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Survey Report:

Implementation of Post Disaster Needs Assessment in Indonesia: Literature Review

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This paper shares key findings from past studies on Post Disaster Needs Assessment (PDNA) in Indonesia, to be used as inputs for future research. We used Google Scholar to identify the relevant articles for analysis. From the 297 results obtained, we selected 25 materials, which are reviewed in detail. We classified the findings in the selected literature into 4 topics. (1) Cases of PDNA implementation in Indonesia: many studies deal with the Indian Ocean Tsunami and the Central Java Earthquake. (2) Policy aspects: the previous literature demonstrated PDNA policies and regulations, on which not only the National Disaster Management Agency (BNPB) but also others (e.g., Ministry of Home Affairs) have primary jurisdiction. (3) Coordination of implementation: coordination by the local disaster management agencies (BPBD) when facing challenges. (4) Methodological issues: the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) methodology does not perfectly fit in practice. One of the most significant implications drawn from the review is that more research is needed to examine policy aspects. The existing studies tend to focus mainly on BNPB, and such BNPB-centric perspectives prevented a comprehensive identification of the relevant actors, leading to a narrow range of analysis on PDNA. Our review suggests that changing viewpoints, being mindful of the BNPB function, is beneficial for further understanding PDNA implementation in Indonesia.

Keywords: Indonesia, Post Disaster Needs Assessment (PDNA), literature review, BNPB, Ministry of Home Affairs (MoHA)

1. Introduction

For more than a decade, international communities use the Post Disaster Needs Assessment (PDNA) as a tool to assess the responding needs of the affected locations. However, not much is understood of its implementation, nor of its pros and cons, in both scholarly and practical communities. Exploring PDNA for its better use and function improvement is long overdue. Therefore, this study assesses the available PDNA-related literature in Indonesia, and summarizes the key findings, sharing an initial agenda on future research needs.

PDNA is considered one of the standardized ways for gathering disaster-related statistics. The European Union, the UN Development Group, and the World Bank organized the PDNA Guidelines in 2013 [1]. The document encompasses a multi-sectoral and balanced needs assessment, from infrastructure, shelter, and livelihood to social and community services [2]. Substantially, to implement PDNA requires to valuate damages and losses, and to determine human recovery needs. Nagami points out that they were less strict in calculating loss and damage, although the guidelines set basic concepts [1].

Indonesia has approximately 10 years of history of PDNA and similar assessments. Some documents noted that a large-scale assessment was conducted with relation to the Indian Ocean Tsunami in 2004 (described in detail in Section 3.1). A pilot implementation of the Indonesian PDNA was carried out in the West Sumatra and Jambi Earthquake in 2009 (authors' communication with a government staff on November 25, 2015). Apart from examining if the existing discourse provided a clear definition of what PDNA is, the term "PDNA" had already started to be used prior to the notion defined by the international organizations when publishing the 2013 official guidelines. Along with PDNA implementation, the government of Indonesia has been developing regulations (known as Perka 11/2008, Perka 17/2010, and Perka 15/2011 [3–5]), whose establishment obviously preceded the 2013 official guideline launch. According to a World Bank report, 2008 is the year of the first PDNA implementation [6], suggesting that the Indonesian government officially issued the regulations in accordance with the on-going World Bank initiatives at that time.

Regarding the loss and damage data collection, Indonesia is one of the advanced countries to carry out disaster database development [7, 8]. Sasaki et al. demonstrated an interesting finding: they analyzed the relationship between academic articles (searched on Web of Science and published between 2015 and 2018) and the global targets

of the Sendai Framework of Disaster Risk Reduction [9]. They found that 4 academic articles have relationship with Target C (direct economic loss reduction) and Target D (damage reduction) [10–13]. These 4 papers do not touch PDNA at all. PDNA contains the Damage and Loss Assessment (DaLA), and we expected we might find some linkages between PDNA and the targets of the Sendai Framework for Disaster Risk Reduction (SFDRR). While data collection for the database is not necessarily the same with PDNA implementation, we may find similarities in terms of practice of data gathering after disasters.

