THE NATIONAL ORGANIC WASTE COMPOSTING STRATEGY

Compost is **BLACK GOLD** to soil *"Dirt, the movie"*

FINAL Strategy Report

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

April 2013

FOREWORD AND DISCLAIMER

This project is to strategise the potential of composting as a method to beneficiate organic waste, to help divert organics from landfill disposal.

As the Terms of Reference clearly refers to a National Organic Waste Composting Strategy, the focus of this report is on composting only.

With respect to technologies, the Project team is aware that many other technologies and opportunities are available and may be active in the industry, other than composting, to treat organic waste and to obtain beneficial use of treating (diverting) organic waste.

The status quo (refer to the final Status Quo Report, December 2012) is a high-level, literature-based Status Quo Report that serves to identify and assess the baseline information available on organic waste in South Africa, including that from stakeholder engagement and inputs thereof. The Status Quo Report was dependent on the quality of information readily available by those who beneficiate this waste source and public bodies, together with past or existing waste quantum analysis projects.

The Project Team does recognise that technology is developing at an increasing rate, such that more opportunities are arising to improve efficiencies and viability of getting beneficial use from organic waste treatment.

Ultimately, each “Implementing Authority” must evaluate suitable, viable, sustainable, implementable and affordable composting opportunities. This Strategy approach must feed into this vision.

The Project Management Team responsible for the preparation and review of this final report consisted of the following members:

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EXECUTIVE SUMMARY

The overall aim for this project is to ensure that organic waste generated in South Africa is diverted from landfill sites (where viable) for composting through integrated and sustainable waste management planning.

The development of the National Waste Management Strategy (2011) was an important milestone in facilitating the implementation of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The National Waste Management Strategy promotes composting as one of the approaches towards achieving the objectives of the waste management hierarchy, amongst other measures. The National Organic Waste Composting Strategy (NOWCS) was initiated by the Department of Environmental Affairs (DEA) with the aim to develop and promote the diversion of organic waste from landfill sites for soil beneficiation and other uses through composting. The DEA appointed specialist consultants, Jeffares & Green (Pty) Ltd, in July 2012 to assist in the development of a NOWCS.

Composting is a proven method of organic waste minimisation, and various local and international practices have demonstrated the effectiveness of composting organic waste which in turn reduces the amount of waste requiring landfill and the generation of landfill gas. Due to the high percentage contribution of green waste to the total general waste generated in South Africa (i.e. up to 24% by mass[1]), the potential for composting in South Africa is significant and thus was investigated as a diversion alternative.

The NOWCS is expected to facilitate and guide the development of legislation, norms, standards, as well as South African Certification Standards specifically for organic products, including organic compost and organic fertilizer.

Methodology

The NOWCS project followed a four stage approach incorporating a Literature Review, Status Quo Analysis, Stakeholder Engagement Process and the development of the Strategy. The Project was divided into the following phases and was conducted during the following months:

[1] Department of Environmental Affairs, 2012

Table 1: Summary of Project Phases and Duration

Phase	Description	Duration
Phase 1: Literature Review	A Literature Review Report was compiled and key information from the report was summarised and carried forward as an appendix attached to the Status Quo Report.	**August 2012 – September 2012**
Phase 2: Status Quo / Situational Analysis	The Status Quo Report presented the current organic waste management systems that are in place in South Africa with an overview and examples of international practices being discussed.	**August 2012 – December 2012**
Phase 3: Stakeholder Engagement	The stakeholder engagement process (meetings, consultation, workshops, comments etc.) undertaken for Phases 2 and 4 are documented in the separate internal Stakeholder Engagement Reports.	**August 2012 – March 2013**
Phase 4: Development of the NOWCS	The Strategy Report is the final phase of the project and has been compiled in response to the final Status Quo Report and internal specialist engagements and workshops undertaken.	**November 2012 – March 2013**
Supplement to Phase 4: Development of a Guideline Document for undertaking composting	A Guideline Document was developed as part of the project to assist Municipalities and/ or private/ non-governmental organisations to consider key elements to undertaking composting prior to constructing such a facility.	**August 2012 – March 2013**

The key findings documented in the Status Quo Report (December 2012), clearly showed that strategies and specific actions are needed to ensure that an acceptable level of diversion of organic waste from landfill disposal is achieved, in particular, composting. The findings from the Status Quo phase provided the necessary basis on which to build the strategy as this phase assisted in identifying the gaps in information, as well as the challenges/ issues with regards to organic waste composting within South Africa.

As part of developing the NOWCS, an internal two-day focus group review workshop was held with selected key stakeholders / role-players from government and to a lesser extent academic sectors with the aim of initiating focussed discussions with key governmental officials and composting researchers

to find consensus on the key issues regarding the Strategy, prior to making the draft report available for stakeholder comment. The Draft NOWCS Report as well as the Composting Guideline document was made available for a 30 day public comment period, and three facilitated workshops were held for stakeholders in Gauteng, Western Cape and KwaZulu-Natal.

Goals, objectives and actions

This strategy assists in providing a direction and clear, structured planning towards a common goal *viz.* to ensure (where viable) that organic waste generated within South Africa is diverted from landfill sites.

A goal is defined as an observable and measurable end result having one or more objectives to be achieved within a more or less fixed timeframe[2].

An Action Plan (refer to **Appendix A**) has been developed based on the gaps, with timeframes, roles and responsibilities as well as priorities being assigned by DEA to each item.

Five key goals were derived from the gaps that were identified during Status Quo phase, which include:

Goal 1: Review legal and regulatory requirements

Goal 2: Understand and facilitate feedstock sources and opportunities

Goal 3: Provide the necessary support structure and functions to implement composting

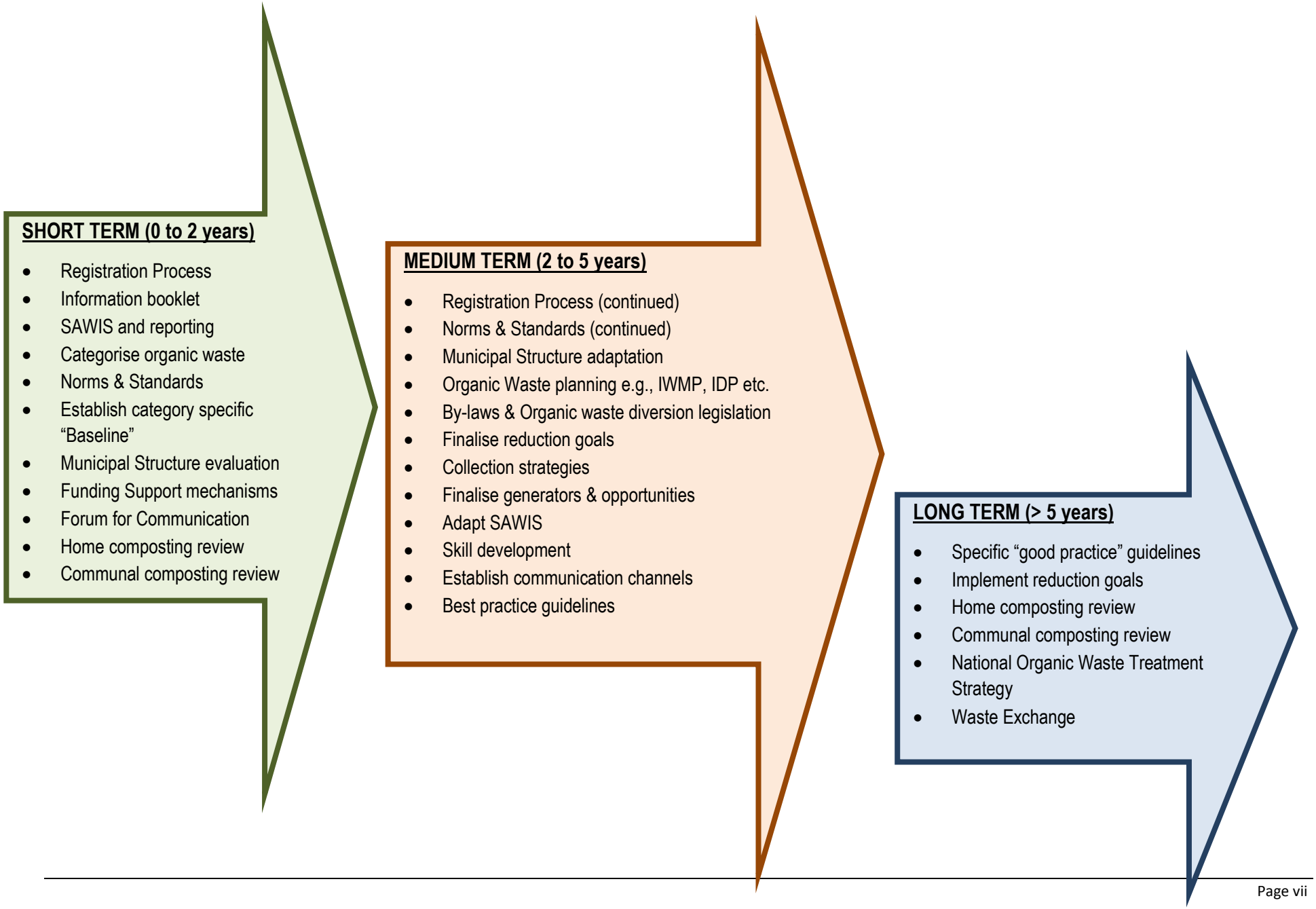
Goal 4: Undertake education, skills transfer and awareness

Goal 5: Incorporate composting into municipal planning, responsibilities and create roles for the private sector

For each goal, objectives have been identified within which indicators and key actions / items have been assigned to realise the goal. Instruments to achieving each objective as well as limitations have been tabulated. Refer to **Chapter 2** for more detail.

