Regulation of waste disposal at local government level: contributing to the water-energy-food nexus

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ABSTRACT

Waste is an unavoidable by-product of daily human activities. An estimated 90% of waste created in urban areas is disposed at landfills. However, this is not the case in rural areas, where waste is uncontrolled and unregulated. The uncontrolled creation and disposal of waste creates an environmental challenge, contributing to water pollution and an increase in undesirable climate patterns. Section 24 of the *Constitution of the Republic of South Africa*, 1996 (Constitution) emphasises the need to protect the environment. Additionally, section 156, read with schedules 4B and 5B of the Constitution places an obligation on different spheres of government to put measures in place to protect local communities and to prevent pollution, which includes the disposal of waste. However, several factors, such as lack of infrastructure, poor financial management and selective provision of services result in the failure of local government to adequately deal with waste disposal practices in rural areas and the management thereof. This study is aimed at evaluating the extent to which the regulation of waste disposal at local government level could contribute to the water-energy-food nexus.

The water-food-energy (WEF) nexus refers to the interlinked relationship between water, energy and food resources and the trade-offs that should be made in this regard. South Africa produces, for example, an estimated 1.1 million tonnes of waste from disposable nappies per annum, in addition to other forms of solid waste. This waste results in a significant strain on local governments responsible for its disposal and management, resulting in undesirable consequences for water, energy and food security in rural areas of South Africa. Proper and sustainable disposal of this waste is necessary to avoid pollution of essential resources and the environment. This requires proper infrastructure, regular service delivery, in the form of refuse collection, and adequate funding to ensure effective regulation and management of waste. Local government has a duty to provide these services in an accountable and transparent manner, through developing and adopting plans, policies and programmes and setting targets for delivering services to communities. To assess this duty, this study focused on improper waste disposal practices at local municipalities, using the waste management by-laws and integrated development plans of two local

municipalities, namely the Greater Taung Local Municipality and Matatiele Local Municipality.

Rural areas and land that falls under traditional authorities such as those within these two local municipalities do not receive waste removal services, resulting in improper and illegal waste disposal practices. The pollution caused by these waste disposal practices results in the degradation of soil, contamination of water sources, air pollution, and food scarcity. The study proposes the reduction and eradication of pollution in rural areas that will require the improvement of waste management practices; more funding for infrastructure development in rural areas; raising awareness in communities and stakeholder collaboration in order to achieve adequate and sustainable access to water-energy-food sectors.

Keywords: Waste disposal; rural areas; regulation of waste disposal; environment; water-energy-food nexus

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LIST OF ABBREVIATIONS

AHPs	Absorbent Hygiene Products
ASSAF	Academy of Science of South Africa
BDRR	Blue Drop Risk Rating
CSIR	Council for Scientific and Industrial Research
DBSA	Development Bank of South Africa
DDT	Dichlorodiphenyltrichloroethane
DFFE	Department of Forestry, Fisheries and Environment
ECA	Environment Conservation Act 73 of 1989
eWASA	EPR Waste Association of South Africa
GG	Government Gazette
GN	Government Notice
IDP	Integrated Development Plan
IWMP	Integrated Waste Management Plan
Kg	Kilogram
m	metre
mm	millimetre
MSW	Municipal Solid Waste
NEMA	National Environmental Management Act 107 of 1998
NEMWA	National Environmental Management: Waste Act 59 of 2008
NWA	National Water Act 36 of 1998
NWMS	National Waste Management Strategy
PELJ	Potchefstroom Electronic Law Journal
POPs	Persistent Organic Pollutants

SAJELP	South African Journal of Environmental Law and Policy
SAJHR	South African Journal on Human Rights
SDGs	Sustainable Development Goals
StatsSA	Statistics South Africa
Stell LR	Stellenbosch Law Review
UNEP	United Nations Environment Programme
WEF	Water-energy-food
WRC	Water Research Commission
WSA	Water Services Act 108 of 1997
WTWs	Water Treatment Works
WWTWs	Wastewater Treatment Works

Chapter 1 Introduction

1.1 Problem statement

Since the inception of the Industrial Revolution, the world has been producing waste at an exponential rate.[1] This waste, particularly industrial waste, contains a high amount of contaminants which may be harmful to the environment and people's well-being and health.[2] In South Africa, domestic and industrial waste effluent is a major source of chemical and microbial pollution of water bodies.[3] However, it is not only industrial waste that contributes to this pollution. Sometimes municipalities' sewage systems fail, or in the rural areas where no disposal sites are available, there is littering or disposal of waste onto land and the subsequent contamination of streams and groundwater.[4]

Waste is regarded as a substance of any kind or form that is no longer wanted by its holder or that should be disposed.[5] Solid waste includes waste such as food packaging, plastics and nappies, amongst others, earmarked for landfills.[6] Waste effluent should be disposed at Wastewater Treatment Works (WWTW) of municipalities.[7] If waste or waste effluent is untreated or disposed of in an improper manner, it may have various undesired consequences for water resources, the environment, including the health of humans, animals and ecosystems.[8] This creates the need to find ways to deal with waste and its disposal in an effort to reduce and ultimately eradicate pollution.

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1 Grady 1969 *England Law Review* 62; Mihajlovic "Burden of Industrial Waste and Potential for Recycling: Technological, Economic and Environmental Aspects" 55.

2 Giusti 2009 *Waste Management* 2228; Iloms *et al* 2019 *International Journal of Environmental Research and Public Health* 1; Ziraba *et al* 2016 *Archives on Public Health*) 6.

3 Iloms *et al* 2020 *International Journal of Environmental Research and Public Health* 2.

4 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 1-2; Herbig 2019 *Cogent Social Sciences* 2-3; Kretzmann *et al* 2021 https://www.dailymaverick.co.za; Viljoen *et al* 2021 *Sustainability* 1.

5 Section 1 of the *National Environmental Management: Waste Act* 59 of 2008 (hereinafter NEMWA).

6 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2; Kibria *et al* 2023 *International Journal of Environmental of Research* 2.

7 Iloms *et al* 2020 *International Journal of Environmental Research and Public Health* 2.

8 Iloms *et al* 2020 *International Journal of Environmental Research and Public Health* 2 and 12. Due to the scope of this dissertation industrial waste will not be discussed here; the focus of this dissertation will be on solid waste disposal practices in rural areas.

The need to protect water sources and the environment is emphasised in section 24 of the *Constitution of the Republic of South Africa*, 1996 (Constitution), which makes provision for "the right to an environment that is not harmful to the health or well-being" of all persons,[9] as well as for environmental protection so as "to have the environment protected for present and future generations".[10] This section, read with section 156 and schedules 4B and 5B of the Constitution, places an obligation on different spheres of government to put measures in place to protect its inhabitants and to prevent pollution, which includes the disposal of waste.[11] The *Water Services Act* 108 of 1997 (WSA) and the *Local Government: Municipal Systems Act* 32 of 2000 (*Municipal Systems Act*) apply to sanitation services at a local level, through the collection and disposal of sewage.[12] However, most rural areas do not receive such services, meaning that greywater and blackwater are disposed directly into the environment.[13]

The broad definition of the environment in section 1 of the *National Environmental Management Act* 107 of 1998 (NEMA), creates overlapping mandates in terms of waste disposal. This requires government departments (such as the Department of Forestry, Fisheries and Environment (DFFE) and Department of Water and Sanitation) to work with municipalities through co-operative governance to regulate waste to prevent pollution, through, among other things, the duty of care.[14]

These spheres of government should take the NEMA section 2 principles into account in their decision making in relation to waste disposal.[15] Section 2(4)(b) of the NEMA

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9 Section 24(a) of the Constitution; Currie and De Waal *The Bill of Rights Handbook* 519; Kruger 2019 *Constitutional Court Review* 479.

10 Section 24(b) of the Constitution; Currie and De Waal *The Bill of Rights Handbook* 523.

11 Section 24(b) of the Constitution; Adler *et al* 2007 *The Economics of Peace and Security Journal* 36.

12 See paragraph 4.3 below.

13 Murei *et al* 2022 *Water* 3; Greywater refers to water that comes from kitchen sinks, showers, baths and from doing laundry, while blackwater refers to water that contains urine and faecal matter, see Water Research Commission Report TT 746/17 on Guidelines for Greywater Use and Management in South Africa (hereinafter WRC).

14 Sections 40-41 of the Constitution; section 28(1) of the NEMA and section 16 of the NEMWA; Gunningham 2017 *Environmental and Planning Law Journal* 198; Kidd *Environmental Law* 149; see paragraph 3.2 and 3.3 below.

15 Section 2 of the NEMA; see paragraph 3.3 below.

specifically states that the management of the environment has to be integrated and should consider the effects of its decisions on the environment and the people living in that environment by selecting the "best practicable environmental options".[16] This is aimed at ensuring that the protection of the environment is placed at the forefront of all activities that may impact it, while also taking into account the issue of sustainability and environmental justice.[17]

The NEMWA specifically regulates solid waste disposal. Section 27(2) prohibits littering and section 45 requires a waste management license for listed activities.[18] Local municipalities must apply for such a licence and must comply with norms and standards for solid waste disposal sites. In terms of their service delivery mandate, they must also collect waste and manage the waste so that it may be disposed in a proper manner and at facilities designated for such purposes through the development and implementation of by-laws.[19] In terms of solid waste disposal, section 84(1)(e) of *Municipal Structures Act* provides that district municipalities are responsible for determining waste disposal strategies, regulating the disposal of waste, and establishing, operating and controlling of waste disposal sites and facilities, including bulk waste transfer facilities for all the local municipalities of that district.[20] Local municipalities have similar functions to those of district municipalities with regard to solid waste disposal, the only exception is that the function of local municipalities are limited to the areas that fall within its jurisdiction.[21]

Municipalities are guided by legislation to provide services to communities that fall within their jurisdiction, which include the provision of clean drinking water, sanitation facilities and the treatment of wastewater, refuse collection and provision of

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16 Section 2(4)(b) read with section 1 of NEMA; Kidd *Environmental Law* 37; O'Riordan 1989 *Environmental Conservation* 114.

17 Section 2(1) and 2(4) of NEMA.

18 Section 19 read with Schedule 1 of NEMWA; see GN 921 in *GG* 37083 of 29 November 2013 for waste management listed activities; see also paragraph 3.5.1 below.

19 Section 12 of the *Local Government: Municipal Systems Act* 32 of 2000 (*Municipal Systems Act*); See paragraphs 4.5 and 4.6 below.

20 Section 84(1)(e)(i)-(iii) of the *Local Government: Municipal Structures Act* 117 of 1998 (*Municipal Structures Act*)

21 Section 84(2) of the *Municipal Structures Act*.

electricity.[22] However, sometimes these services do not reach people, which prompts people in affected communities to get rid of waste themselves, often leading to improper or illegal disposal of waste.[23] This means that there are a number of WWTW that do not dispose of non-complying sludge at landfills, as required by the Department of Water and Sanitation.[24] This leads to the contamination of water resources and pollution of the surrounding environment.

As stated above, the effect of improper waste disposal goes beyond the environment; it also has a socio-economic impact. It may lead to the contamination of soil and water, which affects food production and energy generation. The production of food requires both water and energy.[25] The pollution of water resources has dire consequences for food production, which requires clean water and energy.[26] This pollution of water resources also affects energy generation as it means that electricity generation facilities have to treat the polluted water before generation, leading to the use of more energy and additional costs to energy generation, which also affects consumers.[27] In rural areas, water sources are directly affected; where water is required to irrigate plants in the agriculture sector, for drinking, cleaning, cooking and sanitation, as well as for energy generation.[28] If waste is not appropriately disposed on land, the waste (e.g., nappies) can contaminate the groundwater as well as the water seepage in streams and springs.[29]

The water-food-energy (WEF) nexus refers to the interlinked relationship that exists between water, energy and food resources and the trade-offs that need to be made

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22 Section 11 of WSA; section 4(2) of the *Municipal Systems Act*; Goal 6 of the *Transforming Our World: The 2030 Agenda for Sustainable Development*, UN Doc A/RES/70/1 (2015).

23 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 1; Murei *et al* 2022 *Water* 3.

24 See section 21(h) read with section 40 of the NWA; WRC *Guidelines for the Utilisation and Disposal of Wastewater Sludge* 21-23.

25 Kibler *et al* 2018 *Elsevier, Waste Management Journal* 9.

26 Kibler *et al* 2018 *Elsevier, Waste Management Journal* 9.

27 Kibler *et al* 2018 *Elsevier, Waste Management Journal* 8.

28 Botai *et al* 2021 *Sustainability* 2. The focus of the study is on rural areas. The NRF-NWO project's preliminary findings after empirical research in Matatiele and Vaalharts during March and July-August 2022 found that households are water, energy and food insecure, while those who are somewhat secure are dependent on social grants as well as indigent programmes for water and electricity.

29 This is the only source of water within these communities; See paragraph 3.4 below.

in this regard.[30] All three of these resources are essential to humans.[31] It is estimated that 90% of this domestic waste ends up in landfills in urban areas, but this is not true for rural areas.[32] Thus, there is a need to determine how the regulation of solid waste disposal in the rural areas at the local government level could contribute to the WEF nexus in South Africa.

1.2 Research question

The research question that guided this study is: To what extent could the regulation of waste disposal at local government level contribute to the water-energy-food nexus in South Africa?

1.3 Research aims and objectives

The aim of this research study is to ascertain the extent to which the regulation of solid waste disposal at the local government level could contribute to the WEF nexus in the rural areas.

In order to support this main aim, the study has the following objectives:

- To determine what solid waste is and to provide a background on the disposal of solid waste at the local government level and its impact on the environment;
- To determine how regulation of waste may contribute to the WEF nexus in South Africa;
- To determine how South African legislation regulates or controls the disposal of domestic waste both at a municipal and communal level; and
- To provide recommendations on how to improve the regulation of the disposal of solid waste at the local government level in rural areas to contribute to the WEF nexus.

30 Botai *et al* 2021 *Sustainability* 2.
31 Botai *et al* 2021 *Sustainability* 2.
32 GreenCape 2022 http:/www.bizcommunity.com.

1.4 Research method

This mini-dissertation is a desktop study conducted by means of a literature review of legislation, government policy, case law, textbooks and journal articles. This research is informed by workshops undertaken by the NRF-NWO research group titled: Water-Energy-Food communities in South Africa: multi-actor nexus governance for social justice? The study received ethics clearance with ethics number NWU-01216-21-S3 Law. The research also incorporates information gathered at workshops and during field visits. The researcher was part of the team that conducted the field research. Observations on waste disposal practices in rural areas therefore inform the study. The researcher took the photos that are included in the study.

1.5 Structure of the mini-dissertation

The second chapter of the study discusses various definitions of waste and waste effluent and what this means in South Africa. It examines the disposal of solid waste and how this waste is currently dealt with by both domestic users and local governments. The chapter also considers the environmental challenges of waste, including the impact of disposable nappies. This is followed by a theoretical discussion of the WEF nexus in relation to proper and improper disposal of solid waste.

The third chapter discusses the regulation of solid waste in terms of the statutory framework, including the Constitution, NEMA, NWA, NEMWA and the norms and standards for waste management. The chapter also considers general authorisations and norms and standards in this regard.

The fourth chapter considers the Constitution, the *Municipal Systems Act*, the *Traditional and Khoi-San Leadership Act* 3 of 2019 to determine the role and functions of traditional councils in local government, and by-laws to determine the regulation of waste disposal at local government level. Two local municipalities' waste management by-laws and Integrated Development Plans (IDPs), namely that of Greater Taung Local Municipality and Matatiele Local Municipality, are considered. These municipalities were selected because they coincide with the NRF-NWO project and they include town areas with local government services and rural areas where no waste services are

provided. Furthermore, the areas that were selected are under traditional leadership in addition to local government control.

The fifth chapter chapter concludes the study and makes recommendations for the regulation of waste disposal at local government level and its contribution to the WEF nexus.

Chapter 2 Background

2.1 Introduction

The purpose of this chapter is to discuss various definitions of waste and what this means in South Africa. The discussion starts by considering the disposal of domestic waste and how waste is currently dealt with by both domestic users and local government in rural areas. This is followed by a theoretical discussion of the WEF nexus in relation to proper and improper disposal of waste in rural areas.

2.2 Waste as an environmental challenge

On a daily basis humans create waste, as a by-product of their activities.[33] The disposal of domestic waste creates huge challenges for both human beings and the environment at large. This waste, if it is created and disposed of in an uncontrolled manner, can have an undesirable impact on the entire ecosystem and may contribute to climate change and water pollution, among other things.[34] Due to the contaminants that are present in waste, it should be managed in a manner that substantially decreases its threat to the environment.[35]

Different types of waste, such as degradable waste and persistent waste, have different effects on the environment. Waste may have either reversible biological and geophysical impacts or irreversible biological and geophysical impacts.[36] These consequences are discussed in the following paragraphs.

2.2.1 Impacts of degradable waste

Degradable waste refers to waste that has a good rate of degradability, but it still has an adverse effect on human health and the environment.[37] Food waste, paper waste

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33 Baloyi *Regulation of Industrial Waste Effluent Disposal from a Municipal Perspective* 2; El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 5; Herbig 2019 *Cogent Social Sciences* 10; Nkosi *et al* "The Current Waste Generation and Management Trends in South Africa: A Review" 303.

34 Saxena and Pandey "Emerging and Eco-Friendly Approaches for Waste Management" 64.

35 Saxena and Pandey "Emerging and Eco-Friendly Approaches for Waste Management" 61.

36 Department of Tourism *Tourism Environmental Implementation Plan* 16.

37 Komakech, Sundberg and Jönsson 2015 *Resources, Conservation and Recycling* 100-110.

and sewage are some of the examples of waste that is degradable.[38] When this waste degrades, it may have environmental effects, such as air pollution due to by-products of combustion, or land and water pollution as a result of degrading organic waste, and thermal pollution.[39]

2.2.2 Persistent waste

Persistent waste can be described as waste from organic compounds,[40] often referred to as persistent organic pollutants (POPs).[41] Such compounds are not easily degradable and as such accumulate in the environment, thereby causing harm to the environment through the release of toxic chemicals.[42] Persistent waste occurs in various forms, such as heavy metals, certain types of nuclear waste, and manmade chemical compounds like dichlorodiphenyltrichloroethane (DDT) and plastics.[43] This type of waste requires constant management and regulation due to the damage that it can cause as a result of its toxic composition.[44]

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38 Komakech, Sundberg and Jönsson 2015 *Resources, Conservation and Recycling* 100-110.

