A Case Study of Excreta Disposal Following the 2006 Java Earthquake*

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Abstract. Providing safe excreta disposal following disasters is important for disease prevention and the safety and dignity of the affected population. This is challenging because every emergency varies due to the nature of the disaster, local conditions and the characteristics of the affected population. This paper investigates the impact of the 2006 Java earthquake on excreta disposal needs and the response to those needs. Relevant documents were retrieved from the ReliefWeb database, complemented by a literature search. The case study highlights gaps in rapidly providing latrines on a large scale. Three months after the disaster, only 57% of the latrines targeted had been provided. One way to address this problem is to better understand the factors affecting excreta disposal needs and response, allowing appropriate solutions to be identified more effectively.

Keywords: *earthquake; emergency; excreta disposal; sanitation; Yogyakarta.*

1 Introduction

The lack of sanitation following disasters is an important cause of communicable disease transmission [1]. In fact, some studies (e.g. [2]) suggest that excreta disposal can have a greater impact on health than drinking water quality. Just as importantly, toilet facilities affect the safety and dignity of the affected population. Guidelines for excreta disposal response are provided by the Sphere Project [3], which aim to ensure that the environment is free from human feces and that the affected population has access to appropriate and adequate toilet facilities. Indonesia's National Disaster Management Agency has adopted similar standards [4].

Every emergency presents a different set of challenges depending on the nature of the disaster, local conditions and characteristics of the affected population.

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This paper utilizes a case study of the 2006 earthquake in Java, Indonesia, to better understand the implications of earthquakes on excreta disposal.

2 Methodology

Publicly available documents on water, sanitation and hygiene (WASH) were collected, with the majority sourced from the ReliefWeb disasters database as well as a wider Internet search. The content compiled included analyses, appeals, assessments, evaluations and lessons learned, manuals and guidelines, maps, news and press releases, situation reports and United Nations documents. Relevant data were extracted, organized and coded, then compiled chronologically and ordered by the coded categories for analysis.

3 The Earthquake and Its Impact

On 26 May 2006 (Day 1), a magnitude 6.3 earthquake occurred in Galur sub-regency, Yogyakarta, at a depth of 10 km [5] (Figure 1). Ground shaking was felt on much of Java island and was said to be more intense than deeper earthquakes of the same magnitude. The shaking caused extensive damage to infrastructure, compounded by high population densities and poor construction [6]. Key affected areas included the Klaten, Bantul and Sleman districts, located in parts of the Central Java and Yogyakarta provinces. According to OCHA's [7] situation reports, 608,008 houses were destroyed or damaged, which was approximately 30% of the housing stock in the affected areas.

Figure 1 Approximate location of earthquake indicated. Key affected areas included the Klaten, Bantul and Sleman districts. Map from Google (Map data: GBRMPA, Google, MapIT).

Between 200,000 and 650,000 people were estimated to have been displaced [9]. Although camps, collective self-settlements, host families and kinship groups were noted, a snap survey had found that 74% of households whose houses were completely destroyed were living on their existing plots [7]. Hence, the displacement was dispersed rather than concentrated.

In contrast to housing damage, it was reported that there was less damage to sanitation facilities than initially suspected. One assessment suggested that 19% and 13% of toilets were moderately and badly damaged respectively. Another report estimated that 153,598 toilets were moderately or badly damaged [7]. Most of the damage was limited to the superstructure and septic tanks, while latrine slabs and pipe work remained usable [9]. Access to improved sanitation in 2006 in Central Java and Yogyakarta was 39.7% and 54.9% respectively [10]. In Yogyakarta, individual toilets, on-site sanitation and septic tank systems were common, while in rural areas open defecation into nearby rivers was widespread. Yogyakarta had a sewerage system covering 30% of the city and a wastewater treatment plant in Bantul [6].

4 Excreta Disposal Response and Outcomes

In response to excreta disposal needs, the WASH cluster reached a consensus to rehabilitate existing facilities instead of constructing new toilets [7]. The rehabilitation of latrines generally entailed the provision of plastic sheeting and bamboo for screens in order to protect privacy [11]. Types of facilities included communal toilets, bathing and washing facilities (known as MCKs) as well as semi-permanent latrines. Table 1 lists examples of activities that were carried out by various organizations.

Table 1 Examples of latrine provision by the government and various agencies.

