows caused by disasters. Furthermore, the amounts assigned and delivered to affected persons represent only a small fraction of the total financial requirements to achieve recovery and reconstruction after the event.

It has been found in the above-mentioned analysis of current practices that in selected cases of recent major disasters, the assessment of disaster effects and impacts and corresponding post-disaster needs for recovery and reconstruction has been more comprehensive when conducted with assistance from international organizations such as the United Nations, the Asian Development Bank and the World Bank. However, even in these cases, not all recovery and reconstruction needs were assessed since not all sectors of social and economic activity were included in the assessment.

6.2: Desired Scope of Post-Disaster Recovery Needs

A full-fledged post-disaster needs assessment (PDNA), carried out by the Central, State or Local government with support from other stakeholders, is required to estimate the value of recovery and reconstruction requirements. The existing international methodology for post-disaster needs assessment requires (without exception) that recovery needs be estimated for all disaster-affected sectors of social and economic activity because of the inter-relations between sectors of activity, some of which are inter-related 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 recovery is achieved or that recovery is delayed beyond control, thus causing a longer period of suffering to the affected individuals and households.

In case of India, only a limited number of sectors of social and economic activity and only parts of the affected population are routinely included in disaster response assistance assessments, at present.⁴¹ In this

⁴⁰ See *Analysis of Current PDNA Practices in India and the Rest of the World*, Asian Disaster Preparedness Center (ADPC), New Delhi, November 2014.

⁴¹ See again *Analysis of Current PDNA Practices in India and the Rest of the World*, Op. Cit.

regard, it is to be noted that the manufacturing, trade, mining, and tourism sectors are not considered in the provision of post-disaster assistance, and that commercial agriculture is also not included. Apparently, this is due to the (erroneous) assumption that individual persons and enterprises that deal in these sectors have insurance that may cover their losses. Such assumption may be valid in industrialized or developed countries while in most developing countries (including India) the penetration of insurance is very limited and mainly concentrates in providing coverage to destruction of assets but not to production losses arising from disasters. Furthermore, in India not all farmers hold crop insurance; only those farmers that have bank loans are required to acquire such insurance;⁴² in fact, as stated recently by a high government official from the Ministry of Agriculture, only about 1 out of 7 farmers have crop insurance against disasters.⁴³

Including 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 lower levels – should finance recovery and reconstruction for all stakeholders. Instead, the idea is that the total needs for recovery and reconstruction are identified and quantified, that the GoI finances those needs within its purview and that it 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. This is essential to ensure that full recovery is achieved by all disaster-affected sectors of social and economic activity and by all affected persons and enterprises.

Therefore, leaving out such large sectors of activity and population groupings (these sectors are job creators that cover a large proportion of the population) from the assessment of disaster impact and from the estimation of post-disaster recovery and reconstruction needs estimation, leads to significant delays in achieving recovery and increase the suffering of the affected population.

6.3: Indicators for Resilient Recovery

One of the prevailing limitations, when conducting disaster impact assessments and estimations of post-disaster recovery and reconstruction needs, is the absence of quantitative indicators; this is also lacking in the draft recovery framework for India under analysis. Some professionals involved in such activities allege that it is not always possible to obtain quantitative information required to develop such indicators, especially in the social arena, and they concentrate on obtaining qualitative references and criteria only.

It has been found that there exist quantitative indicators to estimate disaster impact at macro-economic, macro-social, sectorial and personal or household levels that may be used and collected within the limited time frame during which assessments are conducted, and which may serve later on as indicators of progress in achieving post-disaster recovery.

⁴² See, for instance, <http://vikaspedia.in/agriculture/agri-insurance/crop-insurance>.

⁴³ See the power point presentation made by the Director, Department of Agriculture and Cooperation, Ministry of Agriculture, titled Disaster Risk Reduction: Role of Financial Institutions, in Roundtable Meetings on Innovations in Technologies for Disaster Rescue Efforts amongst ASEM Countries, New Delhi, 5 December 2014.

To measure human development impact, for instance, proposals have been made to make use of the disaster-induced change on the human development index (HDI). However, as HDI utilizes just three variables (income, life expectancy and education) and due to the relatively static manner in which it is estimated, it has not been possible to adopt it as the standard measure of disaster impact.

Instead, a composite indicator of disaster impact on quality of life for disaster-affected people is now being developed that will enable a quantitative measure of disaster impact at personal or household level, using data that is obtainable during post-disaster assessments, and which will provide a measure of progress on recovery. This quality of life indicator includes the weighting of pre- and post-disaster levels of a few 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
- Direct connection to electricity grid

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

- Number of persons facing food insecurity
- Number of persons facing malnutrition

The PDNA India tools provide full particulars on this composite disaster impact and recovery indicator.

6.4: Risk Transfer Issues

Full recovery after disasters may be achieved more effectively if risk reduction and risk transfer schemes are adopted in the country, together with the post-disaster financing required for recovery of production, income and provision of basic services.

In that sense, the recovery framework should include both the institutionalization of recovery and reconstruction credit facilities and other financial mechanisms to cover non-credit-worthy individuals, under soft-term conditions due to the special conditions generated by disasters, as well as expanded existing schemes of risk transfer. An essential part of the latter would be the establishing of a catastrophe insurance scheme to cover the possible deficits arising in the fiscal budget at Central and State levels.

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.

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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
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- 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
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