Understanding the perceptions, roles and interactions of stakeholder networks managing health-care waste: A case study of the Gaza Strip

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ABSTRACT

The sustainable management of waste requires a holistic approach involving a range of stakeholders. What can often be difficult is to understand the manner in which different types of stakeholder networks are composed and work, and how best to enhance their effectiveness. Using social network analysis and stakeholder analysis of healthcare waste management stakeholders in the case study region of the Gaza Strip, this study aimed to understand and examine the manner in which the networks functioned. The Ministry of Health was found to be the most important stakeholder, followed by municipalities and solid waste management councils. Some international agencies were also mentioned, with specific roles, while other local institutions had a limited influence. Finally while health-care facilities had a strong interest in waste management, they were generally poorly informed and had limited links to each other. The manner in which the networks operated was complicated and influenced by differences in perception, sharing of information, access to finance and levels of awareness. The lack of a clear legal framework generated various mistakes about roles and responsibilities in the system, and evidently regulation was not an effective driver for improvement. Finally stakeholders had different priorities according to the waste management issues they were involved with, however segregation at the source was identified as a key requirement by most. Areas for improving the effectiveness of the networks are suggested. The analysis utilized an innovative methodology, which involved a large number of stakeholders. Such an approach served to raise interest and awareness at different levels (public authorities, health providers, supporting actors, others), stimulate the discussion about the adoption of specific policies, and identify the effective way forward.

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1. Introduction

It is widely accepted that the development and effective implementation of sustainable approaches to global challenges such as climate change and resource security require a holistic approach, involving a range of actors, including government, civic society, non-governmental organizations, and the community (Stern, 2006; Marias and de Almeida, 2007; Bodin and Crona, 2009; Weber and Allen, 2010; Phillips et al., 2011; Starkl et al., 2013; Meadows et al., 2014). However, there are several difficulties in achieving this holistic approach, including the identification of appropriate stakeholders, their effective engagement, and the achievement of some form of consensus during the development and implementation processes. Deliberative approaches (e.g. stakeholder forums and focus groups), have gained increasing prominence as a means of overcoming these limitations (Maclean and Burgess, 2010). They seek to gain the collective views of stakeholders (e.g. policy makers and individuals from the community), and incorporate them during the development of governance strategies (i.e. the overarching aims, objectives and mechanisms), to effectively develop and implement sustainable approaches (Chambers, 2003; Dietz et al., 2003; Guntman and Thompson, 2004). While in theory there is an understanding of the mechanisms of deliberative approaches, in practice, real world case studies are limited (Levänen and Hukkinen, 2013).

Scientific literature presents several approaches to stakeholder participation. The Planning-Oriented Sustainability Assessment Framework (POSAF) utilizes a constructivist approach (Roy, 2010; Starkl et al., 2013). While the Active management strategy involves stakeholders working as a collective and in a structured way, to identify, implement and monitor selected strategies (Walters and Holling, 1990). Decision-making is often undertaken using Bayesian networks (also known as Bayesian belief networks), to map out cause and effect scenarios, from different sources and data, which are then quantified to determine the extent to which one variable is likely to impact upon another (Jensen, 2002; Henriksen et al., 2007). Another concept is that of Adaptive co-management (an expansion of co-management), whereby through collective discussion and negotiation, flexibility is built into the management of the social-ecological systems, to allow for adaptation in response to environmental change, and the acquisition of new knowledge by stakeholders (Carlsson and Berkes, 2005; Armitage et al., 2009; Bodin and Crona, 2009). There are also bottom-up approaches, whereby stakeholders decide on the assessment criteria, including the strategic choice approach (Friend and Hinckley, 2005; Lennartsson et al., 2009), and Community-Led Urban Environmental Sanitation Planning (CLUES) (Simon et al., 2004; Lundie et al., 2006; Lüthi et al., 2011). However, various researchers argue that the fragmentation of stakeholders can often limit the success of bottom-up strategies (Lienert et al., 2013; Starkl et al., 2013).

The ecosystems-based management (EBM) approach to resource management involves an understanding of the entire eco-system and the manner in which the social and environmental factors influence the resilience of the system and its ability to provide the required goods and services (McLeod and Leslie, 2009; Kidd et al., 2011). An examination of the governance structures and the institutions involved in managing the ecosystem forms a key component of the EBM approach (Folke et al., 2007; Hagedorn, 2008; Carollo and Reed, 2010; Cárcamo et al., 2013). Within this context, identifying and understanding the perceptions and expectations of stakeholders plays a significant role in effective implementation of the EBM approach (Gelcich et al., 2005; Pomeroy and Douvere, 2008).