Date of report	Day	Description of activities
30 May 2006	4	In Bantul district, IFRC begins construction of emergency latrines [12]
31 May 2006	5	UNICEF starts construction of emergency latrine facilities at 100 locations [7]
2 June 2006	7	UNICEF has completed 10 latrine / bathing facilities [7]
6 June 2006	11	IFRC and partners have set up emergency latrines at Bantul IDP camp and around field hospitals. However, UNICEF continues to seek partners for Klaten District [7]
12 June 2006	17	Yogyakarta Public Works Department has provided 91 toilets [7]
15 June 2006	20	The Government has installed public toilets in Ngandong village as a model for other agencies [7]
29 June 2006	34	BORDA / LPTP has completed 12 communal toilets; Action Contre la Faim has constructed 31 toilets; Yayasan Dian Desa / UNICEF has completed 610 toilets; YKY / UNICEF has provided 62 toilets; YKMI has constructed 17 latrines in Umbulharjo, 41 in Kepuharjo and 20 in Bina Bakat [7]

Several factors made this strategy feasible. Most of the affected population lived close to their homes. Therefore they could access undamaged latrines. In other cases, families were observed constructing their own makeshift structures in order to use the latrine [8]. Assuming that some families would repair their own toilets, and in considering the limited capacity of WASH cluster members, the WASH Cluster decided on a target of 15,000 toilets (out of the 32,000 required) for implementation [11]. However, by 21 September (Day 118), only 57% of the target had been achieved (Figure 2).

WHO [13] reported a 37.3% rate of open defecation in Berbah and Pudong sub-districts as of 9 June (Day 14). However, there were insufficient reports available to make a decisive conclusion on whether there was a significant impact on public health.

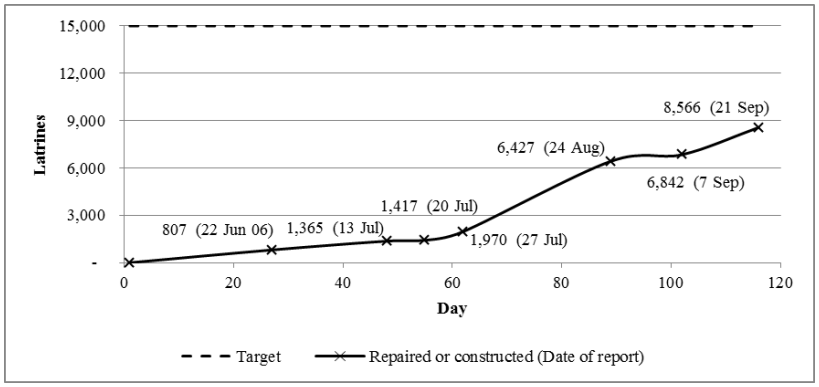

Figure 2 Number of latrines repaired or constructed. Data from OCHA [7].

5 Discussion

The response to the 2006 Java earthquake, as is the case in many emergencies, was insufficient. Three months after the earthquake, implementation targets were nowhere near being achieved with evidence of open defecation, suggesting that the Sphere standard of the environment being free of faeces had not been met. This suggests two important areas where excreta disposal response can be improved: the ability to implement solutions quickly and on a scale to serve large numbers of displaced people.

One possible approach to addressing these shortcomings is to improve the speed with which governments and humanitarian agencies respond to excreta disposal needs. A good starting point would be to better understand the impact of earthquakes on excreta disposal, supported by improved data collection and reporting. This would allow implementing agencies to effectively determine

appropriate solutions and hence respond more quickly. However, there is a lack of literature on excreta disposal following earthquakes and it became evident during the case study that obtaining data from emergency situations was extremely challenging.

Findings from the case study provide hints towards factors that affect excreta disposal needs and response. It is possible to make several propositions that can be tested by studying other emergencies: 1) earthquakes do not cause significant technical or logistical constraints to latrine provision compared to other types of disasters, such as floods; 2) earthquakes cause physical damage to toilet infrastructure but a large proportion of latrine slabs may remain functional; and 3) where families choose to stay close to their homes and the damage to toilets is not significant, the rehabilitation of latrines is an ideal strategy.

A better understanding of such relationships will facilitate the prediction of needs and a more effective response. This process could be supported by a decision-making tool that supports the selection of appropriate solutions in different situations.

6 Conclusion

This paper provided insight into the impact of the Java earthquake on excreta disposal. A number of propositions were identified. Further research into excreta disposal following earthquakes as well as other disasters will lead to a greater understanding of excreta disposal needs and the identification of appropriate responses under different scenarios.

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