Based on these goals, a summary of the NOWCS is visually portrayed (below) which highlights the key actions and responsibilities for the various government departments to action for the next five years and beyond.

[2] http://www.businessdictionary.com/definition/goal.html (accessed 19 March 2013)


SHORT TERM (0 to 2 years)
Registration Process
Information booklet
SAWIS and reporting
Categorise organic waste
Norms & Standards
Establish category specific "Baseline"
Municipal Structure evaluation
Funding Support mechanisms
Forum for Communication
Home composting review
Communal composting review
MEDIUM TERM (2 to 5 years)
Registration Process (continued)
Norms & Standards (continued)
Municipal Structure adaptation
Organic Waste planning e.g., IWMP, IDP etc.
By-laws & Organic waste diversion legislation
Finalise reduction goals
Collection strategies
Finalise generators & opportunities
Adapt SAWIS
Skill development
Establish communication channels
Best practice guidelines
LONG TERM (> 5 years)
Specific "good practice" guidelines
Implement reduction goals
Home composting review
Communal composting review
National Organic Waste Treatment Strategy
Waste Exchange

Conclusion

This Strategy focusses on composting as the organic waste treatment option available to try and achieve meaningful and sustainable diversion of organic waste from landfill disposal, via diversion goals and clear plans of action that can be implemented, measured and monitored going forward. .

It is anticipated that the implementation of the Strategy will substantially reduce the amount of organic waste going to landfill sites and thus resulting in saving landfill airspace. This will translate into reduction in environmental pollution associated with poor landfill operations, amongst other benefits. The success of the Strategy is dependent upon commitment by various role players such as local municipalities, provincial and national governments, as well as the private sectors and NGOs to meaningfully take their responsibilities and making adequate resources available towards diverting organic waste from landfill sites.

The Strategy will be updated and amended as the short, medium and long term goals and action plans are carried out. The first review will occur within five years of the date of the approval of the Strategy and thereafter when the need arises.

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ABBREVIATIONS

AEL	Air Emissions Licence
C:N	Carbon (C) and Nitrogen (N) ratio
COGTA	Department of Co-operative Governance and Traditional Affairs
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism (now DEA)
DWA	Department of Water Affairs (Previously DWAF)
EPWP	Expanded Public Works Programme
IDP	Integrated Development Plan
IWM	Integrated Waste Management
IWMP	Integrated Waste Management Plan
IWMSA	Institute of Waste Management of South Africa
MFMA	Municipal Finance Management Act, No. 56 of 2003
MSA	Municipal Systems Act
NEMA	National Environmental Management Act, No. 107 of 1998 (as amended)
NEM: AQA	National Environmental Management Air Quality Act, No. 39 of 2004
NEM:WA	National Environmental Management: Waste Act, No. 59 of 2008
NOWCS	National Organic Waste Composting Strategy (this project)
NWIBR	National Waste Information Baseline Report
NWMS	National Waste Management Strategy, 2011
SALGA	South African Local Government Association
SAWIC	South African Waste Information Centre
SAWIS	South African Waste Information System
UNISA	University of South Africa
WIS	Waste Information System
WMO	Waste Management Officer

DEFINITION OF TERMS

	Definition	Act / Reference
Air Pollution	Any change in the composition of the air caused by smoke, soot, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, aerosols and odorous substances.	**National Environmental Management: Air Quality Act (Act No 39. Of 2004)**
Animal Manure	A by-product of animal excreta which is bio-degradable in nature and could further be used for fertilisation purposes.	**National Environmental Management: Waste Act (Act No. 59 of 2008) : GN 718 19(1)**
Biosolids	Nutrient rich organic materials (solid/ semi-solid) obtained from wastewater solids (sewage sludge) that have been stabilised through processing and which is often used as fertilizer.	**Adapted from: http://dictionary.reference.com/browse/biosolids**
By-Product	A substance that is produced as part of a process that is primarily intended to produce another substance or product and that has the characteristics of an equivalent virgin product or material.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Compost	A stabilised, homogenous, fully decomposed substance of animal or plant origin to which no plant nutrients have been added and that is free of substances or elements that could be harmful to man, animal, plant or the environment.	**Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947) : GNR 732 of 10 September 2012 - Regulations Regarding Fertilizers**
Compostable Organic Waste	A carbon-based material of animal or plant origin (that is defined as waste in terms of the South African gazetted National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008:) that naturally	**National Organic Waste Composting Strategy, 2013**

	Definition	Act / Reference
	enhances fertility of soil through a natural degradation process but excludes human made organic chemicals and naturally occurring organic chemicals which have been refined or concentrated by human activity. *"Organic Waste" will generally comprise materials that can be accepted for disposal at a licensed municipal general waste landfill facility (i.e. excludes infectious, poisonous, health-care and hazardous organic wastes)".*	
Composting	Controlled biological process in which organic materials are broken down by micro-organisms. See note above for "Compost".	**Guide to Best Practice for Organics Recovery (Sustainability Victoria 2009)**
Domestic Waste	Waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Fertilizer	Any substance which is intended or offered to be used for improving or maintaining the growth of plants or the productivity of the soil.	**Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947): GNR 732 - Regulations Regarding Fertilizers**
Garden Waste	NOTE: The NEM: Waste Act does not list a definition for "Garden Waste". For the purposes of this report, "garden waste" is meant as organic biodegradable waste material generated from the likes of a typical garden. **Reference to "Green Waste" in this report**	**None**

	Definition	Act / Reference
	typically refers to "Garden Waste".	
General Waste	Waste that does not pose an immediate hazard or threat to health or to the environment, and includes— a) domestic waste; b) building and demolition waste; c) business waste: and d) Inert waste.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Green Waste	**NOTE: that there is no recognised common definition for "Green Waste". Reference to "Green Waste" in this report typically refers to "Garden Waste".**	**None**
Hazardous Waste	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Lagoons	The containment of waste in excavations and includes evaporation dams, earth cells sewage treatment facilities and sludge farms.	**National Environmental Management: Waste Act (Act No. 59 of 2008) : GN 718 19(1):**
Municipal Compost	The disinfected and stabilised organic fertilizer manufactured by the controlled decomposition of sorted and milled urban waste including fermentable industrial and commercial waste.	**Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947): GNR 732 - Regulations Regarding Fertilizers**
Municipal Waste	Means any municipal compost that does not meet the requirements for compost given in these regulations: on the understanding that such waste must meet the minimum requirements for municipal waste as set out	**Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947):**

	Definition	Act / Reference
	in the regulations for the registration of fertilizers.	**GNR 732 - Regulations Regarding Fertilizers**
Offensive Odour	Any smell which is considered to be malodorous or a nuisance to a reasonable person.	**National Environmental Management: Air Quality Act (Act No 39. Of 2004)**
Organic waste	"Organic Waste" is categorised as, "garden waste, food waste and wood waste." PLEASE NOTE: For the purposes of this project, waste of biological origin which can be broken down, in a reasonable amount of time, into its base compounds by micro-organisms and other living things and/or by other forms of treatment, regardless of what those compounds may be, have also been considered as "organic waste" and are referenced in this study.	**National Environmental Management: Waste Act (Act No. 59 of 2008) : GNR 625 - National Waste Information Regulations**
Recovery	The controlled extraction of a material or the retrieval of energy from waste to produce a product.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Recycle	A process where waste is reclaimed for further use, which process involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Re-use	To utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Storage	The accumulation of waste in a manner that does not constitute treatment or disposal of that waste.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**

	Definition	Act / Reference
Treatment	Any method, technique or process that is designed to: a) change the physical, biological or chemical character or composition of a waste; or b) remove, separate, concentrate or recover a hazardous or toxic component of a waste; or c) destroy or reduce the toxicity of a waste, in order to minimise the impact of the waste on the environment prior to further use or disposal.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Waste	Any substance, whether or not that substance can be reduced, re-used, recycled and recovered: a) that is surplus, unwanted, rejected, discarded, abandoned or disposed of; b) which the generator has no further use of for the purposes of production; c) that must be treated or disposed of; or d) that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— i. a by-product is not considered waste; and ii. any portion of waste, once re-used, recycled and recovered, ceases to be waste.	**National Environmental Management: Waste Act (Act No. 59 of 2008)**
Wastewater sludge	Material removed from wastewater treatment plants designed to treat predominately domestic wastewater and includes the following products: • Raw or primary sludge from a primary clarifier, • Primary sludge from an elutriation process,	**Guidelines for the Utilisation and Disposal of Wastewater Sludge: Volume 1**

	Definition	Act / Reference
	• Anaerobically digested sludge, both heated and cold digestion, • Oxidation pond sludge, • Septic tank sludge and other sludge from on-site sanitation units, • Surplus or waste activated sludge, • Humus sludge, • Pasteurised sludge, • Heat-treated sludge, • Lime-stabilised sludge, and • Composted sludge.	