39 Department of Tourism *Tourism Environmental Implementation Plan* 16. Air pollution is defined as "the release of pollutants into the air and is caused by the release of chemicals and greenhouse gases from waste that is disposed on land, including fumes from burning solid waste"; see Wernecke and Wright 2022 *Quest* 30. Land pollution refers to "the degradation and contamination of the soil occurs when waste that is disposed on land releases toxic chemicals, which affects the quality of the soil, degrades the nutrients that are vital to the soil structure and the ability of the land to hold on to water, which can also lead to flooding"; see WWF 2023 https://worldwildlife.org. Water pollution refers to "the contamination of water sources which can be caused by directly disposing of solid waste into rivers, springs, wetlands and water canals or through run-off due to rain"; see Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 1-2; Herbig 2019 *Cogent Social Sciences* 2-3; Kretzmann *et al* 2021 https://www.dailymaverick.co.za; Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 409; Viljoen *et al* 2021 *Sustainability* 1. Thermal pollution pertains to "the sudden increase or decrease of water temperature which may be caused by the disposal of domestic sewage into water sources"; see Davidson and Bradshaw 1967 *Environmental Science and Technology* 618.

40 Department of Tourism *Tourism Environmental Implementation Plan* 16; Chakraborty *et al* 2022 *Bulletin of Environmental Contamination and Toxicology* 928.

41 Worm *et al* 2017 *Annual Review of Environment and Resources* 3.

42 Akinrinade and Stubbings 2022 *Journal of Environmental Exposure Assessment* 2; Arp and Hale 2022 *ACS Environmental AU* 483; Department of Tourism 2021 *Tourism Environmental Implementation Plan* 16.

43 Department of Tourism *Tourism Environmental Implementation Plan* 16; MacLeod *et al* 2021 *Science* 63.

44 Department of Tourism *Tourism Environmental Implementation Plan* 16; section 69(1)(b)(c) read with Schedule 3 of NEMWA; see Regulation 2 of GN 1150 in *GG* 42693 of 10 September 2019 on the phasing-out of POPs. Also see its proposed amendments in GN 1150 – GN 3180 in *GG* 48284 of 23 March 2023; GN R414 in *GG* 44559 of 12 May 2021 and its proposed amendments in GN 3181 in *GG* 48285 of 23 March 2023.

2.2.3 Reversible biological and geophysical impacts

Reversible biological impacts are caused by agricultural activities, the construction of roads, and the operation of opencast mines.[45] These activities result in poor socio-economic prospects for the people who reside in the areas where such activities are conducted.[46] It is important to keep these environmental challenges at acceptable levels to minimise its impact through proper planning.[47] This is to ensure that the presence of these challenges do not reach a point where its impact becomes irreversible.

2.2.4 *Irreversible biological and geophysical impacts*

The irreversible consequences for the environment manifests in the form of climate change, impacts on human and animal health, soil and water.[48] The extinction of animals, plants and fragile ecosystems are the most common examples of irreversible biological and geophysical impacts.[49] The extent of the damage caused by these challenges requires the cooperation and intervention of international, regional, national and local agencies to combat these effects.[50]

2.3 Definition of waste

Waste may be defined as any unwanted substance that should be disposed.[51] Solid waste refers to refuse, sludge from WWTW or Water Treatment Works (WTW) or any other discharge from industries such as mining, agricultural operations or community activities not wanted by anyone anymore.[52] However, the proper disposal of waste

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45 Department of Tourism *Tourism Environmental Implementation Plan* 17; MacLeod *et al* 2021 *Science* 63-64.

46 Department of Tourism *Tourism Environmental Implementation Plan* 17.

47 Department of Tourism *Tourism Environmental Implementation Plan* 17; MacLeod *et al* 2021 *Science* 65.

48 Upadhyay 2020 *American Journal of Climate Change* 160; MacLeod *et al* 2021 *Science* 63-64.

49 Department of Tourism *Tourism Environmental Implementation Plan* 17; Upadhyay 2020 *American Journal of Climate Change* 162, 170 and 172.

50 Department of Tourism *Tourism Environmental Implementation Plan* 17; Upadhyay 2020 *American Journal of Climate Change* 179; MacLeod *et al* 2021 *Science* 63-65.

51 Section 1 of NEMWA.

52 Khumalo *A Case Study of Uthukela District Municipality* 14.

depends largely on its classification.[53] This classification is based on the source of the waste and the contaminants or pathogens present in the waste.[54] There are many different types of solid waste that play a role in the waste issue, particularly in rural areas where there are little to no waste disposal facilities.[55] The provision of these facilities and services is the responsibility of municipalities.[56] Municipal solid waste (MSW) is a broad term used to refer to waste that is to be regulated by municipalities. Although MSW consists mostly of household waste, it is also made up of commercial and industrial waste.[57] The two most common types of MSW that plague rural areas are food waste and plastic waste, including disposable nappies.[58]

2.3.1 Food waste

Food waste refers to any food, including the inedible parts of food, that has been removed from the food supply chain to be recovered or disposed.[59] This waste is generated from various activities, such as the production and processing of food, distribution of food, cooking and consumption of food.[60] It is estimated that around a third of food that is meant for human consumption is wasted.[61] Some of this is also the result of consumer behaviour.[62] Food waste is usually accompanied by other pollutants in the form of packaging material, the majority of which consists of plastic.[63]

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53 Naghel, Farhi and Redjem 2022 *Engineering, Technology and Applied Science Research* 8675; Saxena and Pandey "Emerging and Eco-Friendly Approaches for Waste Management" 64.

54 Saxena and Pandey "Emerging and Eco-Friendly Approaches for Waste Management" 64.

55 Godfrey and Oelofse 2017 *Resources* 4; Vinti and Vaccari 2022 *Clean Technologies* 1138.

56 Abdel-Shafy and Mansour 2018 *Egyptian Journal of Petroleum* 1276; Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 1.

57 Vergara and Tchobanoglous 2012 *Annual Review of Environment and Resources* 279.

58 CSIR *Municipal Waste Management – Good Practices* 6 and 8; Principato *Food Waste at Consumer Level: A Comprehensive Literature Review* 3; Strydom and Godfrey "Household Waste Recycling Behavior in South Africa – Has There Been Progress in the Last 5 Years?" 1; Worm *et al* 2017 *Annual Review of Environment and Resources* 2; Xu *et al* 2017 *Sustainability* 2. This was also observed during site visits to Matatiele and Greater Taung, where much of the solid waste consists of disposable nappies.

59 Abdel-Shafy and Mansour 2018 *Egyptian Journal of Petroleum* 1277; Principato *Food Waste at Consumer Level: A Comprehensive Literature Review* 3; Siaw, Oduro-Koranteng and Dartey 2022 *Energy Nexus* 1.

60 Abdel-Shafy and Mansour 2018 *Egyptian Journal of Petroleum* 1277.

61 DFFE *National Waste Management Strategy* 14 (hereinafter NWMS); Principato *Food Waste at Consumer Level: A Comprehensive Literature Review* 1.

62 Principato *Food Waste at Consumer Level: A Comprehensive Literature Review* 3 and 7.

63 Worm *et al* 2017 *Annual Review of Environment and Resources* 2.

2.3.2 Plastic waste

Plastic waste refers to waste that is generated as a result of plastic products. Plastics are a big problem in the environment due to its non-biodegradability.[64] Plastic merely breaks down or dissolves into smaller particles and remains in the atmosphere in the form of microplastics and nanoplastics, which are then consumed by animals, birds, insects as well as humans.[65] The toxicity level of plastics is dependent on its chemical composition.[66]

Figure 1: Disposal of plastics and food packaging in Greater-Taung

At times this waste also ends up in water sources, altering and ultimately destroying aquatic ecosystems.[67] The ever-increasing plastic pollution is also because most plastic is produced for single use.[68] Nappies consist of plastic waste, and as mentioned before,

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64 Worm *et al* 2017 *Annual Review of Environment and Resources* 2.

65 Adeniran, Ayesu-Koranteng and Shakantu 2022 *Pollutants* 532; Benson *et al* 2022 *Frontiers in Marine Science* 1-6; Hu *et al* 2022 *Journal of Hazardous Materials Advances* 2 and 3; Jiang *et al* 2020 *Environmental Health and Preventive Medicine* 5.

66 Worm *et al* 2017 *Annual Review of Environment and Resources* 7.

67 Seay 2022 *Clean Technologies and Environmental Policy* 729; Worm *et al* 2017 *Annual Review of Environment and Resources* 6.

68 Adeniran, Ayesu-Koranteng and Shakantu 2022 *Pollutants* 531; Kumar *et al* 2021 *Sustainability* 7; Seay 2022 *Clean Technologies and Environmental Policy* 729; UNCTAD 2022 https://United.org.

the disposal of disposable nappies contributes to this problem.[69] It is estimated that plastic pollution will reach 12 billion tonnes by the year 2050 if no measures are taken to reduce the amount of plastic that is released into the environment.[70]

The proper management of MSW is crucial to attaining sustainable development. It will also ensure that the resources necessary for the survival of human beings, such as water, energy and food, are used efficiently to minimise waste.[71] However, the rapid increase in population growth, along with human or consumer practices, exacerbates the creation of waste and the damage it causes to the environment as a whole.[72] It is therefore becoming important to have proper management and regulation practices put in place to facilitate the sustainability of natural resources.

2.4 Impact of disposable nappies on the environment

Disposable nappies ae classified as absorbent hygiene products (AHPs).[73] In 2021, a report from the United Nations Environment Programme (UNEP) described the materials used to make disposable nappies as cotton, viscose rayon, wood pulp and plastic material, including polyester, polyethylene and polypropylene.[74] This household waste creates a significant disposal issue because of the high volumes in which it is created and the amount of time it requires to degrade.[75] South Africa produces an estimated 1.1 million tonnes of waste from disposable nappies per annum.[76] Disposable nappies pose a health risk to humans and animals, since the waste contains human excreta and urine.[77] This may lead to diseases such as diarrhoea and in severe

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69 See paragraph 2.4 below.

70 Kumar *et al* 2021 *Sustainability* 2.

71 Botai *et al* 2021 *Sustainability* 2; Petrariu *et al* 2021 *Energies* 3; Siaw, Oduro-Koranteng and Dartey 2022 *Energy Nexus* 1.

72 El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 1.

73 Kashyap, Win and Visvanathan "Absorbent Hygiene Products – An Emerging Urban Waste Management Issue" 58; NWMS 16; Schenck *et al* 2023 *Sustainability* 1.

74 UNEP 2023 https://www.unep.org; see Kashyap, Win and Visvanathan "Absorbent Hygiene Products – An Emerging Urban Waste Management Issue" 59.

75 Kashyap, Win and Visvanathan "Absorbent Hygiene Products – An Emerging Urban Waste Management Issue" 58; NWMS 16; see paragraph 2.2.2 above.

76 Bellaby 2022 *Advances in Recycling and Waste Management* 262.

77 Agestika *et al* 2022 *Journal of Water, Sanitation and Hygiene for Development* 33; Kordecki *et al* 2022 *Elsevier, Environmental Challenges* 1; Schenck, Nell and Chitaka *Exploring Disposable Diaper Usage and Disposal Practices in Rural Areas* 1; Schenck *et al* 2023 *Sustainability* 2.

cases, it may result in death.[78] The health risk poses socio-economic challenges to poor communities that have limited access to health care facilities.[79] This waste also puts significant strain on local governments responsible for its disposal and management.[80]

Figure 2: Disposable nappies in an open field[81]

Due to its hazardous nature, the waste created from the use of disposable nappies should be collected and disposed of, in a safe manner.[82] To this end, municipalities are required to take reasonable measures to ensure the proper disposal of waste.[83] In 2011, the DFFE adopted and published a Policy for the Provision of Basic Refuse Removal Services to Indigent Households.[84] The Policy was aimed at reducing the backlog of a lack of access to municipal waste removal services, particularly in low-income communities.[85] The purpose of the Policy was to ensure that municipalities

78 Kordecki *et al* 2022 *Elsevier, Environmental Challenges* 1.

79 Schenck *et al* 2023 *Sustainability* 2. Underdeveloped areas usually have one district hospital that services a number of communities, often forcing people who intend to seek medical advice at such facilities to travel long distances in order to reach the facility (which is not feasible for people low-income households), and sometimes these people are turned away and told to return at another time because of the long queues.

80 NWMS 16. Also see UNEP 2023 https://www.unep.org.

81 Photos taken by the researcher in the research areas.

82 NWMS 16.

83 NWMS 54.

84 Gen Not 413 in *GG* 34385 of 22 June 2011.

85 Item 1 in Gen Not 413 in *GG* 34385 of 22 June 2011.

provide basic waste removal services to low-income households.[86] Each municipality was given the discretion to determine criteria for households that would qualify for the service.[87] However, sometimes municipal waste collection services do not reach people because of a failure on the part of local government to provide such services.[88] In 2021, it was estimated that a weekly municipal waste removal service was available to only 60.3% of South African households.[89] This prompts people in affected communities to get rid of waste themselves, often leading to the improper disposal of waste at dumpsites and in or near water sources.[90]

Figure 3: Disposal of waste containing disposable nappies in a water canal[91]

These disposal practices are common in rural communities that do not receive waste collection and removal services from local governments. The improper disposal of this waste results in a number of environmental and socio-economic issues.[92]

Even with all the positive developments throughout the years subsequent to 1994, access to waste services and clean water remains a challenge, especially in rural

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86 Item 3 in Gen Not 413 in *GG* 34385 of 22 June 2011.

87 Item 8 in Gen Not 413 in *GG* 34385 of 22 June 2011.

88 Item 2 in Gen Not 413 in *GG* 34385 of 22 June 2011; Schenck *et al* 2023 *Sustainability* 3.

89 Schenck *et al* 2023 *Sustainability* 2.

90 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2; Godfrey and Oelofse 2017 *Resources* 4.

91 This figure is a depiction of the waste disposal practice in the rural township of Kekana Gardens, in Hammanskraal, Pretoria. Photo taken by researcher.

92 Kordecki *et al* 2022 *Elsevier, Environmental Challenges* 1; Schenck, Nell and Chitaka *Exploring Disposable Diaper Usage and Disposal Practices in Rural Areas* 1. During an NRF-NWO Workshop, held at Vaalharts during 12-13 June 2023, community members stated that they disposed of waste in water canals since they do not receive waste removal services from their local municipality.

areas.[93] It is, however, important to note that every area has its own challenges that require specialised services and strategies to deal with socio-economic issues.[94] South Africa is characterised with water scarcity, an unstable electricity grid, and hunger.[95] It has a diverse society and as such requires the government to provide specialised services aimed at meeting the needs of the different communities in this country.[96] The creation and improper disposal of waste have adverse consequences for the WEF nexus and affects resource security. The impact of waste on water, energy and food security is discussed in the next paragraph.

2.5 Impact of waste on water, energy and food security

2.5.1 The impact of waste on water security

Water security may be defined as the sustainable access to clean and safe water that meets the needs of every person, which requires the protection of water sources.[97] However, South Africa is water scarce country and is ranked 30th in the list of the world's driest countries.[98] The Department of Water and Sanitation is responsible for ensuring that South Africans have equitable access to clean water.[99] Unfortunately, there is still an estimated three million people in South Africa who do have access to potable water.[100] A majority of these people reside in low-income rural communities.[101] Poor infrastructure, inadequate access to water, an instability in water supply and demand; lack of maintenance of the available infrastructure, and poor water quality

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93 Naidoo *et al* 2021 *Renewable and Sustainable Energy Reviews* 1; Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 409.

94 El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 5.

95 El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 5.

96 Naidoo *et al* 2021 *Renewable and Sustainable Energy Reviews* 2; Simpson *et al* 2019 *Frontiers in Environmental Science* 2.

97 UN Water 2013 https://www.unwater.org; see Kumar 2018 *International Educational Scientific Research Journal* 26-29.

98 El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 5; Kriel 2009 *Water Sewage and Effluent* 44; Preamble to the NWA; World Wide Fund 2017 wwf.org.za.

99 Section 27(1)(b) Constitution; see paragraphs 3.4 and 3.5 below.

100 ASSAF 2023 https://www.assaf.org.za.

101 ASSAF 2023 https://www.assaf.org.za.

are among the main causes of water insecurity in South Africa.[102] The 2022 Blue Drop progress report found that the 48% of the supply systems fell into the low risk category of the Blue Drop Risk Rating (BDRR); 18 % of the systems had a medium BDRR profile; 11% were in the high BDRR category; and 23% were in the critical BDRR category.[103] The BDRR considers five (5) different risk indicators, namely, design capacity; operational capacity; water quality compliance; technical skills; and water safety plans.[104]

Design capacity is determined through its "size, complexity and electrical consumption" of a water supply system.[105] A large WTW that is dysfunctional or has poor quality drinking water is deemed to be at high risk since it services large communities.[106] Small WTWs are usually classified as low risk, and make up 62% of the WTWs.[107] Boreholes and rural systems are categorised as small WTWs; these require sufficient resources to operate at an optimal capacity.[108] The operational capacities of WTWs is determined by comparing the design capacity of a WTW to its daily potable or drinking water output.[109] Any WTW that deviates from the ideal operational values of between 50% to 100% may experience water quality failures due to overloading of the system or low "retention time".[110] When considering water quality compliance, the report found that only 40% of WTWs met the legally required microbiological water quality and 23% of WTWs met the standards for chemical water quality.[111] Around 60% of the WTWs were required to issue notices for consumers to boil tap water as a result of a failure to comply with microbiological monitoring.[112] Furthermore, 77% of WTWs failed to

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102 ASSAF 2023 https://www.assaf.org.za; Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2.

103 Department of Water and Sanitation *Blue Drop Progress Report* 26; The full Blue Drop Report was set to be released in July 2023, however, as at 21 November 2023, it had not been made available.

