

## Chapter 2

# A Review on Solid Waste Management Using the DPSIR Framework in a Southern Africa Case Study

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### ABSTRACT

*This chapter uses the DPSIR framework to examine logistical, infrastructural, and operational challenges in SA's SWM system using Buffalo City Municipality as case study. Findings suggest that SWM is an endemic problem in the municipality characterised by a preference to landfill disposal, minimal recycling tendencies, poor waste services, non-enforcement of existent waste regulation, inadequate funding, and non-involvement of urbanites and informal sector in the process. To counter these challenges, BCM has enhanced its financial resources to facilitate scientific landfilling and transit to perceptions of solid waste as a useful good. The municipality has collaborated with local industries and international organizations to synergize efforts to implement state and local waste management plans. For an integrated model of SWM, this review suggests SA and BCM's need to plan innovatively, adopt landfill-mining, plan strategically on all waste cycle aspects, and modify existing regulations to accommodate urbanites and informal waste pickers in the process.*

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## **BACKGROUND**

In the last two decades, SA has had unprecedented population growth, which has affected urbanisation trends, waste generation and management. A World Bank survey documented by the South African Institute of Race Relations (2013) details that 62% of the population resides in urban areas which is a rise from 52% in 1990s. This population outburst has overwhelmed municipality authorities reducing their capacity to provide waste services and leading to unscientific handling (Samson, 2010; Muzenda et al., 2012; Katsiimeh et al., 2013; Nyika et al., 2020). In SA, more than 42 million cubic metres of solid waste is generated annually, which translates to 0.7 kg per individual daily (Nkosi *et al.*, 2013). In Eastern Cape Province, approximately 1.6 Million tonnes of solid waste are generated annually from industrial, commercial and residential sources (Nyika et al., 2020). The Buffalo City Municipality (BCM) in Eastern Cape is the largest generator at 619, 099 tonnes annually compared to neighbouring municipalities though Solid Waste Management (SWM) is poorly funded and uncoordinated (DEDEA, 2009). Fiehn and Ball (2005) observed a similar trend citing inadequate waste services for majority of the population, unlicensed and illegal management procedures, unclear waste-related regulations and inadequate recycling action plans as major issues in SWM. The Integrated Pollution and Waste Management Policy noted SWM as SA's biggest twenty-first century problem (Simelane & Mohee, 2012).

At municipality level as is the case in Nelson Mandela Bay and BCM, Integrated Waste Management Plans (IWMP) to oversee the implementation of NWMS have been formulated though not successfully. Ali (2010) and Dlamini et al. (2019) argued that the willingness to better waste services is there but the capacity and infrastructure could be an impediment. On a different viewpoint, Fobil et al. (2010) as well as Rasmeni and Madyira (2019) claimed that it is the lack of a well thought SWM plan that precedence stakeholder participation especially the urbanites, which ails the capacity of municipalities in waste service provision. Senkoro (2003) and Cobbinah et al. (2017) support these suppositions claiming that poor stakeholder involvement causes South African municipalities to spend 20-50% of their revenue on SWM but only about 35% have access to effective waste services. Additionally, existent literature lacks holism in that it focuses on government's failures and recommends improvements without assessing the role of urbanites and private sector in the waste cycle (Oteng-Ababio, 2010; Oteng-Ababio et al., 2013; Cobbinah et al. 2015, 2017; Amoah & Kasoe, 2014; Addaney & Opong, 2015; Dlamini et al., 2019; Nyika et al., 2020). In view of this situation, it is necessary to assess the current situation of SWM, implement and formulate effective measures that synergise development of municipalities countrywide (Dlamini & Simatele, 2016). This book focuses on this issue using the BCM case study.

## **SWM IN SA AND BCM USING THE DPSIR FRAMEWORK**

### **A Brief Introduction of SA and BCM**

SA is one of the largest multiracial countries of Africa and consists of North West, Northern Cape, Mpumalanga, Limpopo, KwaZulu-Natal, Gauteng, Free State, Eastern, and Western Cape provinces (Statistics SA, 2011). It has a population of approximately 57 million and Gauteng is the most populous province followed by KwaZulu-Natal and Eastern Cape. BCM is located in Amathole District of Eastern Cape Province. It neighbours Ngqushwa, Nkonkobe and Amahlathi local municipalities as shown in Figure 1. The area has a total of 223,568 households and 755,200 people that is 11.5% of Eastern

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