1 INTRODUCTION AND OVERVIEW

1.1 PROJECT AIM

Within South Africa huge quantities of organic waste is being disposed of at our landfill sites, greatly reducing the available airspace. This further contributes to greenhouse gas emissions, as well as numerous other negative environmental impacts.

The overall **aim** for this project (Strategy) is to ensure (where viable) that organic waste generated within South Africa is diverted from landfill sites for composting through integrated and sustainable waste management planning.

Diversion of organic waste from landfill and the treatment thereof has the following benefits;

- It reduces dependence on landfilling waste, as well as the associated risk of greenhouse gas emissions.
- It reduces the generation of methane and other gases on landfill sites which has a two-fold positive impact of reduced air quality impacts on surrounding communities, and decreases the carbon footprint.
- Composting is an activity that converts a waste into a beneficial product and promotes job creation.
- Recovery and processing of organics can produce beneficial soil amendments (such as composts and fertilizers) for improving soil profiles (returning nutrients to the soil), increasing soil organic carbon levels, preventing soil erosion and reducing water use for growing plants and crops.
- Some recovery technologies provide alternative options that also allow the generation of electricity, production of heat for industrial purposes and the generation of other fuels for secondary energy production[3].

[3] Adapted from Guide to Best Practice for Organics Recovery (Sustainability Victoria 2009)

1.2 VISION OF THE STRATEGY

The development of the National Waste Management Strategy (2011) was an important milestone in facilitating the implementation of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008). The National Waste Management Strategy promotes composting as one of the approaches towards achieving the objectives of the waste management hierarchy, amongst other measures. This National Organic Waste Composting Strategy (NOWCS) was initiated by the Department of Environmental Affairs (DEA) with the aim to develop and promote the diversion of organic waste from landfill sites for soil beneficiation and other uses through composting[4].

Composting is one of the proven methods of organic waste minimisation, and various local and international practices demonstrate the effectiveness of composting organic waste which in turn reduces the amount of waste requiring landfill and the generation of landfill gas. Due to the high percentage contribution of green waste generated in South Africa (i.e. up to 24% by mass[5]), the potential for composting in South Africa is significant and thus is being investigated as a diversion alternative. Composting can also be accomplished through fairly simple and cost efficient technologies, and can produce positive, sustainable environmental outcomes, i.e. a soil conditioner / fertiliser.

The "**driver**" of this Strategy, is current legislation (e.g. NEM: WA) demanding diversion of certain waste types from landfill together with profit-making opportunities.

Box 1 lists alternative technologies where composting could form a part of the treatment process.

Ultimately, this Strategy and associated Guideline document aims to provide a support tool and insight for public and private bodies to use when identifying and evaluating composting opportunities.

Box 1: Alternative Technologies

Technology
Open windrow composting
Controlled environment open composting
In-vessel composting
Anaerobic digestion (AD)
Anaerobic fermentation
Mechanical biological processing
Biological mechanical processing

Excerpt from NOWCS Guideline Document for Composting, 2013 – Table 15

[4] Department of Environmental Affairs (DEA) Terms of Reference (February 2012)

[5] Department of Environmental Affairs, 2012

1.3 SCOPE OF WORK & METHODOLOGY[6]

The DEA appointed specialist consultants, Jeffares & Green (Pty) Ltd, in July 2012 to assist in the development of a National Organic Waste Composting Strategy.

This project is to strategise the potential of composting as a method to beneficiate organic waste, to help divert organics from landfill disposal.

As the Terms of Reference clearly refers to a National Organic Composting Strategy, the focus of this report is on composting only.

The Project was divided into the following phases:

Phase 1: Literature Review

A Literature Review Report was compiled and key information from the report was summarised and carried forward as an appendix attached to the Status Quo Report.

The literature review provides, *inter alia*, a comprehensive list of abbreviations and definitions, a brief summary of the more commonly used methods of composting that are employed nationally and internationally, an overview of international composting trends, a summary of relevant national and international legislative and regulatory frameworks and a detailed reference summary.

Phase 2: Status Quo / Situational Analysis

The final Status Quo Report presents the current organic waste management systems that are in place in South Africa with an overview and examples of international practices being discussed. The report was made available for Stakeholder comment prior to finalisation and a copy of the final Status Quo report was made available online.

Phase 3: Stakeholder Engagement

Stakeholder engagement and feedback obtained was summarised in the Status Quo Report as well as in Comments and Response Report.

[6] This Strategy report should be read in conjunction with the Final Status Quo Report (December 2012).

Phase 4: Development of the NOWCS

This Report (Strategy Report) is the final phase of the project. The Strategy Report is in response to the final Status Quo Report and internal specialist engagements and workshops.

Supplement to Phase 4: Development of a Guideline Document for undertaking composting

Arising from stakeholder engagement, coupled with discussions with DEA, the need for general information regarding the establishment of a composting facility was also identified as a critical tool that would further assist with diverting organic waste from landfill.

Accordingly, a Guideline Document has also been developed as part of this project to assist Municipalities and / or private / non-governmental organisations to consider key elements to undertake composting prior to constructing such a facility.

1.4 OVERALL APPROACH FOR NOWCS

The overall approach for this NOWCS is to drive viable and sustainable change, in response to legislation change, promote responsible waste handling and to enhance the beneficial use of organics back into the system (cradle to cradle). **Figure 1** shows the NOWCS process, detailing the steps taken throughout the project, and highlights the identified goals.

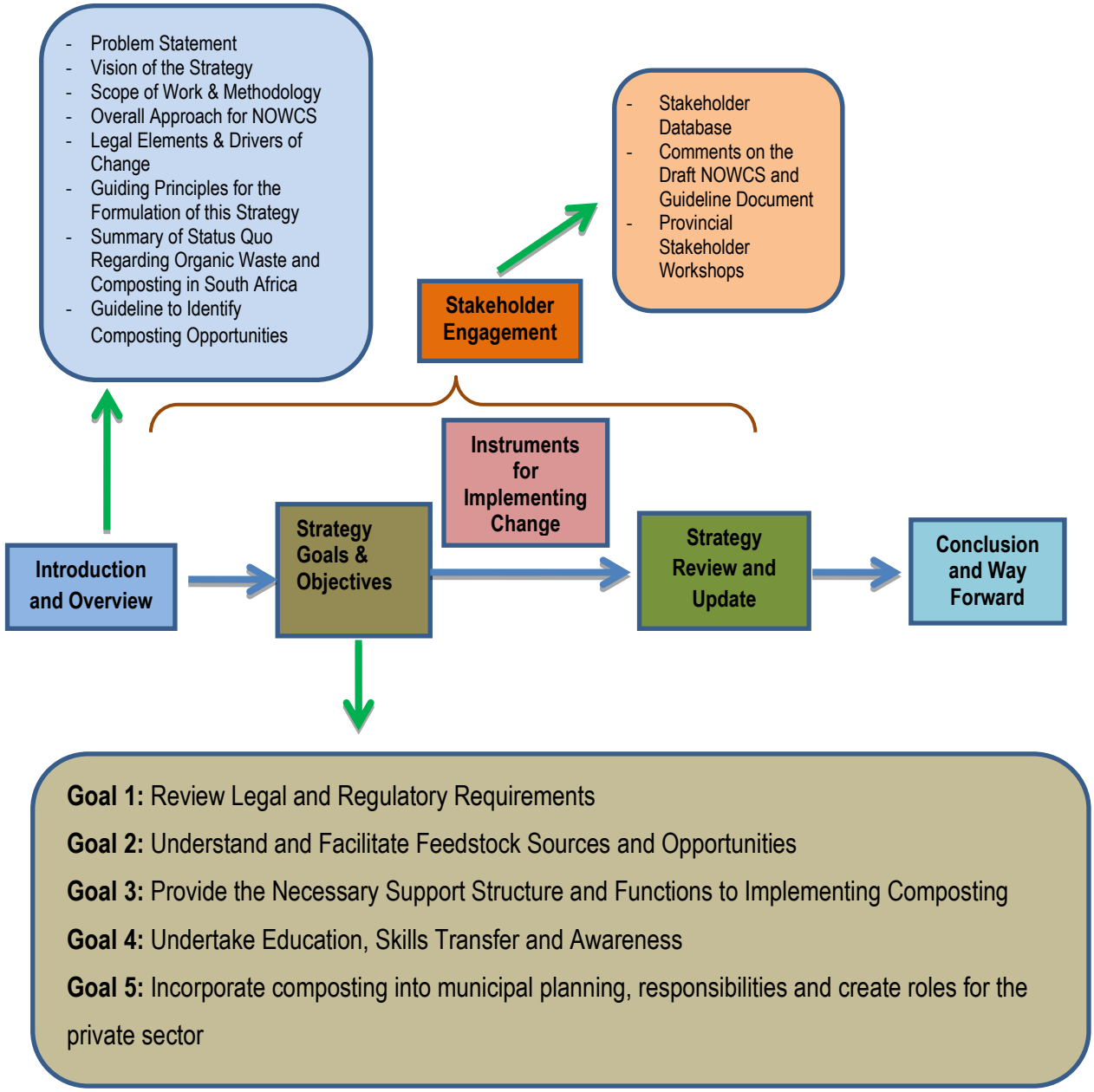


Figure 1: Strategy Process Flow Chart

The process to date has proposed the following 5 goals in order to achieve the broader aims of the NOWCS:

Goal 1: Review Legal and Regulatory Requirements

This goal is about identifying legislation and regulations that require modification in order to facilitate the legal registration of composting activities and facilities, thereby overcoming the current challenges with composting in the current South African legal framework.