104 Department of Water and Sanitation *Blue Drop Progress Report* 26-27.

105 Department of Water and Sanitation *Blue Drop Progress Report* 27.

106 Department of Water and Sanitation *Blue Drop Progress Report* 27.

107 Department of Water and Sanitation *Blue Drop Progress Report* 27.

108 Department of Water and Sanitation *Blue Drop Progress Report* 27.

109 Department of Water and Sanitation *Blue Drop Progress Report* 28.

110 Department of Water and Sanitation *Blue Drop Progress Report* 28.

111 Department of Water and Sanitation *Blue Drop Progress Report* 29; ASSAF 2023 https://www.assaf.org.za.

112 Department of Water and Sanitation *Blue Drop Progress Report* 29.

comply with chemical determinants, such as arsenic, lead and mercury.[113] Such failure may lead to acute or chronic health complications for communities consuming the water and makes the water unfit for use in energy and food sectors.[114]

Figure 4: Disposal of waste at a natural spring in rural Matatiele

The improper disposal of waste adds to the water woes in South Africa. Waste that is improperly disposed causes contamination of water bodies near waste dumps, as shown in Figure 2 above.[115] The contamination of water sources renders the water unfit for use, particularly in rural areas that depend on water from streams and springs.[116] This creates a number of health concerns as a majority of the people in rural areas also depend on this water for cooking and drinking.[117] Contaminated water becomes a breeding ground for flies and mosquitoes, which in turn spread vector-borne diseases.[118] This further exacerbates water insecurity and affects energy and food production, which are dependent on water.[119]

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113 Department of Water and Sanitation *Blue Drop Progress Report* 29

114 Department of Water and Sanitation *Blue Drop Progress Report* 29; ASSAF 2023 https://www.assaf.org.za.

115 Adel-Shafy and Mansour 2018 *Egyptian Journal of Petroleum* 1278; Vergara and Tchobanoglous 2012 *Annual Review of Environment and Resources* 279.

116 Muller *et al Water security in South Africa* 16.

117 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2. This was also discovered during household surveys conducted in Matatiele and Vaalharts as part of the NRF-NWO project.

118 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2.

119 Also see Ngarava 2021 *Water Energy Nexus* 123-133.

2.5.2 The impact of waste on energy security

Energy security is defined as the "uninterrupted availability of energy sources" at affordable rates.[120] Long-term energy security requires energy supply investments that go hand-in-hand with economic development and the environmental needs of each country.[121] In the short term, it requires an energy system that can adapt and adjust to changes in energy supply and demand.[122] However, the 2019 Integrated Resource Plan revealed that three million South African households do not have access to the electricity grid.[123] Additionally, South African have shouldered a 653% increase in electricity tariffs between 2007 and 2022, coupled with a 129% increase in the inflation rate over the same period.[124] In 2023, the National Energy Regulator of South Africa (NERSA) approved a tariff increase of 10% for low-income households for the 2023/2024 financial year.[125] This decision was taken despite the high unemployment levels in South Africa, which currently stands at 32.6%.[126] South Africa is also going through an energy crisis,[127] which has resulted in the implementation of electricity cuts in the form of loadshedding.[128] In 2022, loadshedding was estimated to cost the South African economy a loss of between 2–3% of its GDP growth.[129] In February 2023, South Africa's electricity generation was recorded to show a decrease of 9.7% compared to the 8.2% decrease that was recorded in September 2022.[130] The distribution of energy for the same period experienced an 8.7% decrease compared to the 7.5% decrease that took place in September 2022.[131]

120 International Energy Agency 2023 https://www.iea.org.
121 International Energy Agency 2023 https://www.iea.org.
122 International Energy Agency 2023 https://www.iea.org.
123 Department of Energy *Integrated Resource Plan* 18.
124 Moolman 2023 https://poweroptimal.com.
125 Khonjelwayo 2023 https://www.nersa.org.za.
126 Maluleke 2023 https://www.statssa.gov.za.
127 Department of Minerals and Energy *Energy Security Master Plan – Electricity* 6.
128 The World Bank 2023 https://www.worldbank.org.
129 The World Bank 2023 https://www.worldbank.org.
130 Statistics South Africa *Electricity Generated and Available for Distribution* 2 (hereinafter StatsSA).
131 StatsSA *Electricity Generated and Available for Distribution* 3.

Around 71% of energy in South Africa is produced from burning coal.[132] At least 2% of the country's water is designated for the generation of energy.[133] In 2017, 75% of the country's hazardous waste was generated from the electricity and petroleum sectors.[134] This waste included solid waste, gaseous waste, fly ash and liquid waste.[135] In the same year, the energy sector contributed to 80% of the total greenhouse gas emissions in South Africa.[136]

As a result of the lack of access to energy, a number of South African communities rely on wood and biomass as primary sources of energy, especially in the rural areas.[137] This also contributes to deforestation and its effect on the environment.[138] For example, the Matatiele area is infested with Wattle trees, an alien invasive species. Although the community uses the trees as firewood and biochar projects, the areas where the trees grow have also become waste disposal sites.[139] On the one hand it provides some energy security to the community, but on the other, it contributes to the waste disposal problem.[140]

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132 Msimanga, Godfrey and North 2021 *CSIR Circular Economy Briefing Note* 1.

133 Msimanga, Godfrey and North 2021 *CSIR Circular Economy Briefing Note* 1.

134 Msimanga, Godfrey and North 2021 *CSIR Circular Economy Briefing Note* 1.

135 Msimanga, Godfrey and North 2021 *CSIR Circular Economy Briefing Note* 1. Fly ash refers to "corrosive and abrasive tiny solid particles that is produced from the combustion of coal"; it contains toxic metals and soluble salts, and these leach into the environment, where it then pollutes surface water and groundwater sources; see Petrik 2015 https://www.weforum.org/agenda and Petrik *et al Utilization of Fly Ash for Acid Mine Drainage Remediation* 9. This waste could be used as a source of energy through a waste beneficiation process, see paragraph 2.5.4 below.

136 Msimanga, Godfrey and North 2021 *CSIR Circular Economy Briefing Note* 1.

137 Department of Minerals and Energy *Energy Security Master Plan – Electricity* 17. Household surveys conducted as part of the NRF-NWO Project also revealed that households in Matatiele and Vaalharts still depend on burning firewood to meet their energy needs.

138 Berry, Robertson and Campbell 2005 *South African Journal of Botany* 179.

139 Chepape 2023 https://mg.co.za. Own observations during wetland and waste field trip of the UCP 38th quarterly gathering workshop held at Matatiele on 21 February 2023. WWF 2021 https://www.greentrust.org.za.

140 Also see Greenberg *et al Agroecological initiatives in Matatiele and Umzimvubu, Eastern Cape* 4-5; Yapi *et al* (2018) *International Journal of Biodiversity Science, Ecosystem Services & Management* 105 and 113; UNEP 2023 https://www.unep.org; Roy *et al (eds) Invasive Alien Species and Their Control: Summary for Policymakers* 12 and 29.

2.5.3 The impact of waste on food security

Food security requires the availability, accessibility, stability and utilisation of food.[141] However, a number of South Africans at the household level experience food insecurity.[142] Food insecurity is usually caused by "unemployment, poverty and inequality".[143] Even though there is enough food in South Africa to meet every person's needs, a large number of South Africans still do not have adequate access to food.[144] Statistics South Africa's 2017 report classified over a quarter of South Africans as living below the poverty line.[145] General household surveys conducted in 2017 showed that over 6.8 million South Africans experienced hunger, while 10.4 million South Africans were found to have inadequate food accessibility.[146] However, the general household surveys of 2021 showed that the number of households that experienced hunger has decreased to just over 2.1 million.[147] The 2021 surveys also showed that the around 2.6 million had inadequate access to food, while 1.2 million South African households experienced severe inadequacies.[148] Lack of access to water also plays a role in food insecurity and prevents communities from producing food in household and community gardens to improve access to healthy and nutritious food options.[149] All these factors impede the achievement of zero hunger goal of 2030.[150]

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141 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 2.

142 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 4.

143 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 4 and 5; Oluwatayo, Marutha and Modika 2021 *Food Research* 37-38.

144 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 6.

145 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 4; As of 2023, the food poverty line has been set at R 760 per the StatsSA *National Poverty Lines* 3.

146 StatsSA *Towards Measuring the Extent of Food Security in South Africa* 6; Oluwatayo, Marutha and Modika 2021 *Food Research* 5(1) 38.

147 StatsSA *Assessing Food Inadequacy and Hunger in South Africa* 7.

148 StatsSA *Assessing Food Inadequacy and Hunger in South Africa* 3.

149 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 2. During the NRF-NWO WEF Symposium of 19 October 2023, community members from Matatiele and Vaalharts pointed out that they not only have limited access to water. They also indicated that there is a lack resources to buy seeds and seedlings to grow their own food and plough the land. The community members also indicated that land which was provided to them through land restitution and redistribution had limited water rights.

150 *Transforming Our World: The 2030 Agenda for Sustainable Development,* UN Doc A/RES/70/1 (2015); Botai *et al* 2021 *Sustainability* 3; Oluwatayo, Marutha and Modika 2021 *Food Research* 36.

Additionally, the disposal of waste on land leads to the release of toxic chemicals onto the land, contaminating the soil on which agricultural production of food depends.[151] This degradation and contamination affects the quality of the soil, degrades the nutrients that are vital to the soil structure and the ability of the land to hold on to water, which can also lead to flooding.[152] The release of toxic chemicals also causes air pollution, which may result in respiratory diseases.[153] The consequences of air pollution can be short-term or long-term, depending on the level of exposure to the pollution.[154]

The state of water, energy and food insecurity in South Africa makes it necessary for all the spheres of government, the private sector, and any other relevant stakeholders to work in a collaborative and cooperative manner to reduce the impact of waste on the environment and essential resources.[155]

The next paragraph discusses the WEF nexus to ascertain whether the holistic approach to resources has prospects for waste management in South Africa.

2.5.4 The WEF nexus and prospects for waste management in South Africa

Water, energy and food are some of the most important resources required for any human to live a sustainable and dignified life.[156] These three resources are dependent on each other and the consumption of one has an effect on the others.[157] For example, water is needed for the production of food and energy such as hydro-electricity; energy is required the production and supply of food and for the abstraction, treatment and supply of water.[158] These interdependencies, trade-offs and synergies all form part of

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151 Adel-Shafy and Mansour 2018 *Egyptian Journal of Petroleum* 1280.

152 WWF 2023 https://worldwildlife.org; Alabi *et al* "Assessment of Impacts of Municipal Solid Waste on Soil Properties using Geophysical and Physicochemical Methods at Ajakangba Refuse Dumpsite, Ibadan Southwestern, Nigeria" 2.

153 Manisalidis *et al* 2020 *Frontiers in Public Health* 4.

154 Manisalidis *et al* 2020 *Frontiers in Public Health* 7.

155 Also see Ngarava 2023 *Heliyon* 9(321770) 2 and 14-15; Ngarava 2023 *Heliyon* 9(8) 1-3; Ngarava 2023 *Land Use Policy* 1 and 6-9.

156 Hussien, Memon and Savic 2017 *Environmental Modelling and Software* 366; Mabhaudhi *et al* 2019 *International Journal of Environmental Research and Public Health* 2.

157 Nhamo *et al* 2018 *Water* 1.

158 Nhamo *et al* 2018 *Water* 1; Simpson *The Development of the Water-Energy-Food Nexus Index* 8; Petrariu *et al* 2021 *Energies* 2.

a nexus between water, energy and food.[159] The WEF nexus, therefore, refers to the interlinked relationship that exists between water, energy and food resources and the trade-offs that need to be made in this regard.[160] The WEF nexus is important for the preservation of water, energy and the production and preservation of food sources as it views these sources as parts of a whole.[161]

These practices should be regulated because waste that is disposed in an improper manner contaminates natural resources and affects the WEF nexus. The implications of waste on the WEF nexus and sustainability are far-reaching.[162] The impact of irregular disposal of waste is not only an environmental concern; it also has grave consequences for the socio-economic aspects of a society.[163] The creation of waste in one of the WEF sectors has an adverse effect on the security of the other resources.[164] For instance, water and energy will inevitably be wasted as a result of the wasting of food.[165] Uncontrolled or excess waste leads to food insecurity, water pollution, poor health and unemployment, all which have the potential to collapse the economy.[166]

There is, however, the potential to recycle waste into products that benefit the environment and the economy through the process of waste beneficiation, as reflected in Figure 5.[167]

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159 Simpson *The Development of the Water-Energy-Food Nexus Index* 8; Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 409.
160 Botai *et al* 2021 *Sustainability* 2; Siaw, Oduro-Koranteng and Dartey 2022 *Energy Nexus* 1.
161 Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 409.
162 Petrariu *et al* 2021 *Energies* 2.
163 El Youssfi *et al* "Review of Water Energy Food Nexus in Africa: Morocco and South Africa as Case Studies" 2.
164 Feng *et al* 2020 *BMR Chemical Engineering* 1; Petrariu *et al* 2021 *Energies* 4.
165 Feng *et al* 2020 *BMR Chemical Engineering* 1.
166 Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 409.
167 NWMS 16; eWASA 2021 https://ewasa.org.

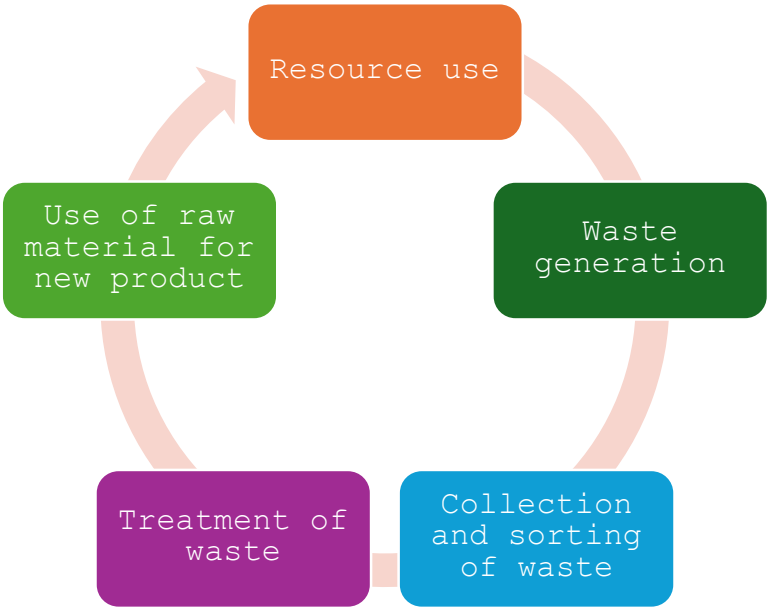

Figure 5: Schematic of a waste beneficiation process

Waste beneficiation is a process through which waste is treated, thereby improving its chemical and physical properties, to allow the use of its raw materials in the production of products that have a high economic value.[168] It promotes the minimisation of waste through a circular economy, rather than the more prevalent linear economy.[169] A circular economy approach extends the responsibility of product producers in every sector to reduce, reuse and recycle waste in an effort to reduce the impact of waste on the environment.[170] In the NWMS of 2020, the DFFE stated that the transition to a circular economy will ensure "long-term resilience", while also creating sustainable socio-economic opportunities.[171] In October 2021, the acting chief director of the DFFE estimated that waste beneficiation would result in the creation of 150 000 jobs by the year 2024.[172] The effective implementation of waste beneficiation requires all spheres of government, government departments and civil society to find holistic ways to tackle waste.[173] This allows for cooperation between different sectors to better manage the resources in a sustainable and systematic manner and to reduce the amount of waste

168 NWMS 5; eWASA 2021 https://ewasa.org.
169 NWMS 25.
170 NMWS 25; Pretorius *et al* 2023 *Development Southern Africa* 1-3.
171 NWMS 25; Pretorius *et al* 2023 *Development Southern Africa* 1-3.
172 Burger 2021 https://m.engineeringnews.co.za.
173 NWMS 57.

that is introduced into the environment.[174] Such an approach will make it easier to achieve the 2030 Sustainable Development Goals (SDGs) aimed at eradicating hunger, providing clean water and sanitation, and clean and affordable energy as set out in goals 2, 6 and 7, respectively.[175] However, no such initiatives currently exist in the rural areas.[176] People just struggle for survival, affecting the trade-offs between water, energy and food.[177]

2.6 Conclusion

Irregular solid waste management has become a serious environmental issue, the management of which is challenging for many authorities worldwide. Waste comes in various forms and contain different types of contaminants. These contaminants can cause long-term, irreversible harm to the environment and human health and well-being. While waste is an unavoidable part of human life, it is important to implement waste management practices that cause the least damage to the environment, water, energy and food security. The impact of waste is especially severe in rural areas where there are either no waste collection or proper waste disposal facilities. The WEF nexus, as an approach to the challenges that humans face due to an over-abundance of waste and resource inadequacies, is well-positioned to deal with the sustainability of water, energy and food, as well as other related environmental and socio-economic challenges. It may ensure that the trade-offs between water, energy and food production is considered, as well as the effect that waste may have on these trade-offs. This WEF-nexus approach is highly dependent on its implementation through proper planning, management and constant regulation. It requires active governance, achieved through educating every person of the benefit of taking proper care of the environment, the adoption and implementation of policies and practices aimed at

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174 Hoolohan *et al* 2018 *Sustainability Science* 1415; Naidoo *et al* 2021 *Renewable and Sustainable Energy Reviews* 2; Terrapon-Pfaff *et al* 2018 *Journal of Environmental Management* 415.

175 *Transforming Our World: The 2030 Agenda for Sustainable Development,* UN Doc A/RES/70/1 (2015); Botai *et al* 2021 *Sustainability* 3; Hussien, Memon and Savic 2017 *Environmental Modelling and Software* 366; Simpson *et al* 2019 *Frontiers in Environmental Science* 2.

176 See Viljoen *et al* 2021 *Sustainability* 17-20; Schenck, Blaauw and Nell 2022 *International Journal of Sustainable Development* 47-49; Kekana *et al* 2023 *GeoJournal* 3715-3722.

177 Also see Vinti and Vaccari 2022 *Clean Technologies* 1141-1147.

sustainable development. One of the ways to address waste, could be to introduce a circular waste economy in these areas.

The next chapter discusses the national legal framework that deals with the regulation of waste.

Chapter 3 National legal framework applicable to waste disposal

3.1 Introduction

This chapter discusses the regulation of domestic waste in terms of national legislation, namely, the Constitution, the NEMA, the NWA, and the NEMWA. This chapter also considers general authorisations issued in terms of the NWA, norms and standards, as well as policies aimed at the management and regulation of waste. As pointed out in Chapter 2 above, the improper handling and disposal of waste have a negative impact on the environment.[178] This impact also permeates other aspects of society, affecting or stalling social justice and the sustainable development goals.[179]

3.2 The Constitution

The Constitution is founded on the values of human dignity, the attainment of equality and the realisation of human rights and freedoms through accountable, responsive and open governance.[180] Additionally, the Constitution aims to achieve social justice.[181] Social justice refers to the fair and equal distribution of rights, resources and opportunities.[182] This requires equal access to the economy, politics and social development prospects.[183] The concept of social justice places an obligation on government to eradicate social injustices.[184] Section 24 of the Constitution provides the right to an environment that is conducive to and not harmful to the health or well-

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178 See Chapter 2 above.