In contrast to the practical efforts, the previous leading literature, which introduce policies and frameworks of disaster risk reduction in Indonesia, do not explicitly provide detailed findings on PDNA implementation [14–18]. On the other hand, considering the almost 10 years of experience with PDNA practice and the disaster management database in Indonesia, it is reasonable to expect that we may be able to find relevant case studies. However, we should not ignore the matter of definition. There might be a possibility that the literature on the recovery and reconstruction phases would have already provided some pieces of findings, even though they do not use the term "PDNA." Accordingly, bearing in mind that scholarly research requires an analytical concept in association with specified operational definitions, we conducted a survey as a preliminary step to simply clarify what we can learn from the existing studies referring to PDNA. Reviewing these existing case studies, although it seems an exploratory effort, enables us to examine what we know, and to discuss implications for elaborating the analytical concept of PDNA in the future.

Following this introduction, we clarify the ways we collected and selected relevant articles on PDNA implementation in Indonesia, in the method section. Then, we categorize the findings of the selected materials. In the last section, we discuss what kind of aspects are significant for future research.

2. Methods

We used Google Scholar to identify relevant articles. The reason we relied on Google Scholar is that it includes not only academic peer-reviewed papers, but also reports, book chapters, masters theses, and doctoral dissertations. We relied solely on Google Scholar for the paper selection for our review. A cross-reference needs to be done for further analysis.

For the search, we used the keywords "Indonesia PDNA" and "Post Disaster Needs Assessment." We considered that such keywords would link our search to relevant materials as much as possible. Regarding the search language, in the beginning we chose "any language" so that the settings would provide us with both English and Indonesian materials. Furthermore, for accuracy, we tested the Indonesian language in search. The reasons for using the local language are that the Indonesian acronym of PDNA is different from the English spelling, and we expected that a certain amount of publications would be available in the local language. We used "Indonesia Jitu Pasna" and "Pengkajian Kebutuhan Pasca Bencana." Jitu Pasna is the Indonesian acronym for PDNA (Pengkajian Kebutuhan Pasca Bencana stands for Post Disaster Needs Assessment).

The search was carried out on April 17, 2020, and we collected 297 results (290 results in the first search in English and 7 results in Indonesian).

In order to precisely identify the relevant materials, we investigated the initial result using two steps. The first excluded materials apparently dealing with PDNA issues in other countries, as many studies outside Indonesia were included in the initial search results. The 2010 Haiti earthquake and the 2015 Nepal earthquake are typical examples that appeared frequently. Consequently, 178 results were excluded in the first step.

We still needed to exclude unclear materials, therefore, in the second step these articles were manually assessed one by one. For instance, we found an article that does not mainly examine PDNA in the context of Indonesia, even though all the search phrases were detected. In other words, although the article can be automatically selected by the key word search, its content may not be relevant (the search words are simply scattered).

After these steps, we finally selected 25 articles for a detailed review.

3. Results of Review

In this section, we classify the findings of the selected literature into 4 topics. Our classification is solely inductive, rather than relying on existing frameworks.

3.1. Cases of PDNA Implementation in Indonesia

When examining the number of disasters in which PDNA was carried out in Indonesia, the Indian Ocean Tsunami in 2004 was referred to the most. Out of the 25 articles, 10 were found to deal with the Indian Ocean Tsunami [19–28], followed by the Central Java Earthquake in 2006 (also known as the Yogyakarta Earthquake), with 6 articles [20, 26, 28–31]. As mentioned in the Introduction, while the PDNA has been piloted after the West Sumatra Earthquake in 2009 (also simply called the Padang Earthquake), only 4 articles examined that disaster [31–34]. Recent large-scale disasters, such as the Lombok Earthquake (Nusa Tenggara Barat) in 2018 [35], and the Central Sulawesi disaster (earthquake, tsunami, and liquefaction) in 2018 [36], were identified as cases in which PDNA has been implemented.