Goal 2: Understand and Facilitate Feedstock Sources and Opportunities

This goal is about the monitoring of organic waste generation, disposal, and treatment, as well as identifying both feedstock and product market opportunities.

Recording of detailed organic waste categories or types is required in order to understand where feedstock is available, and where compost is produced and/or required. Once an understanding has been achieved, opportunities can be identified and facilitation between feedstock generators and compost producers can take place.

Goal 3: Provide the Necessary Support Structure and Functions to Implement Composting

This goal is about identifying enabling mechanisms necessary for successfully implementing this Strategy and ultimately enabling further organic waste diversion. Consideration is given to the necessary support structures and functions that would assist in the creation of opportunities, promoted and facilitated by legal enabling frameworks, and financial support and incentivisation. Governmental synergies with the private sector and regionalisation have also been identified as necessary aspects requiring consideration.

Goal 4: Undertake Education, Skills Transfer and Awareness

This goal is about addressing the limitations set out in the new National Waste Regulations (GNR 625 & 613-615 of 2012). Public awareness and education campaigns and programmes regarding certain waste types is required in order to assist with not only separation at source, but diversion of organic waste from landfill, by means of potential home composting in urban / residential areas, as well as possible communal composting within the informal, lower-income areas.

Goal 5: Incorporate composting into municipal planning, responsibilities and create roles for the private sector

This goal is about adapting the existing municipal structures to suit roles and responsibilities, including the use of Integrated Waste Management Plans (IWMP's) and Integrated Development Plans (IDP's) and identification of private involvement, where necessary. WMO will play a key role in planning and achieving the objectives of NOWCS.

1.5 LEGAL ELEMENTS & DRIVERS OF CHANGE

The following is a list of Acts and Regulations that apply to composting practices:

- The Regulations promulgated in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA)[7] and the National Environmental Management Waste Act, (No. 59 of 2008) (NEM: WA)[8] require that an Environmental Authorisation (EA) and a Waste Management License (WML) respectively be obtained for constructing a composting facility, as well as for undertaking actual composting activities and processes. The Waste Act also focuses on cradle-to-cradle principles and gives effect to the NWMS.

- Consumer Protection Act (Act 68 of 2008) deals with extended producer responsibility and refers to Industry Waste Management Plans. This Act deals with waste and general waste which has relevance to composting of organic waste. Industry Waste Management Plans put responsibility on waste generators to take cognisance of the material, so that this can be "brought back into the system, i.e. cradle-to-cradle" (in this case, composting of such material).

- National Domestic Waste Collection Standards (Government Gazette, 21 January 2011) in response to the Waste Act gives principle effect to collection of domestic waste, supports source separation, structure of a collection system, etc.

- National Water Act (Act 36 of 1998) relates to the pollution of a water source and covers aspects such as abstraction, discharge, etc. This Act needs to be considered as part of the site location and any possible water usage as part of the composting process. Composting operations could generate pollutants that need to be managed and prevent pollution of relevant water sources.

- The National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM: AQA) requires that if any composting activities include the processing of more than 1 ton of animal matter per day, then an Atmospheric Emissions License (AEL) must be applied for.

[7] R544, R545 and R546, 2010 as amended

[8] Government Notice 718, July 2009

- The Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 36 of 1947) compels any facility or operation selling compost to be registered with the Department of Agricultural Technical Services. Furthermore, it provides that wastewater or sewage sludge can be used as an input material into compost, however, the sludge must meet the requirements for total metal and inorganic content.

- The Water Research Commission guidelines, namely, the "*Guidelines for Utilisation and Disposal of Wastewater Sludge*"[9] specify quality requirements of using sewage sludge as feedstock material for manufacturing compost. The beneficial use of sludge requires that various licenses and / or approvals / authorisations are obtained in terms of the National Water Act (No. 36 of 1998) (NWA), NEMA, and NEM: WA depending on the 'use'.

- In terms of the Constitution of South Africa, (Act No.108 of 1996), the Municipality is responsible for providing solid waste services which includes "*refuse removal, refuse dumps and solid waste disposal*"[10]. Once this 'waste' is removed from the waste stream, the waste then enters the "beneficiation stream" and at that point no longer necessarily forms part of the municipal service. A composting operation does not need to be a municipal function and forms part of the "beneficiation stream".

- The National Waste Management Strategy (NWMS Table 3, 2011) places the responsibility (role) on the Municipality (with National and Provincial support in certain cases) to educate, provide vessels (bins), collect, process and dispose (composting facility) of organic waste. **Table 2** is an excerpt from the NWMS which identifies organic waste as one of the waste categories needing management, and lists the relevant role players' contribution to achieve the goals as set out in the NWMS.

- The Municipal Finance Management Act (No. 56 of 2003) (MFMA) restricts Municipal involvement in waste management activities associated with processing and manufacturing, as these are considered to be a non-municipal function. It also covers management of revenue, transparency, expenditure, assets, liabilities, financial planning.

[9] WRC Report No. TT 261/06

[10] Schedule 5 of the Constitution of the Republic of South Africa, 1996

Table 2: Role players' contribution to re-use, recycling and recovery of waste

Role	General & Organic Waste	Hazardous Waste	Recyclables
Awareness and Education	Municipality	Industry	Industry in partnership with Municipality
Providing bins & take back facilities	Municipality	Industry	Municipality to provide bins, Industry to provide take back facilities
Collecting waste	Municipality	Industry	SMEs supported by Industry
Processing waste	Municipality	Industry	MRFs run by SMEs and supported by Industry
Dispose of waste	Municipality	Industry	No disposal a per set targets
NWMS (2011, page 23): Table 3			

- Local Government Municipal Systems Act (Act 32 of 2000) which relates to adopting and the implementation of fees/ tariffs by municipalities. "Fees and tariffs" are a mechanism that could be used to promote diversion of organic waste from disposal to re-use, in this case, composting.

- As of 1 January 2013, in terms of the National Waste Information Regulations (GNR 625, 2012) individuals undertaking a listed waste management activity[11] [12] (in terms of the Annexure 1 of GNR625) are required to register, record, and report to the respective Provincial Waste Information System (WIS). Failure to do so may result in imprisonment or an appropriate fine, or both.

- The Draft Waste Classification and Management Regulations (GNR 613-615, 2012), aim to ban or prohibit a significant portion of certain materials or substances from being landfilled (e.g. garden waste). **GNR 615, 2012 states 25% diversion from baseline of separated garden waste (within next 5 years), and 50% within next 10 years, from time of promulgation.** The Regulations, when promulgated, are going to have a significant impact on solid waste management and related funding.

[11] (c) – Recovery of waste at a facility that has the capacity to process in excess 10 tons of general waste or in excess of 500kg of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.

[12] (g) – Treatment of general waste using any form of treatment at a facility that has the capacity to process in excess 10 tons of general waste or in excess of 500kg of hazardous waste per day, excluding the treatment of effluent, wastewater or sewerage.

- National Waste Information Baseline Report, 2012. This report details the baseline quantities of organic waste that needs to be reported. Organic Waste has been categorised into garden, food and wood waste.

Note: In order to achieve the above-mentioned goals, it will require effort and investment. A consideration of revenue generation and the potential impact on municipal accounts and/ or tariffs must be considered for each opportunity identified.

1.6 GUIDING PRINCIPLES FOR THE FORMULATION OF THIS STRATEGY

The Key Guiding Principles used to formulate the National Organic Waste Composting Strategy are summarised as follows:

- The overall objective of the NOWCS is to develop a national organic waste management strategy to:

  a) serve as a dynamic framework to effectively manage organic waste by diverting it from landfill disposal;
  b) create a specific focus on recycling organic waste in a cost-effective and environmentally acceptable way; and
  c) process organic waste by means of composting in order to beneficiate soils.

- The overall aim for this project is to ensure that organic waste generated in South Africa is diverted from landfill sites for composting through integrated and sustainable waste management planning.

- In terms of Section 24 of the Constitution of the Republic of South Africa (No. 108 of 1996), all citizens of South Africa have the right to a clean and healthy environment, protected through reasonable measures which prevent pollution and environmental degradation and which promote sustainable development.