The development of strong networks can significantly enhance sustainable management of resources. For example, such networks have been shown to lead to more sustainable management of land resources, increased knowledge and motivation amongst stakeholders (Kilgore et al., 2007; Larsen et al., 2011; Meadows et al., 2014), as well as enhanced engagement with marine protection areas (Heck and Dearden, 2012; Lopes et al., 2013; Cárcamo et al., 2014), and mobilization and allocation of resources (Carlsson and Berkes, 2005; Newman and Dale, 2007). Indeed, some argue that social networks are more important than formal governance structures for the effective enforcement and compliance with environmental regulations (Scholz and Wang, 2006). For example, the development of effective health-care waste management (HCWM) policies at the national levels requires full stakeholder participation (de Titto et al., 2012). Indeed, by being proactive and working together, stakeholders, and in particular health-care facilities (HCFs), can improve their performances even if there is no legislative framework in place (Rushbrook and Zghondi, 2005).

Use of deliberative strategies has been extensively employed within the field of environmental management (Hajer and Wagernaar, 2003; Baber and Bartlett, 2005; Dryzek, 2010). However, there is limited information about the 'feedback mechanisms' between institutions developing environmental governance or how best to facilitate a shift away from a spontaneous, self-organising model (Levänen and Hukkinen, 2013). Moving towards such an approach requires not only the effective sharing of information,

but also that this knowledge is actively integrated into the new approaches. This is particularly true about engaging with relevant stakeholders for sustainable management of environmental resources during constrained circumstances (e.g. during armed conflicts or major disasters) (Mendenhall, 2014).

Using the implementation of a new system to manage waste from health-care facilities in the Gaza Strip as a case study, this project set out to examine the strategies via which various stakeholders could best be engaged with the process. The Gaza Strip was chosen as there is limited empirical data on waste management in the area (Caniato and Vaccari, 2014). In addition, the decision was taken to focus especially on healthcare-waste management, due to the wider socio-economic and public health impacts of its management. For example, the ineffective management of health-care waste can lead to the risk of needle stick injuries and blood borne infections (WHO, 2011), as well as the spread of healthcare associated infections (Tudor et al., 2010). The contribution of the study also lies in the methodological approach taken. Understanding how best to integrate the various actors across hierarchical levels and sectorial boundaries has traditionally been undertaken using either stakeholder analysis (Grimble and Wellard, 1997), or social network analysis (Kenis and Scheider, 1991; Crona and Bodin, 2006; Adam and Kriesi, 2007), or a combination of the two (Reed et al., 2009; Lienert et al., 2013). Caniato et al. (2014) introduced a novel approach of stakeholder engagement and analysis, through the integration of stakeholder analysis and social network analysis. Such an approach was developed and tested for research purposes during the analysis of the infectious HCWM system in Bangkok, Thailand. This study employed an amended and improved approach to that used in Thailand. COOPI, an Italian NGO, asked CeTAmb to assess HCWM in the Gaza Strip, as evidence of ineffective management of the waste, linked in part to the on-going geo-political conflicts and the resulting humanitarian and public health impacts were present. This case study therefore offered the opportunity to improve the methodology, and to test it in a particularly complex environment. This paper describes this part of the assessment.

2. Study area: the Gaza Strip

The Gaza Strip is a narrow strip of land, bordered by Israel to the east and north, and Egypt to the south (Fig. 1). It occupies a total area of 365 km^2. In 1948, it had a population of less than 100,000 people, but by the time of this study had 1.6 million and is expected to grow to 2.1 million by 2020, and 3.2 million by 2040 (UNoPT, 2012; PCBS, 2013).

As a result of the armed conflicts in the region, management of the physical environment in the Gaza Strip has been severely neglected. Waste management faces a number of restrictions, including (UNDP, 2012; Salem, 2013):

– Limited national and local legislation.
– Political and security instability.
– Limited funding.
– Inadequate infrastructure, including space for facilities.

In addition, household waste arisings are expected to rise from around 1506 tonnes per day in 2011, to approximately 3383 tonnes per day in 2040 (UNDP, 2012).

At the time of the study, waste was being managed by five main providers, namely: (i) North Gaza Joint Service Council (JSC), (ii) the Municipality of Gaza, (iii) Deir al Balah JSC, (iv) the Municipality of Rafah, and (v) the United Nations Relief and Works Agency (UNRWA). The JSCs are also called solid waste management councils (SWMCs). Waste was primarily collected using donkey carts, in