179 Govender 2016 *Civitas, Porto Alegre* 16(2) 238; Kotzé 2003 *Potchefstroom Electronic Law Journal* 6(1) 2 and 4; *The International Forum for Social Development, Social Justice in an Open World: The Role of the United Nations*, UN Doc ST/ESA/305 (2006); Goal 16 in *Transforming Our World: The 2030 Agenda for Sustainable Development,* UN Doc A/RES/70/1 (2015).

180 Section 1(a) and (d) of the Constitution; Currie and De Waal *The Bill of Rights Handbook* 14 and 17.

181 Preamble to the Constitution.

182 San Diego Foundation 2022 http://www.sdfoundation.org; *The International Forum for Social Development, Social Justice in an Open World: The Role of the United Nations*, UN Doc ST/ESA/305 (2006); Goal 16 in *Transforming Our World: The 2030 Agenda for Sustainable Development,* UN Doc A/RES/70/1 (2015).

183 Govender 2016 *Civitas, Porto Alegre* 245; San Diego Foundation 2022 http://www.sdfoundation.org; *The International Forum for Social Development, Social Justice in an Open World: The Role of the United Nations*, UN Doc ST/ESA/305 (2006) 5-7; Fuo *Local Government's role in the pursuit of transformative constitutional mandate of local justice in South Africa* 12; Fuo 2014 *Stell LR* 189-194.

184 *The International Forum for Social Development, Social Justice in an Open World: The Role of the United Nations*, UN Doc ST/ESA/305 (2006) 6.

being of individuals.[185] In this regard, section 24 aims to promote reasonable measures for the sustainable management of the environment for the benefit of present and future generations.[186] This section places an obligation on government to put measures in place to protect its citizens through the prevention of pollution and ecological degradation that results from domestic solid waste disposal.[187] Such an obligation essentially requires all spheres of government to work together to deal with the different environmental issues and find ways to prevent and minimise the impact of waste on the biodiversity of the environment.[188] This must be achieved through the provision of services that cause the least amount of harm to the environment, human health and well-being, and ecosystems to maintain ecological sustainability.[189]

As such, legislative frameworks have been enacted to mediate the impact of waste and its disposal on the environment in an effort to reduce the ecological damage that occurs from the creation of waste.[190] The next paragraph determines how the NEMA relates to waste disposal.

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185 Section 24(a) of the Constitution; Feris and Fuo "Environmental Rights Protected in the Constitution" para 6.3.1; Kidd "Environment" 518; See *Hichange Investments (Pty) Ltd v Cape Produce Co (Pty) Ltd t/a Pelts Products* 2004 2 SA 393 (E) 415, where the court addressed the adverse impact of exposure to "stench" to the health and well-being of people; See also *Kenton on Sea Ratepayers Association and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 16.

186 Section 24(b) of the Constitution; *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province, and Others* 2007 6 SA 4 (CC) para 44; Glazewski "The Nature and Scope of Environmental Law" 8; Kidd *Environmental Law* 22; Kidd "Environment" 522; Kotzé 2003 *Potchefstroom Electronic Law Journal* 6(1) 2. See Du Plessis 2015 *PELJ* 1848-1854; Du Plessis 2011 *SAJHR* 279-282.

187 Section 24(b)(i) of the Constitution; Feris and Fuo "Environmental Rights Protected in the Constitution" para 6.3.1; Kidd *Environmental Law* 22; see also *Kenton on Sea Ratepayers Association and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 16.

188 Sections 40-41 of the Constitution; sections 16 and 40 of the *Intergovernmental Relations Framework Act* 13 of 2005.

189 Glazewski "The Nature and Scope of Environmental Law" 19; section 1 of the *Municipal Systems Act*; sections 2(3) and 2(4) of the NEMA; Preamble and section 2 of the NEMWA. See paragraph 3.3 and 3.5 below. See also Du Plessis 2018 *SAJHR* 208.

190 Braid *Does th*e *South African water resources management regulatory governance framework achieve its constitutional responsibilities in regard to section 24 of the Constitution of the Republic of South Africa, Act* 108 *of* 1996? 8.

3.3 NEMA

The NEMA is the legal framework that was enacted to give effect to the provisions set out in section 24 of the Constitution.[191] It lays down environmental management principles applicable to all activities that may negatively influence the environment across the country.[192] The principles emphasise the need for sustainable development, which includes both the environment and socio-economic factors.[193] These principles make provision for people to be placed at the "forefront of environmental management".[194] In relation to the impact of waste, the principles provide as follows:[195]

> (i) that the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
> (ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; …
> (iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a reasonable manner.

As a result, the White Paper on Integrated Pollution and Waste Management in South Africa was published in 2000[196] in an effort to combat pollution, minimise waste, and manage and remediate the impact of waste.[197] This Policy was adopted due to the devastating impact of waste on the environment and unsustainable waste disposal practices.[198] The Policy required government departments to work together towards the eradication of waste and to reconcile the "fragmented and uncoordinated" manner in which government deals with pollution.[199]

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191 Preamble of the NEMA; Kidd *Environmental Law* 35; Nel and Du Plessis 2001 *SAJELP* 1.
192 Section 2(1) of the NEMA.
193 Section 2(3)-(4) of the NEMA; Burnett *A Critical Analysis of the Polluter Pays Principle* 16; Kidd "Environment" 529; *MEC for Agriculture, Conservation, Environment and Land Affairs v Sasol Oil (Pty) Ltd* 2006 5 SA 483 (SCA) para 15.
194 Section 2(2) of the NEMA.
195 Section 2(4)(a) of the NEMA; Kidd *Environmental Law* 37.
196 GN 227 in *GG* 20978 of 17 March 2000; this Policy led to the enactment of the NEMWA.
197 White Paper on Integrated Pollution and Waste Management in South Africa 10; Kidd *Environmental Law* 145; Section 11(4) of the NEMA; see paragraph 3.4 below.
198 White Paper on Integrated Pollution and Waste Management in South Africa 22-23, 35; Couzens 1999 *SAJELP* (6) 14; see paragraph 2.2 above.
199 White Paper on Integrated Pollution and Waste Management in South Africa 5, 23 and 31; Couzens 1999 *SAJELP* (6) 14; Section 12(a) of the NEMA.

Additionally, the principles in the NEMA place a duty on people to prevent and/or minimise the negative impact of waste on the environment.[200] The duty of care, as referred to in section 28(1), provides that the person whose actions may cause pollution should take reasonable measures to prevent pollution the environment.[201] However, in the event that an activity that causes pollution is authorised or pollution could not be avoided, the polluter would then be required to take reasonable measures to minimise and remedy the pollution.[202] Such reasonable measures include an analysis of the impact of the waste; avoiding the activity that causes pollution; controlling activities that cause pollution; ensuring that pollutants are controlled; eliminating sources of pollution; and remedying the impact of the pollution.[203] It is important to comply with the provisions of the NEMA in order to mitigate the pollution and its impact on the environment and the lives of low-income households and rural communities.[204] Reasonable measures may also include that municipalities' powers and functions include the competency to regulate the disposal of waste, through by-laws.[205]

The establishment of waste facilities will trigger an application for an environmental authorisation.[206] Listed activity 6 of GN R984[207] and listed activity 10 of GN R985[208] requires respectively that a basic assessment or an environmental impact assessment has to be undertaken. An independent environmental assessment practitioner will have to conduct these studies to determine the impact of the waste facility on the environment, including the impact on water quality and food production.[209]

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200 Section 2(4)(a)(viii) read with section 28(1) of the NEMA; White Paper on Integrated Pollution and Waste Management in South Africa 75; Gunningham 2017 *Environmental and Planning Law Journal* (34) 198; Kidd *Environmental Law* 149.

201 Section 28(1) of the NEMA; Kidd *Environmental Law* 8.

202 Section 28(1) and (2) of the NEMA.

203 Section 28(3)(a)-(f) read with section 30 of the NEMA; Glazewski "The National Environmental Management Act" 70; Kidd *Environmental Law* 149-150.

204 See paragraph 2.3 and 2.4 above.

205 Section 156 of the Constitution, read with Schedules 4B and 5B; section 84(1) *Municipal Systems Act*; Feris and Fuo "Environmental Rights Protected in the Constitution" para 6.2; NWMS 15; See chapter 4 below for the discussion of municipal by-laws. See, for example, LAN 193 in PG 3397 of 1July 2022; PN 105 in PG 7653 of 7 June 2016. See also section 19 of the NWA and section 16 of the NEMWA that also provide for the duty of care – paragraph 3.4 and 3.5 below.

206 Section 24 of the NEMA.

207 GN R984 in *GG* 38282 of 4 December 2014, as amended.

208 GN R985 in GG 38282 of 4 December 2014, as amended.

209 Regulation 12 in GN R982 read with Appendix 1 and 3, as well as section 24O.

However, the state of waste management remains an issue in South Africa as set out in Chapter 2. The next paragraph determines how the NWA deals with waste disposal and discusses its strategies to reduce waste and regulate waste disposal practices, particularly in rural and low-income communities.

3.4 NWA

The need to regulate waste is largely influenced by resource insecurities, especially in rural areas fraught with socio-economic inequalities.[210] The water scarcity in South Africa is another factor that necessitates the regulation of water resources.[211] The pollution of water resources, either directly or indirectly, affects the water quality, making it harmful to animal, human, and plant life.[212] This makes it a lot more challenging to realise the constitutional rights to sufficient food and water, while also affecting every sector that relies on water sources.[213] As such, it is paramount to have frameworks in place to protect and preserve water resources. The NWA is one such framework. It was enacted to protect and conserve South African water resources.[214] The NWA lists a number of water use activities that require regulation due to its impact on water sources, including:[215]

> (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
> (a) disposing of waste in a manner which may detrimentally impact on a water resource; …
> (i) altering the bed, banks, course or characteristics of a watercourse.

Any person who controls, owns or uses land on which section 21 activities occur, must take reasonable measures to prevent pollution of water sources.[216] The NWA has established a number of institutions such as the Catchment Management Agencies to

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210 See section 3(1) and (2) of the NWA.
211 Kriel 2009 *Water Sewage and Effluent* 44; Preamble to the NWA; World Wide Fund 2017 wwf.org.za.
212 Section 1(1) read with section 4 of the NWA.
213 Section 27(1)(b) of the Constitution; This includes the energy sector as well as the health sector, see paragraph 2.5 above; Braid *Does the South African water resources management regulatory governance framework achieve its constitutional responsibilities in regard to section 24 of the Constitution of the Republic of South Africa, Act* 108 *of* 1996? 2.
214 Section 2 of the NWA; Kidd *Environmental Law* 74.
215 Section 21 of the NWA; Kidd *Environmental Law* 77.
216 Section 19(1) read with section 19(2) of the NWA; see also paragraph 3.4 above.

aid in this task.[217] The Agencies may issue directives to any person who has failed to comply with the provision of section 19(1) to adhere to the pollution prevention measures within a specified period.[218] The Agencies may remedy the pollution if the polluter fails to comply with its directives to prevent further contamination to the water resources.[219] Thereafter, the Agencies may recover the costs for such remediation from anyone who contributed to the pollution, whether directly or indirectly.[220] The Agencies also have a duty to encourage participation of communities in the "use, management and control" of water resources.[221] If waste is disposed to land, then the applicant would also need to apply for a water use licence.[222]

The Minister may make regulations for activities listed in section 26.[223] Among other things, the Minister may prescribe standards that regulate the treatment and management of waste.[224]

It is important to set guidelines to regulate the management of waste to reduce pollution and the impact of waste on the environment. The following paragraph deals with the national waste regulations to determine how these regulations contribute to the management of improper waste practices.

3.5 NEMWA

3.5.1 General

The NEMWA has been specifically enacted to manage and regulate solid waste, giving effect to section 24(b) of the Constitution.[225] State organs must implement uniform rules and measures to deal with waste and to make provision for the re-use, recycling

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217 Kidd *Environmental Law* 79; see also *Harmony Gold Mining Company Ltd v Regional Director Free State Department of Water Affairs* 2014 1 All SA 553 (SCA); 2014 3 SA 149 (SCA) 6. In the absence of a catchment management agency, the Department of Water and Sanitation takes over the task.

218 Section 19(3) of the NWA.

219 Section 19(4) of the NWA.

220 Section 19(5) read with section 19(6)-(8) of the NWA.

221 Section 80(e) of the NWA.

222 See sections 39, 40-41 and 43 of the NWA.

223 Section 22(2)(c) read with section 26(1) of the NWA.

224 Section 26(1)(i) and section 39(1) of the NWA; see paragraph 3.5 below. As far as can be established the Minister has not yet prescribed regulations in terms of section 26(1)(i) of the NWA.

225 Preamble read with section 2 of the NEMWA.

and recovery of waste to ensure that the waste is disposed of in a safe and sustainable manner.[226] Municipalities have the authority to provide waste management services that are aligned with the NWMS and the Norms and Standards for Domestic Waste Collection.[227] In doing so, municipalities may set local standards for solid waste that deal with separating and storing waste, avoiding and minimising waste generation, re-using, recycling and recovering waste, treating and disposing of waste at waste facilities, and littering.[228] The minister of the DFFE has a responsibility to implement the NWMS in terms of section 6 of the NEMWA.[229] The NWMS states that only 11% of the 55 million tonnes of general waste that was produced in 2017 made its way to landfills.[230] It proposes the diversion of solid waste from landfills so that it can be treated and turned into a new product.[231] It provides that the low cost of landfills, lack of awareness and poor service delivery impedes the efficient and just transition to waste beneficiation.[232] While the NWMS is binding on all organs of state in every government sphere,[233] the issue remains that waste management is often not prioritised in municipal budgets and IDPs, leading to improper waste disposal practices.[234] Municipalities are, thus, required to prepare integrated waste management plans (IWMP) in which the provisions of the NWMS must be implemented.[235] This IWMP must be incorporated into the IDPs of each municipality.[236] Section 12 of the NEMWA also provides for the minimum contents the must be included in the IWMP of each municipality.

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226 Section 3 of the NEMWA; see GN 270 in *GG* 35206 of 30 March 2012.

227 Section 9(1) and (2) read with section sections 7 and 8 of the NEMWA; Alberts and van Rooyen "Solid-waste Management" para 13.3.2.2.

228 Section 9(3) of the NEMWA; Alberts and van Rooyen "Solid-waste Management" para 13.3.2.2.

229 Minister Barbara Creecy is responsible for the implementation of the NWMS, which was first implemented in 2011 and published in GN 344 in *GG* 35306 of 4 May 2012 and revised in 2020 in GN 56 in *GG* 44116 of 28 January 2021 in terms of section 6 of the NEMWA; see Alberts and van Rooyen "Solid-waste Management" para 13.3.1.

230 NWMS 15.

231 NWMS 16; See paragraph 2.5.4 above.

232 NWMS 18.

233 Section 6(1), (3) and (4) of the NEMWA.

234 NWMS 19.

235 Section 11(1) read with section 11(4)(a) of the NEMWA; see Alberts and van Rooyen "Solid-waste Management" para 13.3.2.4.

236 Section 11(4)(a)(ii) of the NEMWA; see section 36 of the *Municipal Systems Act*.

Municipalities are also required to apply the provisions set out in section 16 of the NEMWA when handling waste. This places a general duty on waste holders to take reasonable measures to:[237]

(b) avoid the generation of waste and where such generation cannot be avoided to minimise the toxicity and amounts of waste that are generated;
(c) reduce, re-use, recycle and recover waste;
(d) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
(e) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
(f) prevent any employee or any person under his or her supervision from contravening this Act; and
(g) prevent the waste from being used for an unauthorised purpose.

It is important to follow the measures set out in section 16(1), as failure to do so can have dire consequences for an already fragile environment.[238] Another example of this can be found in section 27, which deals with the duty to abstain from littering and to prevent it from taking place.[239] As a general observation on the state of littering in South Africa, it seems that this section is not enforced.[240]

The court, in *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality,*[241] dealt with the closing and relocation of the Marselle waste facility. It was argued that such conduct is illegal because the facility did not comply with the regulations that deal with the establishment of waste sites.[242] The surrounding community was put at risk of fires, toxic smoke and air pollution as a result of the site.[243] The court declared that the waste facility is operated contrary to the provisions of section 16 of the NEMWA, and accordingly the first respondent is in breach of its "constitutional and statutory

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237 Section 16(1) of the NEMWA; See paragraph 3.3 above; see also Alberts and van Rooyen "Solid-waste Management" para 13.3.3.1.
238 NWMS 15.
239 See section 27(1) and (2) of the NEMWA.
240 Also see Schenck *et al* 2022 *South African Journal of Science* 7.
241 *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 15.5.
242 *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 74.
243 *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 74.

duty".[244] It ordered the first respondent to take reasonable steps to decommission the waste facility and to establish a new one.[245] This case illustrates that the courts will not tolerate unlawful actions in relation to waste facilities.

The responsibilities of government spheres, as laid out in the NEMWA, require cooperation and the forging of partnerships between government, communities as well as private entities to work towards the eradication of waste to combat pollution and bring about sustainable development for the equal benefit of society as a whole, not just portions thereof.[246] The improper disposal and management of waste has the potential to pollute water resources, adding to the water security issues in South Africa.[247]

The following paragraph deals with the waste management authorisation under the NEMWA.

3.5.2 Waste management authorisation

The NEMWA distinguishes between two categories of waste in Schedule 3 of the Act, namely category A and B, each determining the type and level of regulation for various waste management activities.[248] Category A in Schedule 3 refers to hazardous waste, Category B deals with general waste that includes domestic waste.[249] The Minister may publish listed activities in the *Government Gazette* for which a waste management licence is required. She has done so in GN 921 of 2013,[250] which introduces a third category of activities.

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244 *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 116.

245 *Kenton on Sea Ratepayers and others v Ndlambe Local Municipality and others* 2017 JOL 37639 (ECG) para 116.

246 See section 12 read with section 44 of NEMWA; see also paragraph 3.2 above.

247 See paragraphs 2.4 and 2.5.1 above.

248 See regulations 3, 4 and 5 of GN 921 in *GG* 37083 of 29 November 2013, as amended; see chapters 2 and 3 of GNR 634 in *GG* 36784 of 23 August 2013.