- The development of the NOWCS builds on the provisions for organic waste management embodied in the National Environment Management Waste Act (No. 59 of 2008) (NEM: WA) and the Draft Waste Classification and Management Regulations (GNR 613-615, 2012).

- A fundamental goal of the NOWCS is to determine and facilitate practical and appropriate organic waste landfill disposal diversion goals **with due recognition to local authorities already implementing and achieving organic waste diversion**.

- Understanding the quantitative and qualitative components of the organic waste streams will be essential for implementing Organic Waste Stream Management, a necessary requirement for achieving a proper and balanced allocation of feedstock to competing processors.

- The NOWCS targets municipalities, forestry, and agriculture, commercial and institutional generators and composters of organic wastes, in their public and private capacities.

- The NOWCS is committed towards poverty alleviation and promotion of employment through empowerment projects (e.g. promoting the growth of organic waste recovery, reuse, recycling and composting).

- Ownership of the NOWCS is required by the public as well as private sector to ensure that an acceptable level of diversion of organic waste from landfill disposal is achieved.

- The waste management hierarchy provides a systematic and hierarchical approach to integrated waste management, promoting waste recycling, and treatment (composting), ahead of safe disposal (refer to **Figure 2**).

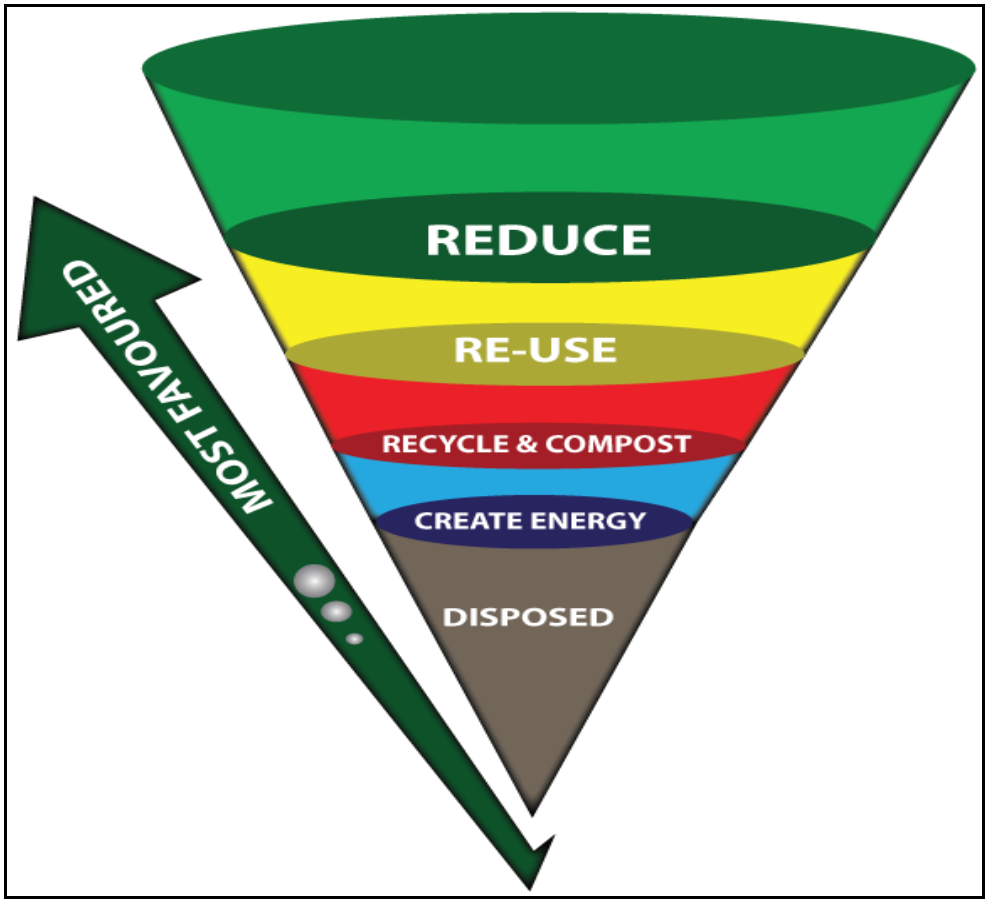


Figure 2: Waste Hierarchy

1.7 SUMMARY OF STATUS QUO REGARDING ORGANIC WASTE AND COMPOSTING IN SOUTH AFRICA

The key findings documented in the Status Quo Report (December 2012), based on the findings from the situational analysis that was undertaken from September 2012 to December 2012 on organic waste within South Africa, clearly show that strategies and specific actions are needed to ensure that an acceptable level of diversion of organic waste from landfill disposal is achieved, in particular, through composting initiatives.

The findings highlighted in the Status Quo Report, assisted in identifying gaps in information, as well as challenges and issues with regards to organic waste composting within South Africa. This report provided the necessary basis on which to build the strategy.

From the Status Quo Report, it became evident that technology plays an important role in achieving effective composting. **Table 3** provides a summary of some of the composting technology options.

Table 3: Summary of composting technologies[13]

Issue / criteria	Minimal Technology	Low Technology	Medium Technology	High Technology	Low to High Technology
Examples of composting methods	Static Piles (No air)	Compost bins or barrels, turned windrows, and vermicomposting	Aerated static piles, turned windrows, anaerobic composters	Turned or agitated bays or beds, anaerobic in-vessel units	Anaerobic Fermentative Composting
Potential input waste type	Garden waste, wood waste, manures, food waste and fruit waste.	Food & garden waste, wood, fruit waste & manures.	Mixed organics and possibly primary sewage sludge, manure, and in some cases animal waste.	Mixed organics and possibly primary sewage sludge, manure and animal waste.	Food / food processing, garden, abattoir, animal manure and sewage sludge
Output product	Lower-grade Compost, soil conditioner	Compost, soil conditioner	Compost, soil conditioner.	High-quality, high-demand compost, soil conditioner	Stabilised fermented organic matter, soil conditioner, liquid and/or solid bio fertilizer, compost, vermicompost or animal feed
Capital / O&M costs	Minimal/ Minimal	Low/ Low	Medium/ Medium	High/ High	Low for low tech, medium for high tech
Plant (mechanical) Types	Manual labour Front-end loader (bigger operations).	Grinder, loader, screen.	Grinder, loader, screen, blowers, compost turner, or other specialised compost system equipment.	As for "medium technology" plus mixer, conveyor, compost bays, in-vessel unit & handling equipment.	**For garden refuse:** grinder, handling equipment, mixer, inoculant sprayer, waterproof covers **For food waste:** low-tech - in-vessel units, high-tech - in-vessel units, food waste macerator, screw-press dewaterer, extruder, vacuum flash drier, specialised liquid bio-fertilizer fermentation tanks **For animal manures and sewerage sludge:** front end loaders, inoculant sprayer, waterproof covers
Skill required for operation	Generally less skilled staff.	May require more skilled personnel.	Higher number of skilled personnel.	Extensive and specific.	Low tech – minimal skill, High Tech – skilled labour
Labour and/or employment.	High	High	Medium	Low	Low tech – minimal skill, High Tech – skilled labour

Excerpt from NOWCS Guideline Document for Composting, 2013 – Table 14

Feedback from Stakeholders and the review of certain existing facilities suggests that the most common practice of composting is static windrows/piles and turned-windrows with certain facilities employing forced aeration. Most composting facilities in South Africa are minimal-technology practices (Refer to **Figure 3).**

Figure 3 illustrates findings from the feedback from the (few) stakeholders who did respond to Jeffares & Green as part of the Status Quo phase of the project.

[13] Table is an abbreviation of a more comprehensive Table in the Guideline Document