Volcanic eruptions, such as Mt. Merapi [25, 28] and Mt. Sinabung [25] eruptions in 2010, as well as Mt. Kelud eruption in 2014 [37] were also cases in which PDNA has been implemented. Furthermore, a few cases on flood disasters were identified [38, 39].

3.2. Policy Aspects

As noted in the Introduction, the Government of Indonesia has been developing regulations relating to PDNA since 2008 (Perka 11/2008, Perka 17/2010 and Perka 15/2011 [3–5]). They were issued by the head of the National Disaster Management Agency (BNPB in Indonesian). In addition to these BNPB regulations, the previous literature revealed other relevant legal documents in their analysis.

Hadi introduced many types of documents: Law No. 23 of 2014 on Regional Governance, Government Regulation Number 2 of 2018 concerning Minimum Service Standards, Law No. 20 of 1961, and the Local Medium-Term Development Plans ("RPJMD: Rencana Pembangunan Jangka Menengah Daerah"), including the regional spatial plans ("RTRW: Rencana Tata Ruang dan Wilayah") [28]. The author is a staff member of the National Development Planning Agency (BAPPENAS), and he showed a wide range of the legal and policy documents network [28]. In relation to spatial plans, Fitzpatrick (2010) considered that systematic land registration and titling should be carefully conducted, noting the Reconstruction of Aceh Land Administration System (RALAS) in the Indian Ocean Tsunami [19].

Two studies [37, 40] indicated that PDNA is linked with budget and funding issues. Nehru introduced Finance Number: 87/PMK.02/2015 concerning Procedures for Budget Users of the Budget Section of the State General Treasurer for Other Expenditure Management, and also noted that PP No. 22/2008 concerning Funding and Management of Disaster Assistance and APBD (Anggaran Pendapatan dan Belanja Daerah: the local government budget) are related to PDNA implementation [37].

Other two papers [25, 36] pointed out the relationship between PDNA and the Action Plan for Rehabilitation and Reconstruction (locally known as RENAKSI). According to them, PDNA provides baseline data for drafting RENAKSI, and they are not to be separated. Because of that relationship, when PDNA practice took time and needed to be updated, RENAKSI also required changes.

3.3. Coordination of Implementation

In PDNA field practice, [37, 38, 41] stated that the Local Disaster Management Agencies (BPBD) have not fully achieved their roles, in contrast with the regulation development. On the other hand, the World Bank report praised the BRR (Badan Rehabilitasi dan Rekonstruksi: The Agency for the Rehabilitation and Reconstruction of Aceh/Nias) function [24]. Furthermore, the World Bank and Global Facility for Disaster Reduction and Recovery (GFDRR) working paper positively noted that the monitoring and evaluation in the case of the Central Java Earthquake were conducted based on the experience with the Indian Ocean Tsunami [20].

3.4. Methodological Issues

The latest PDNA guideline was developed based on the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) methodology. Daniell and Wenzel [30] and Sharma [31] argued almost the same point: the ECLAC methodology has unclear definitions for damage and loss calculation. Shafi noted that the level of physical damage and losses was overestimated in the Aceh Province in the Indian Ocean Tsunami, in which the ECLAC methodology was used [21]. Medina and Santoso used a quantitative approach to the Damage and Loss Assessment (DaLA) method, to find out the economic loss rate of the community in flood cases [42].

Other materials suggested and emphasized specific perspectives for PDNA implementation. Hinzpeter and Sandholz suggested the importance of eco-DRR and that it should be integrated into the PDNA [33]. Harrowell and Özerdem raised the gender equality perspective in PDNA [27]. Wiig (2019) stressed the cultural aspect, with repeatedly citing the PDNA guidelines (Social Sector in Volume B) written by Amartya Sen [35].

