Post-disaster Damage and Needs Assessment

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Synonyms

Disaster damage; Emergency; Post-disaster; Post-disaster needs assessment

Definition

Post-disaster damage and needs assessment refers to the process of estimating the losses that have already occurred or could potentially happen due to a certain disaster. Loss assessment is a crucial component of disaster management, as it assists authorities in examining risk management and identifying relief and rehabilitation needs by providing strategies and estimates of damage.

Introduction

Traditionally, disaster management has been primarily focused on post-disaster response, but in recent years, there has been a growing emphasis on pre-disaster activities, such as incorporating disaster-resistant technologies and addressing environmental degradation to reduce vulnerability [6]. Disaster management authorities have the responsibility to promptly address the requirements of people impacted by hazards [4]. However, they frequently experience difficult circumstances, such as limited time, resources, and other practical difficulties, which public administration scholars refer to as "bounded rationality" [18].

One of the significant components of post-disaster response is the assessment of damage and the identification of needs. This process is essential for allocating resources effectively, prioritizing relief efforts, and informing long-term recovery strategies. Post-disaster needs assessments ideally provide disaster relief and rehabilitation organizations with prompt and trustworthy data and information encompassing all essential and additional requirements specific to the affected individuals and community [13]. Undoubtedly, it is impossible to determine an undisputed and exact figure for the damages and losses caused by disasters. Loss estimates for similar occurrences, or even for the same event, might differ significantly despite the use of the same approach [3].

Post-disaster needs assessment prioritize the immediate and essential needs that arise as a result of a disaster [5]. The Post-Disaster Needs Assessment (PDNA) is a collaborative effort by the UNDP, the United Nations system, the European Union (EU), the World Bank, and national governments. This collaborative approach ensures a comprehensive review of disaster impacts, addressing not just the physical damage but also the economic,

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social, and environmental consequences. The PDNA provides the foundation for designing recovery programs that align with long-term national development goals and strategies [20].

PDNA highlights the most pressing disaster needs that are essential for sustaining life [7]. These include access to clean drinking water and sanitation facilities, sufficient food, proper medical aid, adequate shelter (in terms of housing and clothing), and fuel for cooking purposes. In addition to fulfilling basic needs, it is crucial to safeguard affected individuals or community from physical violence, especially in situations involving refugees and internally displaced individuals. It is also essential to address the psychological and social stress due to resultant disaster [7]. After fulfilling the fundamental requirements for sustaining life, one might shift their focus towards addressing other needs that are not immediately pressing but nevertheless hold significance for recovery and rehabilitation [9]. There are many methods to assessing damage and needs after a disaster. This entry aims to explore current state of research and practice in post-disaster damage and needs assessment, as a guiding principle, highlighting challenges, trends, and methodologies.

Different Types of Damage and Needs Assessment

Estimating the damage caused by natural hazards is an essential component of emergency response and recovery initiatives. Accurate and quick damage assessments are crucial for resource allocation, prioritizing recovery initiatives, and formulating effective mitigation strategies.

A significant problem in post-disaster damage assessment is the complexity of the process, requiring the integration of various sources of information, such as satellite images, aerial surveys, ground-level inspections, and socioeconomic data [17]. Researchers have investigated the use of sophisticated technologies, including remote sensing and machine learning algorithms, to improve the accuracy and efficiency of damage assessment. Nonetheless, the existing methodologies continue to encounter challenges regarding delays and put pressure on affected communities for collecting data through surveys [10].

Interdisciplinary collaboration and the setting up of standards are essential to advancing the adoption of emerging technologies, including artificial intelligence, in natural hazard management [14]. Effective project management and coordination among many stakeholders, including non-governmental organizations, government agencies, and local communities, are crucial for the success of post-disaster reconstruction efforts [8].

Disaster damage and needs assessments must be trustworthy and all-inclusive to support the commitment of governments during the disaster recovery phase. These significant assessments play a vital role in fostering community resilience and mitigating the potential risks of future hazards and the broader economy [3]. It is widely documented that hazards can have detrimental impacts on the physical and psychological well-being of individuals impacted. The repercussions of hazards extend beyond these. Hazards can result in various repercussions for individuals affected, impacting several aspects of their lives, including social and economic functioning.

Disaster assistance can be categorized into five domains [5, 12]. These domains include: basic assistance, which involves providing safety and security, food, and shelter; information, which entails sharing details about the incident, updates, the whereabouts of affected ones, and potential health consequences; emotional and social support, which involves listening grievances and solution; practical support, which includes providing legal aid and financial assistance; and healthcare for individuals, which encompasses prevention, diagnosis, and treatment of health problems.