249 Including garden, municipal and food waste.

250 GN 921 in in *GG* 37083 of 29 November 2013.

If an activity is listed in terms of Category A, the requirement is to conduct a basic assessment[251] to support the application of a waste management licence.[252] In terms of waste disposal, this category limits the disposal of general waste to land with an area of over 50m^2 up to 200m^2, with a total capacity of no more than 25 000 tons.[253] This category also applies to the disposal of domestic waste that exceeds 500 kg per month in areas that do not receive municipal services.[254] Listed activities in terms of Category B require a scoping and environmental impact report.[255] This category regulates the disposal of general waste on land that covers an area of over 200m^2, with a total capacity of over 25 000 tons.[256] Category C listed activities should comply with relevant norms and standards issued by the Minister.[257] Any person may apply to the Minister to motivate why certain waste management activities should not require a licence.[258] Applicants for such an exemption still have to comply with the requirements or standards set out in section 19(3)(a).[259]

If hazardous waste (type 1) is disposed at a class A landfill, the Minister of Forestry, Fisheries and the Environment is the licencing authority.[260] The MEC of a province, who is responsible for the environment, is the licencing authority for type 2 hazardous waste, which is disposed at a class B landfill, and for type 3 and 4 waste (general waste) to a class B landfill.[261]

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251 Regulations 19-20 read with Appendix 1 in GN R982 in *GG* 38282 of 4 December 2014, as amended.

252 Section 45 of NEMWA, read with section 20(b) and regulation 3 of GN 921 in *GG* 37083 of 29 November 2013; see Alberts and van Rooyen "Solid-waste Management" para 13.3.2.3.

253 Regulation 3(10) of GN 921 in *GG* 37083 of 29 November 2013.

254 Regulation 3(11) of GN 921 in *GG* 37083 of 29 November 2013.

255 Regulation 4 of GN 921 in *GG* 37083 of 29 November 2013, read with regulations 21-24 of GN R982 in *GG* 38282 of 4 December 2014, as amended; see Alberts and van Rooyen "Solid-waste Management" para 13.3.2.3.

256 Regulation 4(8) of GN 921 in *GG* 37083 of 29 November 2013.

257 Regulation 5(d) of GN 921 in *GG* 37083 of 29 November 2013; such as those in GN 1094 in *GG* 41175 of 11 October 2017 dealing with general waste. See Alberts and van Rooyen "Solid-waste Management" para 13.3.2.3. For other norms and standards, see GN R926 in *GG* 37088 of 29 November 2013; GN R924 in *GG* 37086 of 29 November 2012; GN R925 in *GG* 37087 of 29 November 2013; GN 1094 in *GG* 41175 of 11 October 2017; GN 561 in *GG* 44762 of 25 June 2021.

258 Regulation 9(1) of GN R634 in *GG* 36784 of 23 August 2013.

259 Regulation 9(1) of GN R634 in *GG* 36784 of 23 August 2013.

260 Regulation 2 of GN 3968 in *GG* 49511 of 17 October 2023.

261 Regulations 3 and 4 of GN 3968 in *GG* 49511 of 17 October 2023.

3.5.3 Norms and standards for disposal of waste to landfills

The purpose of the National Norms and Standards for Disposal of Waste to Landfill is to set out the requirements for waste disposal at landfills.[262] These Norms and Standards make provision for four classes of landfills, classed A to D, specifying the minimum design requirements of each class.[263] The landfills must be protected with a number of containment barriers that must be included in a waste management licence application.[264] The purpose of the barriers is to prevent seepage of chemicals or contaminants onto the land and groundwater sources.[265] Each barrier or layer must contain drainage pipes that will withstand atmospheric pressure for the entire "service life" of landfills.[266] The Norms and Standards also set criteria for the type of waste that may be disposed at a landfill that is licenced.[267]

The problem still lies with the waste disposal practices and lack of service delivery, which leads to contamination of the land on which waste is improperly disposed at unlicensed dump sites.

3.5.4 Standards for remediation of contaminated land and soil quality

The National Norms and Standards for Remediation of Contaminated Land and Soil Quality were implemented to provide a uniform approach and criteria to determining the level of contamination on land and the measures that needed to remedy the contamination.[268] These Norms and Standards are required for site assessment reports that must be compiled after a site screening, done in terms of section 36 of the NEMA.[269] It provides soil screening values for the soil screenings for "metals and organics", such as arsenic and cyanide, and for "anions", such as fluorides and

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262 Regulation 2 of GN R636 in *GG* 36784 of 23 August 2013; see Alberts and van Rooyen "Solid-waste Management" para 13.3.3.1.

263 Regulation 3(1) of GN R636 in *GG* 36784 of 23 August 2013.

264 Regulation 3(2) of GN R636 in *GG* 36784 of 23 August 2013; a registered civil engineer must certify the proposed landfill designs.

265 Regulation 3(2)(c) of GN R636 in *GG* 36784 of 23 August 2013.

266 Regulation 3(2)(e) of GN R636 in *GG* 36784 of 23 August 2013.

267 See Regulation 4(1) of GN R636 in *GG* 36784 of 23 August 2013.

268 The Norms and Standards were published in GN 331 in *GG* 37603 of 2 May 2014; see Regulation 2 of GN 331 in *GG* 37603 of 2 May 2014; see Alberts and van Rooyen "Solid-waste Management" para 13.3.3.7.

269 Regulation 4(1) of the GN 331 in *GG* 37603 of 2 May 2014.

sulphates.[270] The Norms and Standards categorise the screening values as value 1 and value 2.[271] Value 1 is defined as soil quality values for contaminants that include migration or seepage into water sources, while value 2 apply in soil screenings for contaminants where there are no water resources.[272] However, the values shown therein must not be construed as "absolute minimum values",[273] or "default remediation values".[274] The Norms and Standards also provide for the screening of contaminants that are not listed in soil screening value tables, if such screening can be validated in a scientific fashion.[275]

The contamination of land results in land that is barren, thereby affecting the production of food, it also affects the quality of water. Therefore, it is important for government to provide guidelines for the use of such land, especially if it falls in the rural areas.

3.5.5 National domestic waste collection standards

The regulation of waste disposal requires the development and implementation of norms and standards for waste management to ensure the delivery of services and the reduction of pollution.[276] The National Domestic Waste Collection Standards were implemented to address the challenges surrounding the provision of waste services in South Africa.[277] The aim of these Standards was to improve waste collection services so that there is uniformity in the provision of waste collection services across South Africa.[278] It provides for municipalities to offer waste collection services in an equitable manner, and to provide alternative ways of dealing with waste in areas where it would not be feasible to offer regular collection of waste.[279] This provision is pertinent for the

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270 Regulation 5(1) of GN 331 in *GG* 37603 of 2 May 2014.
271 Regulation 5(1) of GN 331 in *GG* 37603 of 2 May 2014.
272 Regulation 1 of GN 331 in *GG* 37603 of 2 May 2014.
273 Regulation 4(3)(i) of GN 331 in *GG* 37603 of 2 May 2014.
274 Regulation 4(3)(ii) of GN 331 in *GG* 37603 of 2 May 2014.
275 Regulation 4(2) of GN 331 in *GG* 37603 of 2 May 2014.
276 GN 344 in GG 35306 of 4 May 2012 and GN 56 in GG 44116 of 28 January 2021.
277 These were published by the DFFE in 2011 in GN 12 in *GG* 33935 of 21 January 2011.
278 NWMS 15; see Alberts and van Rooyen "Solid-waste Management" para 13.3.3.2.
279 NWMS 16; see paragraph 2.4 above for discussion on Provision of Basic Refuse Removal Services to Indigent Households; see also Alberts and van Rooyen "Solid-waste Management" para 13.3.3.2.

rural areas. This requires the variation of the level of services provided to different areas in so far as it is practical and feasible.[280]

In low density rural and farm areas, waste collection involves on-site disposal that takes place under the regulation and constant supervision of a waste management officer.[281] In areas with medium density settlements, this may be accomplished through central collection points where the communities are required to transfer its waste to the collection points.[282] In high density settlements, collection can take place at kerbsides or through an organised transfer of waste to collection points.[283] Municipalities are required to educate communities on how to separate waste, including the type of waste that is recyclable, and provide receptacles in which waste must be stored.[284]

For communal collection points, municipalities must provide bulk containers to which household waste can be transferred in areas that allow ease of access to waste collection vehicles.[285] The frequency for the removal of waste is set at intervals of once a week for non-recyclable waste and every two weeks for recyclable waste.[286] However, the frequency of waste removal at communal sites must take place within 24 hours of the containers being reported to be full, or otherwise it must be removed every week.[287] The waste management officer is responsible for raising awareness in the communities and is the relevant person to whom community members can lodge complaints that are related to waste management.[288]

Although the National Domestic Waste Collection Standards, as well as the NWMS provide for different waste collection service levels to different types of communities, a number municipalities tend to limit such services to urbanised areas.[289] As such, it is

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280 NWMS 15; see Alberts and van Rooyen "Solid-waste Management" para 13.3.3.2.
281 NWMS 15.
282 NWMS 15.
283 NWMS 16; see Alberts and van Rooyen "Solid-waste Management" para 13.3.2.2.
284 NWMS 16-17; see Alberts and van Rooyen "Solid-waste Management" para 13.3.3.2.
285 NWMS 18-19.
286 NWMS 19.
287 NWMS 19.
288 NWMS 21.
289 Haywood *et al* 2021 *International Journal of Environmental Research and Public Health* 1-2.

important to provide alternative measures for rural and traditional disposal of solid waste in a proper and regulated manner. The following paragraph deals with regulatory frameworks to allow for the establishment of waste disposal sites to see whether these frameworks can lead to the reduction of improper means of disposing waste.

3.5.6 General Communal and General Small Waste Disposal Sites

If the local municipality does not collect waste in a rural area, the traditional community may consider establishing a general or small waste disposal site in terms of the Directions for the Control and Management of General Communal and General Small Waste Disposal Sites. These Directions were issued in terms of the *Environment Conservation Act* 73 of 1989,[290] and remained in place despite the repealing of the authorising section.[291] These sites do not need authorisation but must be registered with the DFFE and permission must be obtained from the relevant local authority.[292] These waste facilities may be used for general waste and must receive less than 25 tonnes of waste per day.[293] The waste site must be constructed according to minimum standards set for construction.[294] As the ECA regulations in this regard have been repealed, the site will have to comply with the norms and standards of the NEMWA. Access to the site must be controlled and the waste facility area must be fenced.[295] According to regulation 5(7) a "buffer zone of a minimum of two hundred (200) metres for a general communal waste disposal site and of four hundred (400) metres for a general small waste disposal site must be maintained at all times."

Regulation 7 of the Directions indicate that all waste must be compacted and that animal carcases must be disposed of differently from the rest of the waste. Burning is

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290 GN 91 in GG 23053 of 1 February 2002.

291 According to the Juta editorial note: "Section 20 of the Environment Conservation Act 73 of 1989 was repealed by section 80(1) of the National Environmental Management: Waste Act 59 of 2008. The regulation remains in force in terms of section 80(2) of Act 59 of 2008."

292 Regulations 2 and 13(1) of GN 91 in *GG* 23053 of 1 February 2002.

293 Regulations 1 read with regulation 4 of GN 91 in *GG* 23053 of 1 February 2002. Annexure B indicates which waste (hazardous and toxic) may not be disposed at these sites. The sites may not receive medical waste – regulation 4(2).

294 Regulation 5 of GN 91 in *GG* 23053 of 1 February 2002.

295 Regulation 6 of GN 91 in *GG* 23053 of 1 February 2002.

allowed under prescribed circumstances. The waste may not create a nuisance and the person in control must implement dust control measures. The activities of waste reclaimers must be controlled. Windblown litter must be collected on a daily basis. Proper water and sanitation facilities must be available to the workers on site. Boreholes and underground water must be monitored on a regular basis[296] and annual reports must be provided to the Director-General.[297]

Although these Directions seem to be a way in which to establish smaller waste sites, they still have to comply with the norms and standards set in the NEMWA as discussed above.

3.6 Conclusion

It is clear from the discussion above that national legislation has detailed provisions in place for regulating the disposal of solid waste. From the discussion, one can argue that it has not been enough to combat pollution and its damage to the environment. Proper implementation of these regulations is still a major hurdle in the road to sustainable resource management. Another issue lies with the fragmentation of available legislation due to a lack of cooperation between the stakeholders responsible for managing these resources. This has created duplicated laws dealing with the same issues. As a result, rural communities and low-income households are left with no choice but to partake in improper waste disposal practices. This has dire consequences for the environment and the health of the members of these communities. Unless waste management is prioritised at all levels of government, the issue of pollution from household solid waste will remain a constant challenge in the path to social justice. There is a need for smaller communal waste sites in areas where there is no service delivery. The next chapter focuses on waste regulation at local government level.

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296 Regulation 8 of GN 91 in *GG* 23053 of 1 February 2002.
297 Regulation 9 of GN 91 in *GG* 23053 of 1 February 2002.

Chapter 4 Regulation at local government level

4.1 Introduction

This chapter considers the Constitution, the *Municipal Systems Act*, the *Traditional and Khoi-San Leadership Act* 3 of 2019, as well as by-laws. The relevant by-laws are the waste management by-laws and the IDPs of the Greater Taung Local Municipality and the Matatiele Local Municipality, which are situated in the Dr Ruth Segomotsi Mompati and Alfred Nzo district municipalities, respectively. The chapter relies on information from Statistics South Africa and the Auditor-General to determine whether service delivery is taking place. The Constitutional measures are discussed first; followed by the Municipal Systems Act. Thirdly, the provisions of the *Traditional and Khoi-San Leadership Act* 3 of 2019 are examined; then, the IDPs and by-laws of the two municipalities are analysed, followed by a comparison between them. Thereafter, the provision of municipal services is analysed, followed by a conclusion to the chapter.

4.2 Constitutional position

South African municipalities form part of the local sphere of government.[298] Municipalities are responsible for the provision of services to communities that fall within its geographical jurisdiction.[299] The right of municipalities to self-governance is dependent on constitutional provisions and the provincial legislation of the province wherein each municipality is situated.[300] Municipalities must also adhere to the national legislation as these may create new mandates for municipalities.[301]

There are three categories of municipalities (local, district and metropolitan municipalities), each with its own set of responsibilities.[302] Since municipalities directly work with communities, this gives them adequate access to raise awareness in

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298 Section 151(1) of the Constitution.

299 Section 151(3) of the Constitution; see paragraph 4.3 below.

300 Section 151(3) of the Constitution.

301 Nel, Du Plessis and Du Plessis "Instrumentation for Local Environmental Governance" 118-121.

302 Section 155(1) of the Constitution. Metropolitan municipalities fall within category A, District municipalities are Category C, and local municipalities are Category B, which in turn falls within the jurisdiction of Category C municipalities. For purpose of this dissertation, focus will be on district and local municipalities.

communities about the importance of environmental conservation and how protecting the environment can contribute to their health and well-being.[303] Municipalities have certain constitutional mandates that should be performed for the benefit of their local communities, these are set out as follows:[304]

(a) to provide democratic and accountable government for local communities;
(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;
(d) to promote a safe and healthy environment; and
(e) to encourage the involvement of communities and community organisations in the matters of local government.

These mandates extend to the management and regulation of waste, particularly the provision of services, because municipalities are required in terms of the Constitution, NEMWA and NWMS to provide waste removal and collection services.[305] Every municipality is encouraged to compile and adopt by-laws to set out its administrative duties and the extent to which the provision of services to local communities will take place.[306] To achieve the objects of section 152(1), municipalities must:[307]

(a) structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the community; and
(b) participate in national and provincial development programmes.

However, municipalities must ensure that the adopted by-laws do not contradict national and provincial legislation, as that would render the by-laws invalid.[308] This requires municipalities to collaborate with the other spheres of government in formulating plans that will dictate the manner in which each municipality provides services to local communities, such as making use of IWMPs.[309] As such, the national

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303 Fuo *Local Government's Role in the Pursuit of Transformative Constitutional Mandate of Local Justice in South Africa* 12; see also paragraph 3.2 above.

304 Section 152(1) of the Constitution; Section B of the *White Paper on Local Government*, 1998; Wall 2022 *Acta Structilia* 29(2) 265; see section 4(2) of the *Municipal Systems Act*; Article 5(2) of the *African Charter on the Values and Principles of Decentralisation, Local Governance and Local Development* (2014); Feris and Fuo "Environmental Rights Protected in the Constitution" para 6.2.

305 Schedule 5B read with section 155(7) of the Constitution.; see paragraphs 3.4 and 3.5 above.

306 Section 156(2) read with Schedules 4B and 5B of the Constitution; See section 162 of the Constitution.

307 Section 153 read with section 152(2) of the Constitution; see paragraph 3.4 above.

308 Section 156(3) of the Constitution.

309 Nel, Du Plessis and Du Plessis "Instrumentation for Local Environmental Governance" 118-121; see section 156(4) read with section 40(2) of the Constitution; Section B and C of the *White Paper on Local Government*; see also paragraph 3.5.1 above.

and provincial spheres of government are tasked with the responsibility of providing support to the local government, making sure it has the capacity to manage its affairs.[310] Every municipality must ensure that the public has convenient access to its by-laws.[311] Municipalities also have powers to make financial decisions to allow them to effectively perform their functions, through approving budgets, determining rates, levies and taxes to be charged for providing services, and raising loans.[312]

Unfortunately, a large number of municipalities still fail to provide adequate services to communities, often at the expense of poor and marginalised communities.[313] The next paragraph discusses the *Municipal Systems Act* to determine the how it regulates the provision of municipal solid waste collection services.