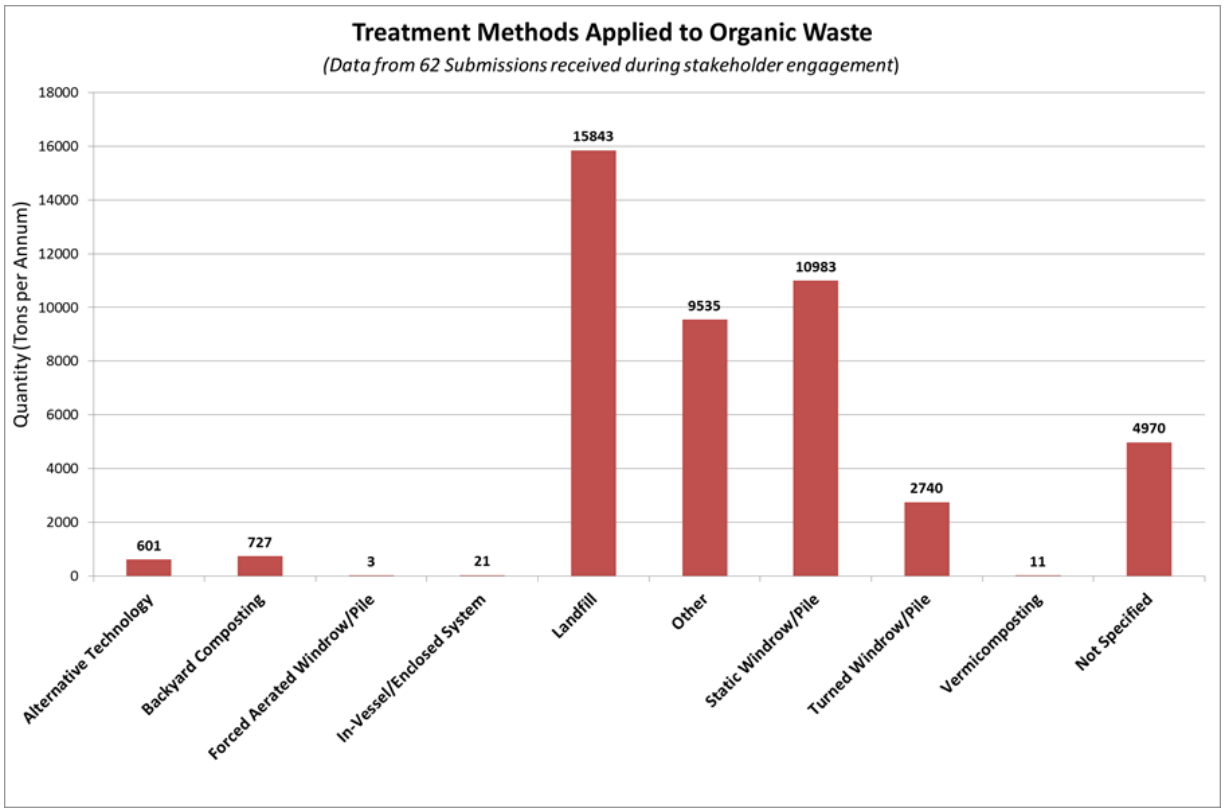


Figure 3: Quantity of organic waste and varying treatment methods[14]

In conclusion it appears that most organic waste (by mass) still is disposed of at landfill, clearly illustrating opportunities for composting and beneficial use. The most common treatment method undertaken by the Respondents is static windrows.

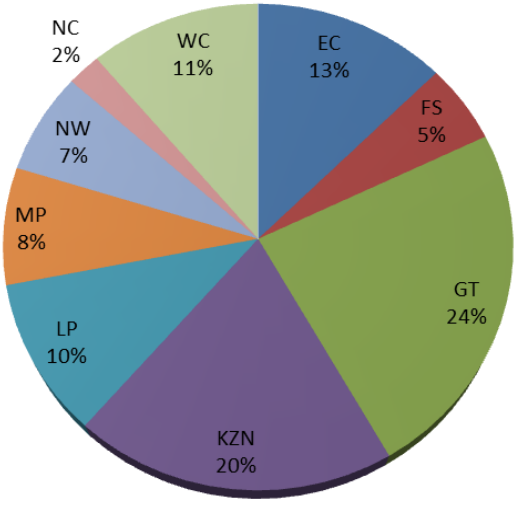
1.8 KEY PRIORITIES AND OPPORTUNITIES

The National Waste Information Baseline Report (2012) (NWIBR) estimates the total organic waste (garden and food waste) generated in South Africa to be in the region of 3 million tons for the year 2011, of which approximately 35% is currently recycled and the remainder (about 2 million tons) is landfilled. Although the NWIBR establishes a baseline for organic waste generation, it is unable to quantify each waste type (i.e. garden, food, or wood) within the GW20 category (Organic Waste) due to the lack of waste characterisation studies with this level of detail having been undertaken in the country (pers. comm. Oelofse, 2013).

[14] Excerpt for "Landfill" which is waste that goes direct to landfill without treatment.

As indicated in **Figure 4** in terms of information obtained from the NWIBR, almost 45% of all organic waste produced in South Africa is generated by only two Provinces; Gauteng (24%) and KwaZulu-Natal (20%).

As an initial step towards diverting organic waste from landfill and possibly to compost, these two provinces should be approached first as they represent "low hanging fruit" in terms of opportunities for sources of feedstock material.



Annual Organic waste generated by province	
EC	383 249 t
FS	160 353 t
GT	716 747 t
KZN	599 650 t
LP	315 665 t
MP	235 948 t
NW	204 995 t
NC	66 923 t
WC	340 070 t
	3 023 600 t

Figure 4: Organic waste generation by province (Adapted from NWIBR, 2012)

1.9 GUIDELINE TO IDENTIFY COMPOSTING OPPORTUNITIES

This NOWCS Report and the Guideline Document provides stakeholders, such as municipalities, with information to enable them to compile their own specific plans to divert organic waste from their landfills through composting, in terms of specific needs, demographics, climate, budget, etc.

Box 2: Evaluating a composting opportunity

Issues to consider when evaluating and establishing a composting facility covered by the Guideline Document	
Regulatory processes	Costs
Strategic planning	Various Technologies
Marketing	Typical layouts
Impacts and controls	Planning tools and information
Education and skills	Useful reading and references

The Guideline Document contains data, facts and figures that should be of assistance and value to those wishing to expand existing composting activities or for those wanting to identify potential new

composting opportunities. **Box 2** provides an indication of certain key issues to consider when evaluating a composting facility opportunity.

Table 4 and **Table 5** highlight typical challenges that can be expected when a WMO, private entity or other such responsible person evaluates a composting operation or opportunity.

Table 4: Broad challenges in composting programs

Significant challenges in developing and operating successful composting programs include[15]
Developing markets and new end uses
Inadequate or non-existing standards for finished composts
Inadequate design (business plan) data for composting facilities
Lack of experienced designers, vendors, and technical staff available to many municipalities
Potential problems with odours
Problems controlling contaminants
Inadequate understanding of the biology and mathematics of composting
Inadequate financial planning.

[15] O'Leary & Walsh, 1995

Table 5: Tasks and activities to consider prior to establishing a potential composting facility

Launching a Collection and Composting Scheme[16]	Task 5 Development and Design of Collection System
Activity 1 Determine the opportunities and threats for your composting project	Activity 1 Select the most appropriate vehicles
Task 1 Identifying Stakeholder Interests	Activity 2 Select the appropriate waste collection system
Activity 1 Identify project stakeholders	Activity 3 Calculate the number of vehicles required
Activity 2 Identify environmental legislation and land use regulations	Activity 4 Community participation and mobilisation for waste collection
Activity 3 Identify potential marketing options	Activity 5 Organise and introduce fee collection
	Activity 6 Try to promote source segregation
Task 2 Assessing Target Community Interests and Land Availability	**Task 6 Design and Construction of Composting Facility**
Activity 1 Organise a community meeting	Activity 1 Plan and decide on the composting plant layout
Activity 2 Conduct a structured survey using a questionnaire	Activity 2 Plan the required key features
Activity 3 Assess land availability and visit proposed sites	Activity 3 Plan staffing requirements
	Activity 4 Plan additional equipment and expendables
Task 3 Data Collection	**Task 7 Operating and Maintaining a Composting Facility**
Activity 1 Determine the solid waste generation	Activity 1 Operation and monitoring
Activity 2 Analyse the solid waste composition	Activity 2 Trouble shooting
Activity 3 Assess topography and road conditions	Activity 3 Control the quality of compost
Task 4 Preparing a Business Plan and Financial Projections	**Task 8 Marketing of Compost**
Activity 1 Develop an appropriate management model	Activity 1 Assess potential customers and competitors
Activity 2 Determine the viability of the project: Benefit - Cost Analysis	Activity 2 Develop a marketing strategy
Activity 3 Develop the contract for involved partners	Activity 3 Define your product
	Activity 4 Create a market map

Table 6 provides some rates of expected costs that could be incurred in a composting operation.

[16] Enayetullah, Rothenberger, Maqsood Sinha, & Zurbrügg, 2006

Table 6: Typical costs of key inputs involved in a composting operation, which could be used as a guide when planning viability of a composting operation (high-level figures)

Typical costing of items in a composting facility		Costs
Labour	Skilled	R 139/hr
	Unskilled	R 19/hr
	Manager	R 245/hr
Plant	Bakkie	R 56/hr
	Tipper Truck (10m3)	R 254/hr
	Low Bed Truck	R 397/hr
	Crane Lift Truck (4-6 ton)	R 278/hr
	Tractor (4-6 ton)	R 123/hr
	Compost Turner	R 500/hr
	Excavator (20 ton)	R 331/hr
	Skidsteer loader (Bobcat)	R 142/hr
	Chipper	R 150/hr
	Compressor (175 cfm)	R 53/hr
	Air hoses (30m x 20mm)	R 9/hr
	Waste Bins (numerous)	R 250/hr
Materials	Kraal Manure	R 9,000/mnth
	Plastic Bags	R 25,000/mnth
	Fertilizer	R 5,000/mnth
Sundries	Fuel	R 12// **
	Communications	R 5,000/mnth
	Rent	R 10,000/mnth
	Electricity	R 5,000/mnth
	Water	R 5,000/mnth
	Maintenance	R 20,000/mnth
	Marketing	R 5,000/mnth
	Site Office Container	R 2,000/mnth
	Toilets to rent	R 3,000/mnth

* - estimated rates are values from a typical, existing composting facility in South Africa using the windrow-process.