The applications of damage and loss assessment. Post-disaster damage assessment can be utilized effectively to identify rapid needs, long-term recovery planning, and the design of reconstruction programs. Additionally, it can also be employed to monitor the advancement of both economic recovery and reconstruction [11]. The evaluation of damage not only quantifies the extent of the damages caused by a disaster but also offers insights into the consequences and

affects in the geographical areas and communities that have been most severely affected. The evaluation of the extent of damage, determined by analyzing the distribution of losses across, based on geographical areas and sectors, can be utilized to estimate the needs for reconstruction [1].

From damage to needs assessment. It is crucial for both the affected country and the development partners to promptly determine the financial requirements for post-disaster recovery and reconstruction. Damage assessment forms the foundation for estimating these requirements. However, the primary goals of economic recovery efforts are to reinstate individual and household earnings, vital services, and productive operations in the impacted regions. The primary goal of the reconstruction effort is to replace or restore assets that were entirely or in part damaged, under the principle of "building back better" [1].

From the decline in production to the requirements for economic recovery. An effective post-disaster recovery program may incorporate alterations or adjustments to public policies with the aim of reducing the economic recovery challenges and minimizing the individual damages [2]. A program of this kind typically consists of the following elements: income generation initiatives for the most affected individuals or community; a special grants program to restore for household assets and goods and to restart their business; the provision of favorable financial scheme to resume productive activities in enterprises like before, providing the dedicated lines of credit; and measures to accelerate the process and execution of construction and reconstruction programs.

By analyzing the assessment of production losses and the duration of these losses in each sector, we can also determine the number of employment days that have been lost. This information allows us to assess the financial impact on individuals, particularly those living in poverty or extreme poverty. Damage assessments can serve as the foundation for establishing a prompt income generation program. The assessed worth of damage for households and firms could possibly be used to develop a targeted grants program that specifically caters to those who are not eligible for credit [1].

The sector-specific estimations of production losses can be employed to determine the need amount of initial financial support for micro-, small-, and medium-sized firms. This information can be used to design a specialized financing program for entrepreneurs, ensuring that they can promptly resume their operations. The budgetary needs for the relief and rehabilitation program may be calculated based on the regional, sector-wise, and demographic group-wise distribution of losses as outlined during the data collection analysis for assessment [1].

The need for a program that addresses damage and reconstruction. The reconstruction program following a disaster is determined once a reconstruction strategy has been established, which includes guidelines on how to improve upon the previous state, and the projected cost of damage serves as the foundation for determining the necessary reconstruction efforts. In order to determine the value of reconstruction requirements, it is necessary to include some issues in mind, in addition to the anticipated damage to physical assets identified during the assessment: the additional expenses associated with improving housing standards, particularly for impoverished families; the expenses incurred for implementing strategies to minimize the effect of future disasters, such as retrofitting buildings and constructing them to meet high standards of disaster resilience; the expenses involved in relocating to safer areas when necessary; the expenses associated with technological advancements, as and when necessary; and the projected expenses resulting from post-disaster inflation, caused by scarcity or other factors related to the disaster [1].

The aforementioned necessitates the adoption of a reconstruction design for the government that have been affected. This strategy may encompass definitions regarding various aspects of reconstruction, such as the approach to be taken (e.g., using salvaged materials versus completely replacing construction materials), the scale of reconstruction efforts (e.g., large-scale reconstruction versus house level reconstruction), and the implementation of new construction codes for disaster-resilience, among others. However, the distribution of financial requirements may be

determined and ranked based on the assessment of the extent of damage, but it should be appropriately confirmed with the valid and reliable information [1].

Primary Data and Existing Literature for the Assessment of Post-disaster Damage and Needs

The post-disaster needs assessment methodology, which was initially devised in 1972 by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC), has been carried out in the aftermath of significant hazards worldwide. The methodology provides a systematic process that is government-led and is designed to measure the damage and the requirements of all affected sectors. In 2013, the World Bank, United Nations, and European Commission reached an agreement to systematize the method in order to provide more effective assistance to affected countries [16].

National governments may adapt the international methodology to the context and requirements of their respective countries in order to strengthen their post-disaster assessment and recovery planning systems. However, the adaptation process at the national level is needed due to some specific reasons such as alignment with the existing legal and institutional framework at the national level; synergy with government's administrative system and national disaster management bodies; provision of sector specific guidelines and templates in the national language; specification of country-specific household and community assets in various sectors; strengthening standard operating procedure (SOP) for assessment; and sustainable approach to developing the administrative capabilities (technical and functional) of government officials [16].

The general steps and outcomes of an assessment report. Post-disaster needs assessment typically involves the following general steps: collection of baseline information for all sectors; evaluation of damages for all sectors; evaluation of disaster impacts (social, economic, and other issues); and determination of a recovery strategy (prioritized needs, programs, and projects) [16]. Nevertheless, the assessment's findings offer valuable insights into the needs and priority areas for recovery. These include the total value of damages in physical assets and the changes in economic activities; the diagrammatic representation (with quantity) of damages based on ownership (government or private); the documentation of the geographic distribution of the most affected areas and sectors; the effects of the disaster on the macroeconomic and personal/household levels; and the estimations of post-disaster recovery, reconstruction, and disaster risk reduction needs [16].