4.3 Local Government: Municipal Systems Act

The Constitution sets out a list of "basic values and principles" that every public administrator must have, including the provision of services in an impartial, fair and equal manner.[314] Municipalities are also required to maintain high standards of professionalism in providing services and performing any other municipal duty.[315] The failure of municipalities to live up to these high standards can prove to be disastrous, often resulting in service delivery protests.[316] As such, it is important for national and provincial governments to monitor, support and regulate the conduct of municipalities to ensure that every municipality adheres to these "basic values and principles".[317] This must be provided in terms of constitutional provisions, in conjunction with any

310 Section 154(1) read with section 227 of the Constitution.
311 Section 162(3) of the Constitution.
312 Section 160(2)(b)-(d) read with section 229 of the Constitution. The Municipal Council requires a majority supporting vote from Council members to decide on these issues, see section 160(3) of the Constitution. Also see the *Local Government: Municipal Finance Management Act* 56 of 2003.
313 Wall 2022 *Acta Structilia* 273.
314 Section 195(1)(d) of the Constitution; see also section 4(2) of the *Municipal Systems Act*.
315 Section 195(1)(a) of the Constitution read with section 38(b) of the *Municipal Systems Act*; Wall 2022 *Acta Structilia* 265.
316 Section 17 and section 139(1) read with section 151(4) of the Constitution; Wall 2022 *Acta Structilia* 268 and 272.
317 Wall 2022 *Acta Structilia* 273; see paragraph 4.2 above.

other relevant legislative measures.[318] The duties of each municipality also depend on the category under which the municipality falls. For example, category B municipalities are responsible for refuse collection and for establishing, operating and controlling solid waste disposal sites, and bulk transfer- and waste disposal facilities that fall within their respective jurisdictions.[319] However, category C municipalities regulate the disposal of waste and determine waste disposal strategies.[320]

Local municipalities therefore have a duty to provide waste collection and removal services to local communities, in exchange for service fees and levies, as well as community compliance with municipal by-laws and procedures.[321] The provision of services requires municipalities to be accountable and transparent to communities to which services are provided.[322] The legislative or executive authority of municipalities must develop and adopt plans, policies and programmes and set targets for delivering services to communities.[323] For this to be achieved, municipalities are required to draft, pass and publish by-laws that specifically deal with the service level for waste collection.[324] However, the by-laws can only be passed if all the council members have received reasonable notice of the draft by-laws and the document has been published for public comment.[325] Moreover, municipalities must employ processes and procedures that encourage and promote a culture of community participation.[326] Any planning and development of municipalities must be aligned with national and

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318 Item 37 on the International Guidelines on Decentralisation and Strengthening of Local Authorities in *International Guidelines on Decentralisation and Access to Services for All for the UN-HABITAT,* UN Doc HS/1205/09E (2009).

319 See section 84(1)(e)(iii) read with section 84(2) of the *Municipal Structures Act*.

320 Section 84 (1)(e)(i) and (ii) of the *Municipal Structures Act*.

321 Section 4(2)(f) read with section 5(2) of the *Municipal Structures Act*.

322 Article 5(2) of the *African Charter on the Values and Principles of Decentralisation, Local Governance and Local Development* (2014); Wall 2022 *Acta Structilia* 265 and 271; see section 38(c) of the *Municipal Systems Act*.

323 Section 11(3)(a) of the *Municipal Systems Act*. A Municipal Council exercises such authority, as stated in section 160(1) read with section 157(1) of the Constitution.

324 Section 12 read with section 13 of the *Municipal Systems Act*.

325 Section 12(3) of the *Municipal Systems Act*; section 13(a) of the *Municipal Systems Act* requires publication to be made in a Provincial Gazette, and if possible, to also be published in a local newspaper and any other place the Council deems practical.

326 Sections 16-21 read with section 42 of the *Municipal Systems Act*.

provincial legislation, the implementation of which must be achieved through collaborative governance.[327]

Municipal councils have to develop and adopt IDPs that inform development within communities under the jurisdiction of the municipalities and showcases strategies for implementing development programmes.[328] The IDPs must be adopted at the start of every municipal council term and must be aligned with the resource capacities of a municipality.[329] Once adopted, a municipality must inform the public of its adoption within 14 days. The IDP must then be made available for public inspection and a summary must be published.[330] A district municipality, in consultation with local municipalities, are responsible for adopting a framework for the IDPs, which apply to every municipality in its district.[331] The IDPs of local municipalities must then be aligned with this framework.[332] The conduct of a municipality should be in accordance with its IDP as well as its IWMP.[333] All this is to ensure that the provision of municipal services takes place in a manner that gives effect to constitutional provisions.[334] These service should be provided in an equitable and sustainable manner and must be accessible to all citizens.[335] Municipalities have a duty to regularly review and improve its services, ensuring that the provision of services reflects the current needs and circumstances of communities.[336] A municipality may either provide waste collection services directly, or indirectly through the use of service providers.[337] The use of service providers requires a service delivery agreement, which authorises the service provider to provide waste collection and removal services on behalf of a municipality.[338] Even with such an

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327 Article 6(2) of the *African Charter on the Values and Principles of Decentralisation, Local Governance and Local Development* (2014); sections 24 of the *Municipal Systems Act*; Alberts and van Rooyen "Solid-waste Management" para 13.3.2.5.

328 Sections 25-27 of the *Municipal Systems Act*; see paragraph 3.4 above.

329 Section 25(1)(b) read with section 28 of the *Municipal Systems Act*. This term lasts for a period of five years, see section 159(1) of the Constitution.

330 Section 24(4) of the *Municipal Systems Act*.

331 Section 27(1) of the *Municipal Systems Act*.

332 Section 29(3) read with section 27(2) of the *Municipal Systems Act*.

333 Section 36 of the *Municipal Systems Act*; see section 75(1) of the *Municipal Systems Act*.

334 Section 73(1) of the *Municipal Systems Act*.

335 Section 73(2) of the *Municipal Systems Act*; see paragraph 3.5 above.

336 Section 73(2)(e) read with sections 76-78 of the *Municipal Systems Act*.

337 Section 81(1) of the *Municipal Systems Act*.

338 Section 81(2) of the *Municipal Systems Act*.

agreement in place, municipal councils still have a duty to oversee the level of services that the service provider renders, and may adjust the tariffs set for such services, from time to time.[339]

The next paragraph looks at the role of traditional leaders and traditional councils in local government to determine whether they have a waste management responsibility.

4.4 Traditional and Khoi-San Leadership Act

The role of traditional leaders in communities that fall under the jurisdiction of local government cannot be denied.[340] As such, cooperation between local government and traditional leaders is pertinent to the success of local governance.[341] Traditional leaders must be afforded an opportunity to participate and comment on a decision that the municipal council makes if it may affect a traditional area.[342] The *Traditional and Khoi-San Leadership Act* was enacted to give effect to section 31 of the Constitution, which recognises traditional communities.[343] Section 16 of this Act provides for the establishment of a traditional council, such a council will be required to work hand-in-hand with ward committees that have been established as per section 73 of the *Municipal Structures Act*.[344] The function of traditional councils include assisting municipalities to identify the needs of communities, making recommendations on interventions that will "contribute to development and service delivery", participation in policy development, promotion of service delivery, and informing the municipality in its jurisdiction of any issue that may be a hazard or pose a disaster.[345] This means that the traditional councils may recommend that the municipal council provides basic

339 Section 81(3) and (4) of the *Municipal Systems Act*.
340 Section D of the *White Paper on Local Government*.
341 Section 81 of the *Municipal Structures Act*.
342 Section 81(2) and (3) of the *Municipal Structures Act*. The participation is regulated by the provincial MEC for local government, see section 81(4) of the *Municipal Structures Act*.
343 Long title and section 3 of the *Traditional and Khoi-San Leadership Act* 3 of 2019; see section 212 of the Constitution. This Act was declared unconstitutional in the case of *Mogale and Others v Speaker of the National Assembly and Others* 2023 9 BCLR 1099 (CC); 2023 6 SA 58 (CC). See discussion below.
344 Section 20(3)(a) of the *Traditional and Khoi-San Leadership Act* 3 of 2019. The ward committee referenced to in section 73(1) of the *Municipal Structures Act* consists of a ward councillor and 10 other members, see section 73(2) of the *Municipal Structures Act*.
345 Section 20(1) of the *Traditional and Khoi-San Leadership Act* 3 of 2019.

refuse removal in their communities, such as through the use of communal waste disposal facilities as per the National Domestic Waste Collection Standards; and the Policy on the Provision of Basic Refuse Removal Services to Indigent Households to curb the unsustainable waste disposal practices within their communities.[346] Municipalities and traditional councils may enter into partnerships and agreements with each other, setting out the role of each party thereto and aimed at achieving the principles of cooperative governance.[347] The approval of such agreements is, however, subject to public consultation processes.[348] In terms of the agreement, the municipality may contract the traditional council, as a service provider, to provide its service delivery functions.[349] As a service provider, the municipal council is able to provide waste collection and removal services in their communities. Since traditional councils know more about their communities than municipal councils, they are able to provide services that are well suited to each community.[350] Despite its progressive nature, this Act has been declared by the Constitutional Court as unconstitutional and invalid as public consultation processes were neglected in the passing of the Act.[351] This order of invalidity has, however, been suspended for a period of 24 months to allow Parliament to either re-enact it or enact another Act in its place.[352]

The next paragraph examines the waste management by-laws and IDPs of Greater Taung Local Municipality to determine how the Municipality regulates the disposal of within its local communities.

346 See paragraphs 2.4 and 3.5.4 above.
347 Section 24(2)(a) and (4) of the *Traditional and Khoi-San Leadership Act* 3 of 2019.
348 Section 24(3) of the *Traditional and Khoi-San Leadership Act* 3 of 2019.
349 Section 24(5) of the *Traditional and Khoi-San Leadership Act* 3 of 2019; see paragraph 4.3 above.
350 Section D of the *White Paper on Local Government*.
351 *Mogale and Others v Speaker of the National Assembly and Others* 2023 9 BCLR 1099 (CC); 2023 6 SA 58 (CC) para 87.
352 *Mogale and Others v Speaker of the National Assembly and Others* 2023 9 BCLR 1099 (CC); 2023 6 SA 58 (CC) para 87.

4.5 Greater Taung Local Municipality

4.5.1 Background

Greater Taung Local Municipality is situated in the North West province and is one of five local municipalities in the Dr Ruth Segomotsi Mompati District Municipality.[353] The Greater Taung Local Municipality is a category B municipality made up of rural areas that fall into the jurisdiction of three senior traditional leaders.[354] Its topography has major agricultural significance to the economy of South Africa.[355] The Municipality does not have a proper landfill site.[356] It relies on Dr Ruth Segomotsi Mompati District Municipality, which provides refuse removal services and manages its landfill sites.[357] The Municipality provides for the regulation of waste disposal in terms of its Waste Management By-laws, which it published in terms of section 13 of the Municipal Systems Act.[358] The By-law was adopted to give effect to sections 24 and 156(2) of the Constitution as well as section 9(3)(a) of NEMWA, and is aimed at regulating the "avoidance, minimisation, generation, cleaning and disposal of waste".[359] The By-law regards the provision of a basic municipal waste management service as necessary to ensure a quality of life that is not only reasonable, but acceptable.[360]

4.5.2 Waste management practices

The provision of waste management services is the sole responsibility of the Municipality.[361] These services include the collection, storage and disposal of waste.[362] In so doing, the Municipality has to implement an integrated waste management plan

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353 Main *The Local Government Handbook* 162.

354 Khosi Ponatshego Mothibi heads 14 villages in South Western Greater Taung, under the Tribal Council of Batlhaping Ba-Ga-Mothibi; Kgosi Tshepo Mankuroane heads villages in Central Taung and its neighbouring villages, including Mokgareng and Vaaltein, under the Tribal Council of Batlhaping Ba-Ga-Phuduhucwana; Kgosi Kelebone Motlhabane heads 12 villages between Khudutlou and Manthe, under the Tribal Council of Batlhaping Ba-Ga-Maidi.

355 Main *The Local Government Handbook* 162.

356 Greater Taung Local Municipality *Fourth Generation IDP* 57.

357 Greater Taung Local Municipality *Fourth Generation IDP* 107. These functions were transferred to the District Municipality in 2008, by the Provincial Government of North West.

358 LAN 269 in PG 7385 of 23 December 2014.

359 Preamble and section 9(1) of LAN 269 in PG 7385 of 23 December 2014; see paragraph 3.4 above.

360 Section 1 of LAN 269 in PG 7385 of 23 December 2014.

361 Section 5(2) of LAN 269 in PG 7385 of 23 December 2014.

362 Section 5(2) of LAN 269 in PG 7385 of 23 December 2014.

to ensure that development allows for sustainable and affordable access to municipal services for all its inhabitants.[363] In this regard, the Municipality has the discretion to set local standards to deal with separating, compacting and storing solid waste; the management of such waste at disposal facilities; and curbing littering.[364] The By-law places an obligation on the Municipality to manage the generation of all waste within its jurisdiction.[365] The By-law sets out a waste management hierarchy, which prioritises waste management based on the following order:[366]

(a) avoidance, minimisation and reduction of waste;
(b) re-use of waste;
(c) recycling, re-claiming, reprocessing and treatment of waste; and
(d) disposal of waste.

Waste generators are obligated to take reasonable measures to give regard to the waste hierarchy and ensure that the disposal of waste takes place in an "environmentally sound manner", while also preventing the occurrence of nuisance.[367] The Municipal Council is required to appoint a waste management officer to regulate waste management practices for compliance with the By-law and any other relevant legislation.[368] The waste management officer is also responsible for determining conditions for waste management practices for specific classes of waste generators, in accordance with the IWMP of the Municipality.[369] These classes of waste generators refer to people or firms that generate business, industrial, building, event and hazardous waste, including waste generators that are in the business of sorting, recycling, re-using and recovering of waste.[370]

4.5.3 Municipal waste management services in by-laws

The By-law places a duty on the Municipality to ensure that the communities which it services have access to municipal waste services that are efficient, affordable and

363 Section 5(2)(b)-(e) of LAN 269 in PG 7385 of 23 December 2014.
364 Section 5(3) of LAN 269 in PG 7385 of 23 December 2014.
365 Section 8(1) of LAN 269 in PG 7385 of 23 December 2014.
366 Section 8(2) read with section 35 of LAN 269 in PG 7385 of 23 December 2014.
367 Section 10(1) of LAN 269 in PG 7385 of 23 December 2014; waste generators are defined in section 1 of this by-law as people or companies that generate waste.
368 Section 11(1)-(3) of LAN 269 in PG 7385 of 23 December 2014.
369 Section 12(6) of LAN 269 in PG 7385 of 23 December 2014.
370 See section 12(2) of LAN 269 in PG 7385 of 23 December 2014.

sustainable.[371] This service is provided at a fee as determined by the Municipality, taking into account factors such as affordability and environmental protection.[372] The collection of domestic waste must be done on a regular basis and where reasonably possible, the Municipality must also provide waste recycling facilities.[373] The frequency of these services depend on the quantity of waste and the need for maintaining a safe and healthy environment.[374] Any waste that measures over the maximum waste that may be collected will be subject to an additional service fee.[375] The owner or occupier of a residence where domestic waste is to be collected is to ensure that the waste is placed in an approved receptacle, the contents of which should not pose harm to municipal workers who are tasked with its collection.[376] The Municipality is entitled to charge waste management fees regardless of whether or not an account holder makes use of its services.[377] In respect to municipal charges, the By-law also provides for exempting indigents from paying for its services in accordance to its indigent policy.[378]

4.5.4 Domestic waste disposal in by-laws

Domestic waste is described in these By-laws as waste that has been generated on residential premises.[379] This waste is to be disposed of at a municipality approved waste disposal facility.[380] Burning waste, whether in public or privately, as a method of disposal is prohibited by the By-law.[381] The Municipality may impose conditions for the disposal of waste at a disposal facility, including the timeframes for such disposal

371 Section 16(1) of LAN 269 in PG 7385 of 23 December 2014.
372 Section 16(2) and (3) of LAN 269 in PG 7385 of 23 December 2014.
373 Section 17(1) and (5) of LAN 269 in PG 7385 of 23 December 2014.
374 Section 17(3)(a) and (b) of LAN 269 in PG 7385 of 23 December 2014.
375 Section 17(3)(c) and (6) of LAN 269 in PG 7385 of 23 December 2014.
376 Section 18 of LAN 269 in PG 7385 of 23 December 2014.
377 Section 19(1) of LAN 269 in PG 7385 of 23 December 2014.
378 Section 19(4) of LAN 269 in PG 7385 of 23 December 2014; The Municipality offers free basic refuse removal services; see paragraph 2.4 above.
379 Section 1 of LAN 269 in PG 7385 of 23 December 2014.
380 Section 33(1)(a) of LAN 269 in PG 7385 of 23 December 2014.
381 Section 33(2) of LAN 269 in PG 7385 of 23 December 2014.

and the nature of waste that may be disposed at a particular disposal facility, keeping in mind the need to manage waste in an environmentally sound manner.[382]

The Municipality cannot be held liable for any damage that a person may sustain while at a waste disposal facility.[383] Upon entry to a waste disposal facility, a person who wishes to dispose of waste may be required to provide information on the composition of the waste in question and will need to follow instructions with regard to the disposal procedures as set by the Municipality.[384] Access onto a waste disposal facility is subject to certain conditions, such as the prohibition of alcohol and being allowed entry only for purposes of disposing waste, provided such waste is permitted at the particular facility.[385] Failure to act in terms of these conditions may render the person liable for damages that may be incurred by the Municipality.[386] The By-law prohibits the storage of waste, where the manner of storage may cause pollution or create a nuisance.[387]

Domestic waste is collected by the Municipality to combat pollution and to prevent damage to the environment. As such, the waste generator ceases to be the owner of waste once such waste is collected by the Municipality, at which point the Municipality becomes the owner thereof.[388] Thereafter, only an authorised person is permitted to handle or otherwise interfere with the waste.[389] The illegal dumping of waste is prohibited by this By-law.[390] Any person who partakes in the illegal dumping of waste may be held liable by the Municipality for the cost of removing such waste.[391] A person who is found guilty of contravening the provisions of this By-law will be liable for either

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382 Section 33(5) of LAN 269 in PG 7385 of 23 December 2014; The Waste Management Officer is, in terms of section 52, responsible for enforcing the By-law and ensuring compliance thereto, as an authorised person.
383 Section 33(6)(a) of LAN 269 in PG 7385 of 23 December 2014.
384 Section 33(6)(c)-(e) of LAN 269 in PG 7385 of 23 December 2014.
385 Section 33(7) of LAN 269 in PG 7385 of 23 December 2014.
386 Section 33(8) of LAN 269 in PG 7385 of 23 December 2014.
387 Section 33(12) of LAN 269 in PG 7385 of 23 December 2014.
388 Section 34(1) of LAN 269 in PG 7385 of 23 December 2014.
389 Section 34(2) of LAN 269 in PG 7385 of 23 December 2014.
390 Section 49(1) of LAN 269 in PG 7385 of 23 December 2014. This refers to the manner in which communities dispose of waste when the municipality fails to deliver refuse removal services.
391 Section 49(4) of LAN 269 in PG 7385 of 23 December 2014.

a fine of an amount ranging from R500 to R10 000, an imprisonment of six months up to two years or less, or both.[392]