** - means project specific.

Excerpt from NOWCS Guideline Document for Composting, 2013 – Table 16

2 STRATEGY GOALS AND OBJECTIVES

The following chapter highlights the identified goals, and details the associated objectives, which were predominantly derived from the situational analysis undertaken as part of the Status Quo phase.

Appendix A lists the Action Plan which includes a table of challenges that need to be addressed. These challenges plus expert opinion and analysis by the Team, led to a set of goals and objectives. See **Table 7**.

A goal is defined as an observable and measurable end result having one or more objectives to be achieved within a more or less fixed timeframe[17].

Where indicated, recommendations / responses which are seen as being a priority in terms of diverting organic waste from landfill, have been assigned. Based on the above, broad themes were identified, in conjunction with the Stakeholder engagements and liaison with DEA, which can serve as specific directives and independent goals with particular outcomes. These are categorised and tabulated and include:

- **Goal 1:** Review legal and regulatory requirements. See **Table 8** for list of inherent challenges and gaps plus recommendations.
- **Goal 2:** Understand and facilitate feedstock sources and opportunities. See **Table 10** for list of inherent challenges and gaps plus recommendations.
- **Goal 3:** Provide the necessary support structure and functions to implementing composting. See **Table 11** for list of inherent challenges and gaps plus recommendations.
- **Goal 4:** Undertake education, skills transfer and awareness. See **Table 12** for list of inherent challenges and gaps plus recommendations.
- **Goal 5:** Incorporate composting into municipal planning, responsibilities and create roles for the private sector. See **Table 13** for list of inherent challenges and gaps plus recommendations.

In terms of ease of reference, the above-mentioned goals have been tabulated in **Table 7**. The table lists the resultants goals and objectives for NOWCS.

[17] http://www.businessdictionary.com/definition/goal.html (accessed 19 March 2013)

This section is then followed by a more detailed description of each goal in **Section 2.1** to **Section 2.5** inclusive. Each of these Sections includes a Table which outlines the inherent gaps and conceptual thinking to these gaps.

Appendix B lists **Table 7** with the inclusion of instruments to achieve objectives and possible limiting factors.

Table 7: Goals and Objectives

Goal 1: REVIEW LEGAL AND REGULATORY REQUIREMENTS	
Objective 1.1:	Define "organic waste", "compost", "green waste" and "composting".
Objective 1.2:	Develop norms and standards, amend current legislation and integrate standards with Department of Agriculture practices.
Objective 1.3:	Formalise diversion requirements (from landfill).
Objective 1.4:	Amend reporting on waste quantum.
Goal 2: UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES	
Objective 2.1:	Identify opportunities for composting operations with specific attention to job creation, diversion from landfill and achieving cradle-to-cradle approach.
Objective 2.2:	Monitor and record the diversion, disposal and treatment of organic waste. Characterisation of organic waste.
Objective 2.3:	Establish waste exchange/ website / Communication tool.
Objective 2.4:	Integrate NOWCS into a future "Organic Waste Management Programme"
Goal 3: PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING	
Objective 3.1:	Establish clear authority responsibilities and decision making.
Objective 3.2:	Identify funding support and incentives.
Objective 3.3:	Understand synergies with Private sector/ support to municipalities and between municipalities.
Objective 3.4:	Establish forum for communication.
Goal 4: UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS	
Objective 4.1:	Government run education and awareness programmes.
Goal 5: INCORPORATE COMPOSTING INTO MUNICIPAL PLANNING, RESPONSIBILITIES AND CREATE ROLES FOR THE PRIVATE SECTOR	
Objective 5.1:	Identify clear roles and responsibilities.
Objective 5.2:	Identify responsibilities for reporting opportunities and controls.
Objective 5.3:	Facilitate, enable and guide various levels of Public involvement (from Private, through Public-Private, to Public).

2.1 GOAL 1: REVIEW LEGAL AND REGULATORY REQUIREMENTS

With respect to **Goal 1** looking at legal and regulatory requirements for NOWCS, **Table 8** identifies inherent challenges and goals together with conceptual thinking and recommendations for the NOWCS project.

Table 8: Goal 1 challenges versus conceptual thinking

Inherent challenges and gaps	Conceptual thinking/recommendation
The current South African environmental legal framework has inherent challenges when it comes to the management of organic waste and the composting thereof. These include the following; i. A lack of definition of "compostable organic waste" ii. A lack of detailed categories of organic waste iii. Environmental authorisation and licensing process iv. There is no South African norms and standards dealing specifically with composting v. Organic waste reduction goals are limited to garden waste vi. Legal and regulatory amendments to align with this NOWCS.	i. Composting can lend itself to job creation (varies depending on volume, Geographic location, technology usage, etc.) ii. Composting can complement the "Green Economy". iii. Need to define materials involved in composting, establish legislation (legal base for organic waste beneficial use for composting purposes - in this instance), implement drivers of change, then drive the change. iv. Need to use legislation such as the NEM:WA, NWMS, DAFF regulations and the Draft Waste Classification and Management Regulations (GNR 615 of 2012) as the drivers of change. Amend some of the legislation, where necessary. v. Need to establish "Norms and Standards" to regulate organic waste diversion and to manage composting operations, sales/use, quality. vi. Need to establish more information on base materials (feedstock) for composting operations. Broad figures are available to provide an indication of these materials at a Provincial level. Composting operations would be at a regional (possibly combined municipal level) or de-centralised level (community-based, home composting). vii. Necessary to integrate the legislation with efforts by DAFF. Integrate efforts, resources, skills, knowledge at National level of Government (DWA, DEA, and DAFF). viii. Information is key to any planning. ix. Data on existing and future operations is critical for effective planning. Instruments such as SAWIS and

Inherent challenges and gaps	Conceptual thinking/recommendation
	SAWIBR can be an effective tool for this purpose and should be used as such.

2.1.1 Definition of compostable organic waste

In terms of South African legislation there is no common definition for compostable organic waste. This has a restrictive impact on the regulation and management of organic waste and is a major challenge when attempting to prioritise the diversion from landfilling. Organic waste is generally categorised as "garden, food, or wood" and in some instances "putrescible and notifiable (hazardous) waste" (NWIBR, 2012). Arising from stakeholder engagement and in developing the Strategy, it became evident that a broad definition of compostable organic waste needed to be developed, as well as more specific categorisation of organic waste (refer to **Section 2.1.2**).

In this Strategy, the following definition developed and adopted:

'Compostable Organic Waste' referred to in the National Organic Waste Composting Strategy is defined as;

"A material that naturally enhances fertility of soil through a natural degradation process[18] but excludes human made organic chemicals[19] and naturally occurring organic chemicals which have been refined or concentrated by human activity[20].

"Compostable Organic Waste" will generally comprise of materials that can be accepted for disposal at a licensed municipal general waste landfill facility (i.e. excludes infectious, poisonous, health-care, chemical and hazardous organic wastes). **Box 3** gives examples of such organic waste that could be

Box 3: Types of organic waste suitable for composting.

Typical General Waste			
Suitable for Composting	**Not Suitable for Composting**		
Biodegradable materials	**Hazardous material**	**Residues**	**Recyclables**
Garden Waste	Cleaning products Pesticides HCRW Broken glass Expired medicines Batteries Treated timber Chemicals	Soiled PE Bones Painted woods	Glass Metal Aluminium Paper Plastics Cardboard
Food Waste			
Wood Waste			
Others Biosolids Manures Seed hulls/husks Bagasse Paper-processing Sludge			
Composting Process	**Transport to Landfill site**		**Sell to Recycling Industry**

Excerpt from NOWCS Guideline Document for Composting, 2013 – Table 1

[18] natural occurring fertilizer

[19] such as solvents, chemicals and cleansing agents

[20] such as oil, petroleum, diesel and tar products

considered for a composting operation and that which is more suited for landfill disposal or recycling.

2.1.2 Categories of organic waste

Currently the National Waste Information Regulations (GNR 625, 2012) categorise organic waste as, *"garden waste, food waste and wood waste."* The definition is deemed to be too broad and a more detailed categorisation is necessary to better identify risks and opportunities. In addition, based on the need to develop "Norms and Standards" for the treatment and / or management of organic waste which does not pose a potentially significant negative impact to the environment (on the biophysical as well as the social environment), organic waste types have been grouped into one of three categories depending on their potential significance in terms of negatively impacting on the environment. Refer to the **Table 9** for these proposed categories and types.

Category 1 and Category 2 organic wastes, as illustrated in **Table 9**, can form part of the Norms and Standards, whereas Category 3 would still require the necessary licensing approvals, as identified under the NEM:WA. The Norms and Standards must consider limiting the volume or toxicity of Category 2 organic wastes to be undertaken under the "Norms and Standards".

The priority is to establish the Norms and Standards that will exempt composting activities for Categories 1 and 2 from requiring a Waste Management Licence. However such activities will need to comply with the requirements of the Norms and Standards and register their operations with the DEA.