Research methodology for post-disaster damage and needs assessment. There could be a sequence of events for conducting a successful damage and needs assessment, as follows: Collecting the current baseline data that details the existence and availability of financial and tangible resources in the region, as well as the methods by which the affected community is used to produce and consume goods and services. This will be used as the yardstick for comparing non-disaster conditions with post-disaster ones. However, field assessments conducted by data enumerators aim to determine the level of damage and its adverse impact on the production of goods and services. This will facilitate financial assessment or expenses associated with the consequences of the disaster, including damages and alterations in production flow. Additionally, it is necessary to combine the various impacts of the disaster on different sectors, while avoiding any duplication, in order to accurately calculate the total worth of the damage and changes in production flow resulting from the disaster. Nevertheless, there are assessments of the magnitude of the disaster's consequences at various levels of analysis.

It is important to analyze the macroeconomic impact, including its effect on gross domestic product (GDP) and the fiscal sector. For proper assessment, it is necessary to analyze the effects of a disaster on individuals or households, specifically examining how it affects employment, income, and expenditure [16]. This analysis will help estimation of the impact of disaster on human

development. However, it is possible to estimate the financial demands or necessities following a disaster, such as the restoration of personal income, the availability and delivery of essential services, and the resumption of regular levels of production. Last but not least, the assessment may decrease intensity of the danger of future hazards through the implementation of disaster risk reduction measures. After a disaster, a recovery framework can be developed to determine the specific targets and goals, and schedule of relief and rehabilitation operations. This framework serves as an instrument for evaluating the progress of recovery and reconstruction projects.

The inquiry pertains to the process of gathering data and information for the purpose of conducting a needs assessment, as well as the appropriate methodologies to be employed in the subsequent assessment report for post-disaster damage and needs assessment. The available literature can be gathered by compiling pertinent historical post-disaster data and conducting consultations and interviews with well-informed individuals, including development partners, disaster management officials, national experts, local leaders, health professionals, and other relevant stakeholders [7]. However, there exists a number of assessment techniques that can be employed to collect data in order to evaluate the extent of damage and analyze the needs. For instance, one could employ the appropriate sampling approach to directly observe the catastrophic occurrence and conduct interviews with the affected individuals [16].

Direct observation is a highly effective method for obtaining information with an emergency situation. Skilled disaster observers can rapidly collect information provided they possess knowledge of their specific search criteria. Direct observation, when used in conjunction with interviews, is an effective approach for doing an effective evaluation of disaster losses and needs. Interviews can be arranged with key informants from the government, relevant NGOs, local officials, community leaders, and media outlets. The primary objective is to acquire reliable information that is verified by comparison with other stakeholders. In addition to conducting interviews, focus group discussions (FGDs) with affected individuals and community leaders can be valuable for verifying information with multiple respondents. FGDs can be useful in certain situations to gain an understanding of the concerns that impact the community rather than focusing on individual concerns.

Now, readers may be wondering about the suitable sampling approach to decide the selection of stakeholders for post-disaster damage and needs assessment. There are two distinct categories of sampling techniques, such as probability and non-probability. However, probability sampling relies on statistical techniques. This task is both costly and requires a significant amount of time, as it is not suitable for rapid assessment. Non-probability methods, such as convenience sampling which is regarded as purposive sampling, are frequently employed in social science research. Convenience sampling involves interviewing individuals who are easily accessible, and this sampling involves selecting individuals who are considered to be representative of the population of interest.

Conclusion

To enhance coherence and efficacy in post-disaster damage and needs assessment, it is crucial to introduce a post-disaster household assessment tool and its associated processes. Appropriate stakeholders are involved in identifying and evaluating the damage caused by disasters, as well as assessing the needs of those impacted. They also provide assistance and services that meet the post-disaster needs and conditions of the affected individuals [19]. The involvement of authorities and stakeholders in disaster management is crucial, as they have the responsibility of evaluating the affected individuals and determining their immediate and future needs. Nevertheless, it is imperative to establish and uphold well-defined institutional and coordination mechanisms to rapidly collect information about the needs and difficulties faced by disaster-affected individuals [15]. This is crucial because robust institutional arrangements and policy oversight will ensure

that these mechanisms become the primary means of assessing households' damage and needs in the aftermath of disasters. In addition, it is crucial to ensure that the targeting mechanisms for relief and rehabilitation programs are properly planned. To adhere to this strategy, it is imperative to broaden the scope of the primary safety net initiatives to include a substantial proportion of the most impoverished individuals.

Cross-References

- ▶ Disaster Risk Assessment
- ▶ Drought Risk Assessment using Global Soil Moisture Products
- ▶ EO Data Integration in Drought Risk Assessment

Competing Interest Declaration The author(s) has no competing interests to declare that are relevant to the content of this manuscript.

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