4.5.5 Adoption and implementation of IDP

Refuse removal is not prioritised in the municipal IDP of the Greater Taung Local Municipality. An analysis of the priorities of the services to be provided to the communities of Greater Taung Local Municipality showed that refuse removal was only mentioned once as a sector that should be prioritised, while road infrastructure was mentioned 111 times.[393] As per the 2013 StatsSA reports on access to basic services,[394] 2 389 (5.2%) households in Greater Taung received refuse removal services at least once a week, 272 (0.6%) households received refuse removal services less than once week, 1 183 (2.5%) households made use of a communal refuse dump, 50 (0.1%) households used a central collection point, 39 972 (86.6%) households had their own refuse dump, 1 920 (4.2%) households dumped waste illegally, while 381 (0.8%) used other means to dispose waste.[395]

The Community Social Services Department of Greater Taung Local Municipality is responsible for the provision of refuse removal and waste management services.[396] The Municipal Manager bears the responsibility of adopting and implementing IDPs for the Municipality.[397] In the 2021 strategic planning session, the Office of the Municipal Manager reported that the Municipality was still financially stable, and that the provision of services to its community was consistent.[398] The Community Service Department stated that it succeeded in clearing illegal dumping hotspots, provided waste management services in terms of the national norms and standards, and expanded waste collection services to another ward.[399] However, it also stated that

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392 Section 58(1) of LAN 269 in PG 7385 of 23 December 2014.
393 Greater Taung Local Municipality *Fourth Generation IDP* 22; this was listed by Diplankeng Village, which requested a dumping site, see Greater Taung Local Municipality *Fourth Generation IDP* 28.
394 Adjusted as per the 2016 community survey, see Greater Taung Local Municipality *Fourth Generation IDP* 40.
395 Greater Taung Local Municipality *Fourth Generation IDP* 43.
396 Greater Taung Local Municipality *Fourth Generation IDP* 50.
397 Greater Taung Local Municipality *Fourth Generation IDP* 49.
398 Greater Taung Local Municipality *Fourth Generation IDP* 56.
399 Greater Taung Local Municipality *Fourth Generation IDP* 57.

there is a lack of landfill space, an insufficient budget, lack of skills and infrastructure in the Refuse Unit of Greater Taung, and addressed environmental as well as human-health impacts resulting from illegal dumping.[400] The Municipality then proposed a number of strategic objectives, including the provision of waste removal services in formal areas in an effort to accelerate the service.[401] The Municipality revised and approved an IWMP, with specific focus on its implementation.[402] The Municipal Budget for the 2020/2021 budget year, as adjusted, for refuse removal services was R10 234 566, for the 2021/2022 budget year it was set at R775 726, for the 2022/2023 budget year the Municipality budgeted R818 391 for refuse, and R863 402 for the 2023/2024 budget year.[403]

Unfortunately, it seems as if the Municipality still fails to provide adequate waste management services to the more rural outlaying communities of the Municipality, this is evident from the improper and illegal waste disposal practices in communities within the Municipality as well as from the data collected by the WEF-nexus group.[404]

The next paragraph considers how Matatiele Local Municipality regulates waste disposal in its by-laws.

4.6 Matatiele Local Municipality

4.6.1 Background

The Matatiele Local Municipality is situated in Eastern Cape province and is one of four local municipalities of the Alfred Nzo District Municipality.[405] It is a category B municipality established in the year 2006 and covers areas in Matatiele, Cedarville as well as the magisterial district of Maluti, which used to form part of the Umzimvubu

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400 Greater Taung Local Municipality *Fourth Generation IDP* 57; illegal dumping was identified as one of the key concerns in the Municipality, see Greater Taung Local Municipality *Fourth Generation IDP* 62.

401 Greater Taung Local Municipality *Fourth Generation IDP* 65.

402 Greater Taung Local Municipality *Fourth Generation IDP* 68.

403 Greater Taung Local Municipality *Fourth Generation IDP* 92.

404 This is based on my observation during the collection of empirical data for the larger WEF nexus group project. Ngarava 2024 *et al* https://data.mendeley.com/datasets/56zskrvfwf/1.

405 Matatiele Local Municipality date unknown https://www.matatiele.gov.za; Matatiele Local Municipality *Adopted* 2022-2027 *IDP Summary* 12.

Municipality, and a rural district management area that previously fell under the jurisdiction of the Alfred Nzo District Municipality.[406] The Municipality has a licenced landfill which has been operating since 2008.[407] However, the Municipality has indicated that the landfill is getting filled at a rapid rate.[408] As such, the Municipality has recognised the need to reduce the waste that is disposed at the landfill and aims to achieve this through the adoption of waste minimisation initiatives.[409] The Municipality provides for the regulation of waste disposal under its Waste Management By-laws of 2018.[410] These by-laws define domestic refuse as waste generated as a result of everyday activities on a residential premises.[411] The removal of this waste is done by the Municipal Council or an authorised service provider to be disposed of at a disposal facility that is owned or approved by the Council.[412]

4.6.2 Collection and removal of refuse in by-laws

The generator of domestic refuse is charged with the responsibility of temporarily storing waste until such a time the Council or its service provider collects and removes such waste, subject to a tariff charge.[413] These collection dates are determined by the Council for every area it services.[414] The By-laws also make provision for collection of domestic refuse that, due to its composition, cannot be stored in a refuse container or receptacle in a convenient manner.[415] The provisioning of this service, however, occurs at the discretion of the Council, which may refuse to render such service.[416] In such an instance, the waste generator should take appropriate steps to arrange for the lawful collection and disposal of the special domestic refuse.[417] Provision is also made

406 Matatiele Local Municipality date unknown https://www.matatiele.gov.za; Matatiele Local Municipality *Adopted* 2022-2027 *IDP Summary* 13.
407 Matatiele Local Municipality *Adopted IDP:* 2022-2027 92 and 253. This is exacerbated by the large number of recyclable waste that is disposed at the landfill, see Matatiele Local Municipality *Adopted IDP:* 2022-2027 253.
408 Matatiele Local Municipality *Adopted IDP:* 2022-2027 253.
409 Matatiele Local Municipality *Adopted IDP:* 2022-2027 254.
410 Section 21 of LAN 150 in PG 4268 of 15 July 2019.
411 Section 1 of LAN 150 in PG 4268 of 15 July 2019.
412 Section 1 of LAN 150 in PG 4268 of 15 July 2019.
413 Section 2(1) and (2) of LAN 150 in PG 4268 of 15 July 2019.
414 Section 5 of LAN 150 in PG 4268 of 15 July 2019.
415 Sections 1 and 2(3) of LAN 150 in PG 4268 of 15 July 2019.
416 Section 2(4) of LAN 150 in PG 4268 of 15 July 2019.
417 Section 2(4) of LAN 150 in PG 4268 of 15 July 2019.

for owners or occupiers of a residence who do not wish to be serviced by the municipality to take lawful measures to dispose of the refuse generated on the residence at a disposal site.[418] Owners or occupiers of a new premise are required to provide a written notification to the Council of the intention to produce or generate waste on the premises and are to indicate the class of waste that is to be generated.[419] It is the responsibility of the owners to ensure that the Council has convenient access to the waste on the days set for its collection so that the waste collection and removal services can take place in an efficient manner.[420] The Council should take special measures for the removal of waste, at a cost to the owner or occupier, where such waste has accumulated to such a point that it becomes a nuisance.[421]

4.6.3 Waste disposal sites in by-laws

The By-law provides for the required conduct from any person entering a waste disposal site for the purpose of disposing waste.[422] This includes the use of authorised access points to enter the disposal sites; the manner of weighing the refuse in question; the provision of documentation reflecting the composition of the refuse; as well as the provision of the details of the person liable for the tariff charge.[423] All persons entering a waste disposal site are required to follow all instructions pertaining to the place and manner of disposing the refuse.[424] Alcohol is not permitted at waste disposal sites.[425] Entry to a waste disposal site is only permitted for purposes of refuse disposal and strictly at times determined by the Council.[426] The By-law makes it clear that the Council has ownership of all the refuse it removes, and prohibits the removal or interference with such refuse by any person other than those authorised to do so, by the Council.[427] In this regard, the Council prohibits all those within its jurisdiction from operating as scrap dealers or running buy-back centres prior to obtaining a permit

418 Section 2(5) of LAN 150 in PG 4268 of 15 July 2019.
419 Section 2(6) of LAN 150 in PG 4268 of 15 July 2019.
420 Section 6 of LAN 150 in PG 4268 of 15 July 2019.
421 Section 7 read with sections 11 and 12 of LAN 150 in PG 4268 of 15 July 2019.
422 Section 17(1) of LAN 150 in PG 4268 of 15 July 2019.
423 Section 17(1)(a)-(c) and (e) of LAN 150 in PG 4268 of 15 July 2019.
424 Section 17(1)(d) of LAN 150 in PG 4268 of 15 July 2019.
425 Section 17(2) of LAN 150 in PG 4268 of 15 July 2019.
426 Section 17(3) of LAN 150 in PG 4268 of 15 July 2019.
427 Section 18 of LAN 150 in PG 4268 of 15 July 2019.

from the Council.[428] To obtain such a permit, the Council requires an applicant to submit an environmental impact assessment and an integrated waste management plan.[429] The Council also has discretion to set forth any other requirements with which the applicant must comply.[430] The Council requires written reports and activity schedules detailing the handling, transportation, processing, treatment or disposal of waste for purposes of recycling it.[431] A person who is found guilty of contravening the provisions of this By-law will be liable for either a fine of not more than R30 000, an imprisonment of two years or less, or both.[432]

4.6.4 Adoption and implementation of IDP

The Municipality aims to reduce service delivery backlogs in its key development strategies.[433] The 2021/2022 Action Plan of the Municipality set a timeframe, June 2023, at which the adopted IWMP of Matatiele Local Municipality should have received endorsement from the Department of Cooperative Governance and Traditional Affairs and the Department of Economic Development, Environmental Affairs and Tourism.[434] The same timeframe, of June 2023, was set for the Municipality to align its by-laws with the illegal dumping and littering IWMP, once it has been duly endorsed.[435]

The only waste disposal site in the Municipality has been projected to have the capacity to accommodate around 15 years' worth of waste from the town area.[436] Several municipal wards in Matatiele Local Municipality experience waste management issues. The community members of ward 6 requested the Municipality to supply skip bins, which the Municipality must also monitor.[437] In ward 8, community members dispose of waste in an improper manner because the Municipality does not supply waste removal services to the villages within the ward and does not provide waste facilities

428 Section 18(1) of LAN 150 in PG 4268 of 15 July 2019.
429 Section 18(2)(a) and (b) of LAN 150 in PG 4268 of 15 July 2019.
430 Section 18(2)(c) of LAN 150 in PG 4268 of 15 July 2019.
431 Section 13(3) of LAN 150 in PG 4268 of 15 July 2019.
432 Section 19 of LAN 150 in PG 4268 of 15 July 2019; An authorised official, any member of the municipal council, is responsible for enforcing the provisions of the by-law.
433 Matatiele Local Municipality *Adopted IDP:* 2022-2027 7.
434 Matatiele Local Municipality *Adopted IDP:* 2022-2027 23.
435 Matatiele Local Municipality *Adopted IDP:* 2022-2027 24.
436 Matatiele Local Municipality *Adopted IDP:* 2022-2027 49.
437 Matatiele Local Municipality *Adopted IDP:* 2022-2027 89.

where the communities can dispose of household solid waste.[438] An illegal dumping site near St Monicas School in ward 19 has been identified as a source of pollution to a nearby stream.[439] Community members in ward 20 raised concerns over the inconsistency of waste removal services in its communities.[440] Improper waste management, or a lack thereof, and the pollution associated with it, has been identified as part of the challenges in the Local Municipality of Matatiele.[441] While urban areas of the Municipality are offered waste collection services on a regular basis, this service is very limited in rural areas.[442]

In terms of the 2016 StatsSA community survey, only 7 081 (12.9%) households received weekly refuse removal services; 143 (0.3%) households had less frequent refuse removal; 1 777 (3.2%) households disposed waste at a communal refuse dump; 40 952 (74.5%) households used their own refuse dumps to dispose of waste; 4 506 (8.2%) households had no waste disposal facilities; and the other 491 (0.9%) households did not specify their disposal practices.[443] The Municipality has set a five-year target of providing services to 14 000 households through its indigent policies.[444] However, it does not make mention of waste removal services in its basic service delivery targets.[445]

The Municipality plans to remediate the existing landfill, through identifying and constructing two new cells.[446] The Municipality has set annual targets to provide refuse removal services to ward 1, 19, 20 and 26, respectively, which is to take place twice a week in the residential areas and every day in the Central Business Districts to conserve the environment and manage the manner in which land is used.[447] In relation to the landfill management, the Municipality has set a budget of R2 000 000 for the

438 Matatiele Local Municipality *Adopted IDP:* 2022-2027 89.
439 Matatiele Local Municipality *Adopted IDP:* 2022-2027 90.
440 Matatiele Local Municipality *Adopted IDP:* 2022-2027 90.
441 Matatiele Local Municipality *Adopted IDP:* 2022-2027 91.
442 Matatiele Local Municipality *Adopted IDP:* 2022-2027 92.
443 As cited in the Matatiele Local Municipality *Adopted IDP:* 2022-2027 252.
444 Matatiele Local Municipality *Adopted IDP:* 2022-2027 99; this includes indigent refuse removal services. However, the focus is on the provision of alternative sources, see Matatiele Local Municipality *Adopted IDP:* 2022-2027 108.
445 See Matatiele Local Municipality *Adopted IDP:* 2022-2027 99.
446 Matatiele Local Municipality *Adopted IDP:* 2022-2027 127.
447 Matatiele Local Municipality *Adopted IDP:* 2022-2027 127.

2022/2023 budget year, R8 000 000 for the 2023/2024 budget year, and R12 000 000 for the 2024/2025 budget year.[448] With regard to the provision of refuse removal services in the four wards, the Municipality has set a budget of R8 000 000 for the 2022/2023 budget year, R12 500 000 for the 2023/2024 budget year, and R14 000 000 for the 2024/2025 budget year.[449]

4.7 Comparison of the waste management services

The following graph depicts the waste collection services in Greater Taung Local Municipality and Matatiele Local Municipality, based on the 2016 StatsSA community survey:[450]

Figure 6: Waste disposal practices in Greater Taung and Matatiele

It is clear from Figure 6 above that the two municipalities are failing to provide adequate waste removal services to their respective communities. The total number of households that receive of refuse collection is merely 5.9% in Greater Taung Local Municipality and 13.2% in Matatiele Local Municipality.[451] This means that around 94.2% and 86.8%% of solid waste is not controlled or regulated in the Greater Taung

448 Matatiele Local Municipality *Adopted IDP:* 2022-2027 182.
449 Matatiele Local Municipality *Adopted IDP:* 2022-2027 182.
450 See paragraph 4.5.5 and 4.6.4 above.
451 See Greater Taung Local Municipality *Fourth Generation IDP* 43; and Matatiele Local Municipality *Adopted IDP:* 2022-2027 252.

Local Municipality and Matatiele Local Municipality, respectively.[452] This is an unsustainable manner of regulating waste and contributes to the high levels of pollution to the environment. Additionally, both municipalities seem prioritise the provision of regular waste removal services in the town areas, neglecting the outlying rural areas.[453] It is impractical for the municipalities to require local communities to comply with their by-laws when there are limited to no disposal facilities in a large number of their communities. The two municipalities are failing to comply with national regulatory frameworks as well as their own local norms and standards for waste management.

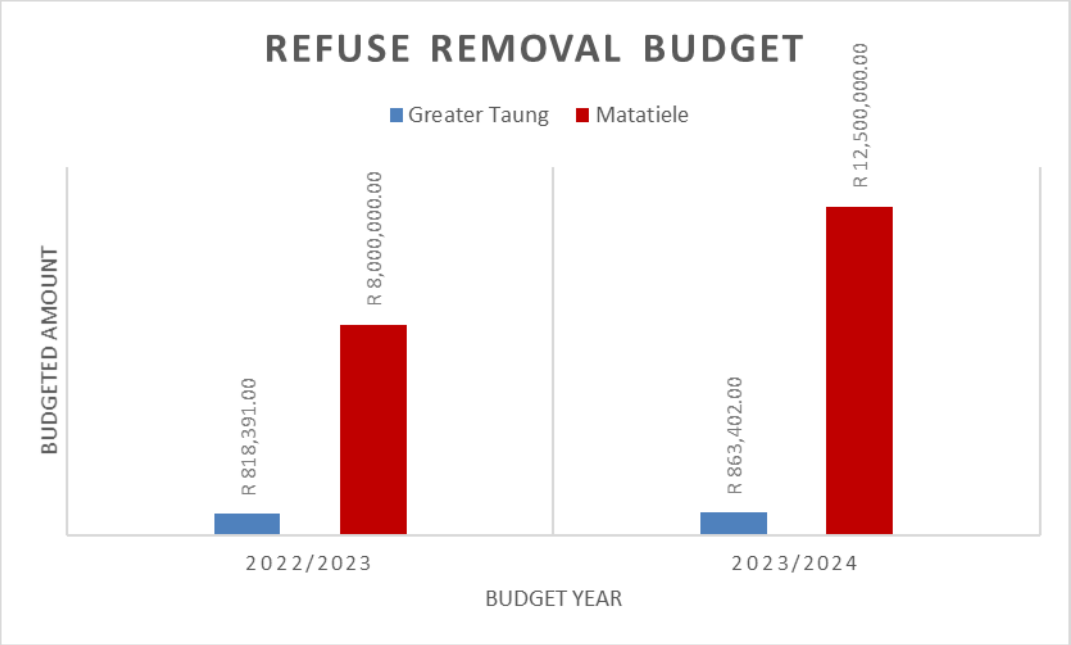

Figure 7: Solid waste removal budget in Greater Taung (blue) and Matatiele (red) [454]

There are disparities in the annual budgets of Greater Taung Local Municipality and those of Matatiele Local Municipality in respect of household solid waste removal.[455] The 2022/2023 refuse removal budget of Matatiele is R7 181 609 (81.4%) more than

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452 See Greater Taung Local Municipality *Fourth Generation IDP* 43; and Matatiele Local Municipality *Adopted IDP:* 2022-2027 252.

453 Matatiele Local Municipality *Adopted IDP:* 2022-2027 89.

454 Data extracted from the municipal IDPs to compare the annual budgets of the two municipalities for a period of two years, see Greater Taung Local Municipality *Fourth Generation IDP* 92; and Matatiele Local Municipality *Adopted IDP:* 2022-2027 182.