We found only one article that dealt with satellite image analysis. Kerle tested the damage mapping in the Central Java Earthquake [43].

4. Discussion and Future Research

Based on the review, this section discusses the results and what should be explored in the future.

Regarding disaster types in PDNA implementation, as we wrote in Section 3.1, earlier studies tended to focus on sudden-onset large scale disasters. The Indian Ocean Tsunami and the Central Java Earthquake are the typical examples. It is of no doubt that much attention was given to research these major catastrophes. However, if we consider the frequency of disaster occurrence, sequential disasters are also important to be studied, and it seems beneficial to understand PDNA. Volcanic eruptions, floods, and landslides periodically or seasonally happen, particularly in Indonesia. We can reasonably assume, for example, that municipalities around a volcano may accumulate their experience and practical knowledge. Process tracing in a specific location study with experiencing multiple disasters, rather than snapshot basis, enables us to observe in a diachronic manner if agencies carry out or customize the PDNA implementation in detail.

In order to understand the PDNA practice more systematically, policy aspects can be a useful viewpoint. As summarized in Section 3.2, we can find that many legal documents are related to each other. As we have explored so far, it is hard to find in-depth and comprehensive studies on the legal framework. The Indonesian legal system has its own hierarchical order. For instance, the Ministerial Regulations (PERMEN: Peraturan Menteri) and the Ministerial Decrees (KEPMEN: Keputusan Menteri) are distinguished between, due to the difference in their legal effects. Further, we may need to pay attention not only to BNPB, but also other government agencies, since BNPB does not always have primary jurisdiction on some laws and regulations. For example, in the case of Government Regulation Number 2 of 2018 concerning Minimum Ser-

vice Standards introduced by Hadi [28], we need to consider the presence of Ministry of Home Affairs (MoHA). In the country's cluster mechanism, MoHA is in charge of information management in the early recovery stage, which is closely related with PDNA. MoHA also sets out the "SPM: Standar Pelayanan Minimum" (minimum standard of services) post disaster. The SPM refers to basic services that citizens rightfully (protected by constitution) receive, and that relates with the assessment results. In this sense, studying the legal and policy frameworks enables us to understand inter-organizational relationships. This could be related to Section 3.3: the coordination roles and process can be examined much clearer through the analysis of the inter-organizational relationship.

Regarding Section 3.4, at least to our understanding, the previous literature has not yet examined specific sector analysis (e.g., housing, livelihood). Even though they focused on specific cases, the detailed sector description is still limited.

Related to SFDRR global targets, they have been separated at least in the context of Indonesia PDNA implementation, although this is a preliminary reflection. From the selected papers in this article, we were unable to find any description regarding the SFDRR global targets.

As an overview of what this reviewing revealed, we conclude that the relevant research has not yet provided sufficient implications for elaborating the analytical concept of PDNA in the future. It is necessary to accumulate findings of the case studies based on the perspectives pointed out in this section. Additionally, the PDNA practice outside Indonesia must be useful for identifying elements to be examined.

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Brief Career:
1994 Pacific Consultants International
2004 Teaching Assistant, Cornell University
2006 Research Assistant, University of Illinois Urbana-Champaign
2010 Urban Specialist, The World Bank
2013 Associate Professor, Tohoku University

Selected Publications:
• K. Iuchi and J. Mutter, "Governing community relocation after major disasters: An analysis of three different approaches and its outcomes in Asia," Progress in Disaster Science, Vol.6, Article No.100071, 2020.
• K. Iuchi, Y. Jibiki, R. Solidum, and R. Santiago, "Natural Hazards Governance in the Philippines," Oxford Encyclopedia of Natural Hazards Governance, Oxford University Press, 2019.

Academic Societies & Scientific Organizations:
• American Planning Association (APA)
• City Planning Institute of Japan (CPIJ)
• Earthquake Engineering Research Institute (EERI)
• Institute of Social Safety Science (ISSS)