455 This may also be impacted by the waste management duties that have been transferred to the District Municipality under which Greater Taung Local Municipality operates, see paragraph 4.5.1 above.

that of Greater Taung. Furthermore, the 2023/2024 refuse removal budget of Matatiele is also R11 636 598 (87.1%) more than that of Greater Taung. However, even with these large differences in the annual budgets, both municipalities face similar challenges in terms of the provision of waste collection and removal services, leading to improper waste disposal practices.[456] This shows a possible lack of skill, planning, as well as effective and efficient decision-making capacities in the governance of Greater Taung and Matatiele local municipalities.

Local municipalities often mention insufficient budgets as a reason for failing to provide services to local communities.[457] However, a lack of services contributes to a number of social ills, such as poverty, unemployment, and inequalities.[458] The following paragraph analyses the current state of municipal service delivery in general to assess the factors that contribute to the poor provision of services at local government level.

4.8 Analysis of the provision of municipal services

The current state of South African municipalities is nothing less than deplorable, with more and more municipalities falling through the cracks. There are a number of issues that are prevalent at local government level, such as corruption, lack of infrastructure, insufficient funds and maladministration, to name a few.[459] The Auditor-General report of the 2021/2022 financial year revealed that only 38 of the 257 municipalities received a clean audit.[460] The Auditor-General noted that there is a lack of accountability and transparency at local government level, particularly with respect to the way in which municipalities spend funds.[461] This is quite concerning as these two factors are deemed to be integral to achieving good governance, which places sustainable development and service delivery at the forefront of public administration.[462] Good governance is

456 See chapter 2 above.
457 Glasser and Wright 2020 *Law, Democracy and Development* 414-416.
458 See paragraph 4.8 below.
459 Schoeman and Chakwizira 2023 *Administrative Sciences* 2.
460 Auditor-General of South Africa 2023 https://mfma-2022.agsareports.co.za.
461 Auditor-General of South Africa 2023 https://mfma-2022.agsareports.co.za.
462 Thusi and Selepe 2023 *International Journal of Social Science Research and Review* 690.

essential to eradicating poverty, unemployment, and bridging and essentially eradicating social inequalities.[463]

Poor service delivery has an adverse effect on the socio-economic circumstances of local communities. Service delivery is affected by a number of factors. The Auditor-General noted a few of these in her report, including the neglect of infrastructure pertinent to the provisioning of services.[464] Municipalities rely on infrastructure to deliver services to its communities and this neglect affects the quality of services provided by municipalities. This neglect has led to the dilapidation of essential government infrastructure and this in turn affects development. The Auditor-General rightfully stated in the report that the state of the infrastructure places an unnecessary financial strain on government and has a dire impact on the environment.[465] Government is mandated to spend money to constantly refurbish such infrastructure. However, there has been little to no improvement in the upkeep of local government infrastructure.[466] Rural areas are particularly affected by poor service delivery due to the lack of financial support and development prospects. People in these areas are forced to live without access to basic services and those that do receive such services tend to bear with the substandard provision thereof.

Some of the issues experienced at local government level boil down to leadership challenges, including party politics.[467] It is very unfortunate to see how leaders place their own desires above the needs of the communities that they are meant to serve. This can be seen in clashes between various coalition partners, which then leads to instability in municipalities. This makes it difficult to hold municipalities accountable and contributes to the vicious cycle of poor governance.[468]

In the Greater Taung and Matatiele local municipalities this leadership issue is further exacerbated by the dynamic between traditional leaders and government officials. In

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463 Thusi and Selepe 2023 *International Journal of Social Science Research and Review* 690.
464 Auditor-General of South Africa 2023 https://mfma-2022.agsareports.co.za.
465 Auditor-General of South Africa 2023 https://mfma-2022.agsareports.co.za.
466 Auditor-General of South Africa 2023 https://mfma-2022.agsareports.co.za.
467 Thusi and Selepe 2023 *International Journal of Social Science Research and Review* 690.
468 Thusi and Selepe 2023 *International Journal of Social Science Research and Review* 688.

Greater Taung, conflict over land rights and servitudes has played a role in proposed development. The traditional leaders often abandon the duty to participate in development planning and then accuse the Municipality of failing to consult the leaders prior to approving decisions on development that will affect traditional communities.[469] In Matatiele, development in certain areas has stalled as traditional leaders argue that the Municipality has built houses on its land, but has failed to keep up with compensating the leaders for the use of such land. Another issue that contributes to poor service delivery is the insistence of appointing service providers, such as community business forums, who lack the required skills and expertise render services.[470] All these issues that affect local government directly contribute to the failure to deliver sustainable services to communities as per the constitutional mandate. Curbing these issues will allow for more time and resources to be directed to improving socio-economic circumstances of local communities.

4.9 Conclusion

Local governments should manage activities within its jurisdictions. It has numerous obligations, including the obligation to render or supply services to communities within its jurisdiction. Municipalities must ensure that services are provided in a manner that protects the environment and promotes social justice within local communities, in line with section 152 of the Constitution. This requires transparency and accountability in the provision of services as well as the administration of municipalities. Failure of local municipalities to meet its obligations has a negative effect on the environment and the people who the municipalities are meant to serve.

The failure of Greater Taung Local Municipality and Matatiele Local Municipality to provide waste collection and removal services to rural areas fall short of their Constitutional mandate and reflects poor implementation of their by-laws and IDPs. Local municipalities operate within the jurisdiction of district municipalities. As such,

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469 This was stated by the Vaalharts User Association during an NRF-NWO Workshop, held at Vaalharts during 12-13 June 2023.

470 Kalonda and Govender 2021 *African Journal of Public Affairs* 5 and 9; Wessels 2022 *Teaching Public Administration* 43-44 and 46.

the district municipalities of Dr Ruth Segomotsi Mompati and Alfred Nzo need to ensure that the local municipalities comply with the waste disposal strategies set at district level.

Furthermore, local government should move away from a reactive manner of governance and start proactively implementing the legal duty placed on it to improve the state of South African municipalities. Even with the plethora of frameworks available for managing and regulating resources to give effect to constitutional provisions, South Africa is still reeling with inequalities and resource mismanagement. This is due to poor implementation of policies and a lack of transparency and accountability present at all spheres of government. Unless there is an outright systemic change in governance practices, poor service delivery will continue to haunt South African communities and hamper the achievement of social justice, particularly in poor communities.

The following chapter concludes this study and make recommendations for the improvement of solid waste regulation.

Chapter 5 Conclusion and recommendations

The aim of this study was to analyse the regulation of waste disposal at the local government level and to determine how such regulation contributes to the WEF nexus. In doing so, the study set the following objectives:

- To determine what solid waste is and to provide background on the disposal of solid waste at the local government level and its impact on the environment;
- To determine how regulation of waste may contribute to the WEF nexus in South Africa;
- To determine how South African legislation regulates or controls the disposal of domestic waste both at a municipal and communal level; and
- To provide recommendations on how to improve the regulation of the disposal of solid waste at the local government level in rural areas to contribute to the WEF nexus.

5.1 Solid waste disposal

Solid waste is any substance that is no longer useful and cannot be reused or recycled before any due process. It should be disposed in a proper manner.[471] Solid waste, at local government level, is typically categorised as household waste.[472] Such waste is divided into general and hazardous waste, depending on its chemical composition.[473] This study focused on general waste (household waste), as it is the most common type of waste that poses challenges in rural communities. This waste includes among others things food waste, food packaging, plastic waste and disposable nappies.[474] The rural communities of Greater Taung Local Municipality and Matatiele Local Municipality are, for example, facing a surge in disposable nappies waste, which is not easily degradable.[475] This is due to the materials used to produce this product, such as

471 See paragraph 2.2 above.
472 See paragraph 2.2 above.
473 See paragraph 2.3 above.
474 See paragraph 2.3 above.
475 See paragraph 2.4 above.

polyester, polyethylene and polypropylene.[476] This waste is disposed improperly in open fields, amongst trees, wetlands, and water canals, where it accumulates due to its poor degradability.[477] It is, however, not only in the rural areas that illegal dumping occurs, South Africa is experiencing an unprecedented surge in illegal dumping.[478] Illegal dumping and littering are endemic in urban areas around the world, even though systems and human attitudes have been put in place to address this issue.[479]

Improper waste disposal practices have a direct effect on the environment and human health.[480] Some waste releases toxins into the environment when it degrades, including methane gas.[481] This results in air pollution, water pollution, and land pollution. Improper disposal of waste can contaminate groundwater and surface water bodies, leading to the pollution of drinking water sources and the degradation of aquatic ecosystems.[482] It can contaminate soil, affecting the quality of agricultural lands and potentially affecting food production.[483] Pollution from the improper disposal of solid waste effects human health and well-being as it gives rise to flies, mosquitoes and rodents, leading outbreaks of vector-borne diseases.[484] Regulations on waste disposal help to address these issues by setting standards for the treatment and disposal of waste, particularly hazardous waste.[485]

South Africa is water, energy and food insecure, which is further exacerbated by poor waste management. In terms of the impact of waste on water, it was found that improper disposal of waste adds to the water woes in South Africa.[486] Waste that is improperly disposed of causes contamination of water bodies near waste dumps.[487] The contamination of water resources renders the water unfit for use, particularly in rural areas

476 See paragraph 2.4 above.
477 See paragraph 2.4 above.
478 See paragraph 2.4 above.
479 See paragraph 2.3.2 above.
480 See paragraph 2.2.1 and 2.6 above.
481 See paragraph 2.2.2, 2.5.3 and 3.5.1 above.
482 See paragraph 2.5.1 and 3.5.3 above.
483 See paragraph 2.5.3 above.
484 See paragraph 2.5.1 above.
485 See paragraph 3.5.2 above.
486 See paragraph 2.5.1 above.
487 See paragraph 2.5.1 above.

that depend on water from streams and springs.[488] This creates a number of health concerns as a majority of the people in rural areas also depend on this water for cooking and drinking.[489] Better management and regulation of waste can control and aid in the reduction of water pollution caused by waste disposal sites such as landfills and wastewater treatment plants.[490] Proper waste management and the prevention of pollution of water resources ensures the availability of clean water for domestic, industrial, and agricultural applications.[491] It also promotes sustainable management of water resources and the production of food and energy.[492]

With regard to the impact of waste on energy production, it was found that during 2017, South Africa generated 75% of hazardous waste from the electricity and petroleum sectors.[493] This waste included solid waste, gaseous waste, fly ash and liquid waste.[494] Additionally, the energy sector contributed to 80% of the total greenhouse gas emissions in South Africa.[495] The regulation of waste can promote the use of waste as a source of energy through the decomposition of degradable solid waste.[496] The recovery of valuable resources such as methane gas from waste potential reduces the dependency on fossil fuels and improves energy security.[497] This energy can be used to generate electricity, which can then be used to produce food and treat water at WTWs.[498]

In relation to the effect of waste on food production, the disposal of waste on land leads to the release of toxic chemicals onto the land and contaminates the soil on which agricultural production of food depends.[499] This degradation and contamination affects the quality of the soil, degrades the nutrients that are vital to the soil structure and the ability of the land to hold on to water, which can also lead to flooding.[500] The release of toxic

488 See paragraph 2.5.1 above.
489 See paragraph 2.5.1 above.
490 See paragraph 2.5.1 above.
491 See paragraph 2.5.1 above.
492 See paragraph 2.5.1 above.
493 See paragraph 2.5.2 above.
494 See paragraph 2.5.2 above.
495 See paragraph 2.5.2 above.
496 See paragraph 2.5.2 and 2.5.4 above.
497 See paragraph 2.5.4 above.
498 See paragraph 2.5.4 above.
499 See paragraph 2.5.3 above.
500 See paragraph 2.5.3 above.

chemicals also causes air pollution, which may result in respiratory diseases.[501] The regulation of waste in the form of the reduction, recycling, and recovery of organic waste can help to promote environmentally friendly farming methods.[502] This promotes the decomposition of organic waste or degradable solid waste to form compost, minimising the demand for synthetic fertilizers.[503] The soil structure will improve to promote crop growth.

Water, energy and food sources are largely dependent on each other and poor management of these resources negatively affects the security of all three of the resources.[504] However, the use regulation of waste allows for the minimisation of waste, through waste beneficiation.[505] This occurs when waste is treated and the raw materials of the waste is used to produce a new product of economic value.[506] This will also create jobs for people in rural communities, thereby reducing the high unemployment rate in South Africa.[507] This requires buy-in from all spheres of government, private sector, and communities.

5.2 Regulation of waste disposal

The Constitution, the NEMA, NEMWA, NWA, norms and standards, the *Traditional and Khoi-San Leadership Act*, *Municipal Systems Act*, by-laws and IDPs were analysed to evaluate whether the Greater Taung Local Municipality and Matatiele Local Municipality comply with the legal framework and regulations relating to waste management.[508] The legislation places a duty on municipalities to provide waste management services to all communities within their jurisdiction. Municipalities are also required to adhere to the provisions of the NWMS and to adopt and implement IWMPs that guide their IDPs and by-laws in respect to waste management.[509] The National Domestic Waste Collection Standards require of municipalities to apply uniformity when providing waste

501 See paragraph 2.5.3 above.
502 See paragraph 2.5.4 above.
503 See paragraph 2.5.4 above.
504 See paragraph 2.5.4 above.
505 See paragraph 2.5.4 above.
506 See paragraph 2.5.4 above.
507 See paragraph 2.5.4 above.
508 See Chapter 3 and 4 above.
509 See Chapter 3 and 4 above.

removal services and require them to provide this service on a regular basis.[510] It provides for different waste removal service levels that can be applied in various communities.[511] This includes on-site disposal, central collection points, kerbside collection, and communal collection.[512] In low-income households that cannot afford to pay for waste removal services, the Policy on the Provision of Basic Refuse Removal Services to Indigent Households provides for municipalities to adopt indigent policies for refuse removal to alleviate the financial burden on these households.[513] However, the low number of households that receive waste removal services in the rural areas of the above two Municipalities is very concerning[514] and shows a lack of compliance to legal frameworks aimed at the reduction of waste and avoidance of improper waste disposal practices.[515] This is evident in the limited budget that is set aside for refuse removal.[516]

It may be possible to establish smaller communal waste sites in rural areas. However, these waste sites will still have to comply with the directions for smaller and communal waste sites as well as comply with the norms and standards for landfills. The municipality will, depending on the scale of the waste disposal site, also have to apply for an environmental authorisation and undertake a basic environmental assessment.[517] There are further economic opportunities for the separation of waste that the communities could utilise.

5.3 Findings

Based on the above, the study reaches following findings:

- Solid waste disposal is a huge challenge in South Africa.
- There is insufficient provision of waste disposal services in the rural areas, despite the obligation on local government to provide these services.

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510 See paragraph 3.6.4 above.
511 See paragraph 3.6.4 above.
512 See paragraph 3.6.4 above.
513 See paragraph 2.4 and 3.6.4 above.
514 See paragraph 4.5.5, 5.6.4 and 4.7 above.
515 See paragraph 4.5 and 4.6 above.
516 See paragraph 4.5.5, 4.6.4 and 4.7 above.
517 See paragraph 3.5.2, 3.5.4 and 3.5.5 above.

- Illegal dumping occurs as a result of this neglect, and it contaminates, among other things the water and soil, and affects the health and well-being of the community.
- There are still challenges associated with proper solid waste management, such as inadequate waste collection infrastructure, limited public awareness and participation in waste management, inadequate planning, insufficient personnel and insufficient funding for waste management programmes, including equipment.
- The legal framework provides for the collection of waste, disposal of waste and the establishment of smaller or communal waste facilities in the rural areas.
- The municipalities and community members may be unaware that improper waste disposal has an effect on water, energy and food security.
- The municipalities do not enforce their own by-laws.
- Municipalities need to include waste management in the rural areas as in their IDPs and should budget for the extension of waste management services to the more outlying rural areas.
- The WEF nexus may assist municipalities and community members when they make decisions on the trade-offs between the use of water, energy and food.

5.4 Recommendations

Based on the findings above, the following recommendations are made.

5.4.1 Addressing the illegal dumping of solid waste

Local municipalities should include waste management services in the rural areas as a priority in their IDPs and should accordingly budget for the extension of waste disposal services to the community. The municipalities should then provide waste disposal facilities according to the NWMS and National Domestic Waste Collection Standards to curb the improper disposal of solid waste. Traditional councils can establish partnerships with municipalities to create waste facilities in their areas in terms of the *Traditional and Khoi-San Leadership Act.* The establishment of these facilities must comply with the provisions, norms and standards of the NEMWA, as well as with the by-laws of the relevant municipality. The municipalities should enforce their own waste management by-laws.

5.4.2 Improvement of community awareness and education

The municipalities should raise awareness of the effect of illegal disposal of waste and littering, for example in relation to disposable nappies. Additionally, the municipalities could work together with other stakeholders to promote the use of reusable nappies.[518] Municipalities could also enter into service agreements with the traditional councils to provide waste removal services, on their behalf, in areas that fall with the jurisdiction of traditional authorities.

Communities should be made aware of the environmental consequences of illegal disposal of waste, not only for themselves but in terms of water quality, soil quality as well as their and their livestock's health and well-being, This awareness can be raised at schools, shopping centres, local radios and newspapers, community meetings, pamphlets, printing on documents, such as electricity bills, salary advices, envelopes (for example, report card, bank statements and payment advice envelopes) and community awareness drives. Traditional leaders and councils can play a major role in this regard.

5.4.3 Solid waste storage and separation

Proper solid waste storage and separation at the source is an important step in good solid waste management. It would effectively improve solid waste management and reduce waste, promote recycling and reuse, and minimise the environmental and health impacts of waste disposal. Thus, it reduces the pollution of air, water, and land. In order to do so, education and awareness training as stated above, should take place.

5.4.4 Proper and sustainable landfill management

Once the waste disposal facility is up and running in a rural community it should be properly controlled and managed as set out in the NEMWA and norms and standards. Landfill sites should be carefully selected and prepared with containment barriers to collect leachate through drainage pipes and prevent contamination the soil and

[518] Masipa 2023 https://www.snl24.com.

groundwater sources. The specifications of landfill licences can also be set to determine the amount of waste that may be disposed at landfills on a daily basis, based on its class, capacity and projected lifespan, as well as the amount of waste that the landfill can process each day. The landfills should also develop a risk mitigation plan to deal with any accidental pollution and measures to promptly remedy the pollution.

5.4.5 Water-energy food nexus

NEMWA and the bylaws should provide for the consideration of the WEF nexus, ensuring that in decision making in relation to waste management, the trade-offs between water, energy and food should be considered to the benefit of the community members. Only if water, energy and food production is considered in when decision-making is undertaken, then only can the waste management legislation contribute to the WEF nexus.

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