Table 9: Categorisation of organic waste

Potential significance in terms of negative environmental impact	Category	Types of organic materials permitted for composting	
		Organic Waste Type	**Examples**
LOW	**Category 1**	Garden and landscaping	Grass[1], leaves, plants, branches, tree trunks and stumps
		Untreated wood	Sawdust, wood shavings, timber off-cuts, wooden crates and pallets, wood packaging
		Natural organic fibrous organics	Peat, seed husks, straw, bagasse and other natural organic fibrous organics
		Processed fibrous organics	Paper, cardboard, paper-processing sludge, non-synthetic textiles
		Manure	Animal manure, animal droppings
MEDIUM	**Category 2**	Other natural or processed vegetable organics	Vegetables, fruit and seeds and processing sludges and wastes, winery, brewery and distillery wastes, food organics excluding organics in Category 3.
		Biosolids and manures	Sewage biosolids, animal manure and mixtures of manure and biodegradable animal bedding organics.
HIGH	**Category 3**	Meat, fish and fatty foods	Carcasses, blood, bone, fish, fatty processing or food.
		Fatty and oily sludges and organics of animal and vegetable origin	Dewatered grease trap, fatty and oily sludges of animal and vegetable origin.
		Mixed residential waste containing putrescible organics	Wastes containing putrescible organics, including household domestic mixed waste and waste from commerce and industry.
		Authorised (and suitable for composting) industrial waste organics	Fish-processing, paper pulp wastes and sludges with high-organic/ nitrogen loads.

Adapted from: *Environmental Guidelines: Composting and Related Organics Processing Facilities, 2004: 17.*

2.1.3 Environmental authorisation and waste management licensing

Currently, composting facilities are required to apply for authorization and a license in terms of the Waste Act and potentially NEMA if activities trigger the threshold limits. This process creates a general reluctance, by compost producers, to undertake the correct and legal procedures prior to establishment of a facility.

A streamlined regulatory process is required, to achieve registration, thereby assisting composting facilities set up a regulated process in terms of the requirements in terms of the NEM:WA and National Environmental Management Act (Act No. 107 of 1998).

The National Water Act (Act 36 of 1998 (NWA) recognises that water is a natural resource that belongs to all people. The National Water Act regulates the way people obtain the right to use water and provides for just and equitable use of water resources. NWA helps ensure that the Nation's water is protected, used, developed, conserved, managed and controlled in respective ways. This National Water Act defines "waste" as any solid material or material that is suspended, dissolved or transported in water (including sediment) and which is spilled or deposited on land or into a water resource in such volume, composition or manner as to cause, or to be reasonably likely to cause, the water resource to be polluted (Section 1 of NWA). The land owner, person in control, user or occupier must take all reasonable measures to prevent pollution of a water resource from occurring, continuing or recurring (Section 19(1)); this includes all organs of state. The Act lists a number of actions amounting to water use and which must be licensed, unless regulated by the General Authorisations, and registered.

The National Environmental Management: Air Quality Act (Act 39 of 2004 (NEM:AQA)) repealed the Atmospheric Pollution Prevention Act, 45 of 1965 and provides for national norms and standards regulating air quality, monitoring of air quality and specific air quality measures. NEM:AQA provides a more comprehensive framework within which critical questions can be addressed. Various activities resulting in air pollution have been identified in GN 248 of 31 March 2010 and which require an Atmospheric Emission License. The repealed Act had a similar system whereby registration certificates were required, which will remain valid for a limited period when they will have to be replaced with a license. NEM:AQA also provides general compliance and enforcement and air quality management measures. Categories 8 and 10 of GN 248 of 31 March 2010 would have most relevance to composting.

This streamlined Composting-registration process will necessitate the review of NEM:WA, the NWMS and the draft Guidelines (GNR 613 – 615), as well as the renewal of the compost registration certificates in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947)

The development of "Norms and Standards" that deal with Category 1 (and possibly Category 2) organic wastes, which would preclude the need for a Waste Management License, is required. This would streamline regulatory processes to achieve a registration process, thereby avoiding costly and lengthy licencing requirements.

2.1.4 South African legislation pertaining to composting

Currently, the Regulations Regarding Fertilizers (GNR 732) of 10 September 2012 issued in terms of the Fertilizers, Farms Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) is the only legislation in the country covering compost quality control. Compliance with the requirements of these Regulations is only necessary when the producer of the compost intends selling their compost as a fertilizer. To this effect, such compost needs to satisfy the following requirements:

- it is sold in containers and must be fine enough for 100% thereof to pass through a 12mm standard sieve;
- it is a household and garden fertilizer as defined in the Regulations;
- the ash content thereof does not exceed 670g/kg on a dry mass basis;
- the moisture content does not exceed 400g/kg;
- it does not contain any visibly undecomposed organic or other foreign material; and
- at least 80% of seeds that are planted under controlled conditions germinate normally and exhibit normal growth when planted in a growth medium as prescribed by the holder of the registration or manufacturer of such fertilizer.

In relation to municipal compost and other categories of compost as defined in the Regulations, further stringent requirements need to be complied with for such products to qualify for registration as fertilizers. The Regulations provide detailed information regarding the registration processes, the validity and the duration of the registration, as well as the renewal of the registration and the address

for the submission of the registration applications. It is important to note that registration and renewal of the registration are subject to payment of the applicable fees as determined by DAFF.

The successful diversion of compostable organic waste from landfill to composting will also need some regulations and legislation developed and implemented at a local municipality level. It is recommended that municipal by-laws have sections that promote the diversion of organic waste from landfill.

Furthermore, the DEA, DWA and DAFF, amongst other authorities should be involved in the development of the Norms and Standards for the composting of organic waste.

2.1.5 Category specific organic waste reduction goals (beyond gw20)

In order to quantifiably reduce organic waste being landfilled, specific reduction goal need to be set. Although the NWMS (2011) and the Draft Waste Classification and Management Regulations (GNR 615 of 2012) identify reduction goal for garden and recyclable waste, these goal do not sufficiently encompass organic waste.

In order to address the lack of more specific organic waste reduction goal, an organic waste (category-specific) reduction goal needs to be set. The setting of the goal and implementation measures will promote the consideration of new collection strategies to enhance organic waste diversion, such as separation at source. This will be supported by the revision of Municipal by-laws.

2.1.6 Legal and regulatory action strategy (plan)

Management planning pertaining specifically to organic waste is currently not evident in South Africa. Municipalities must designate an 'organic waste champion / officer' (could be a Waste Management Officer (WMO) in terms of NEM:WA) to measure, record and monitor organic waste quantities / stream. The powers of the WMO, with regards to organic waste recording, reporting and planning needs to be clarified and the specific organic waste management planning needs to be evident in IWMPs. The recently published *Guideline for the Development of Integrated Waste Management Plans* (DEA, 2012) requires amendment and must include specific guidelines to include composting and the treatment of organic wastes.

The SAWIS and Waste Information Regulations (GNR 625, 2012) require revision in order to accommodate the organic waste categories in **Table 9**.

In summary, organic waste and composting diversion goals need to be included into Integrated Development Plans, Integrated Waste Management Plans, and relevant Industrial Waste Management Plans.

2.2 GOAL 2: UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES

With respect to **Goal 2** looking at feedstock sources for NOWCS, **Table 10** identifies inherent challenges and goals together with conceptual thinking and recommendations for the NOWCS project.

Table 10: Goal 2 challenges and gaps versus conceptual thinking

Inherent challenges and gaps	Conceptual thinking/recommendation
The monitoring of organic waste generation, disposal, and treatment, as well as identifying product and market opportunities, is essential for its management and viability.	i. As stated, information is the key to any planning. ii. Data on existing and future operations is critical for effective planning. iii. WMO and other responsible persons need to evaluate opportunities, initially by assessing potential feedstock. iv. A Forum, specifically for addressing composting queries, skills transfer, etc. would serve the much needed platform for liaison between regulators, industry, potential stakeholders, etc. DEA or other responsible parties could implement this necessary "exchange" platform. This platform needs to be effective, usable, simple, and robust. v. For effective communication and understanding, clear understanding and usage of the terms (describing the raw product and final product) is necessary. This then would be used towards recording and reporting. vi. Strategic composting of organic waste will then "feed" into a greater plan for the diversion, treatment and beneficiation of organic waste. vii. Recording of detailed organic waste categories or types is urgently required in order to understand where feedstock is available, and where compost is being produced and/or required. Once an understanding has been achieved, opportunities can be identified and facilitation between feedstock generators and compost producers can take place.

The key issues to be addressed can be categorized as follows:

2.2.1 Improved recording and reporting of organic waste quantities, including the geographic (GIS) representation.

The current waste information recording and reporting systems, at both Provincial and National level should be aligned, if not already. The detail or level of information that should be recorded may differ to that reported. Facilities should record the "Type" level of classification, and should report on the SAWIS (or equivalent Provincial WIS) at the "Category" level of detail. Refer to **Table 9** for the proposed categories.

The "Category", "Type" and quantity of the organics being produced / treated is essential in order to establish a "Feedstock Supply and Treatment" record; as is the location (geographic), as this will allow mapping of the feedstock source or endpoint / market, whether it is composted, disposed of or other. See **Box 4** for typical conversion values that could be considered when evaluating volumes or mass of material for transportation.

Box 4: Typical values when estimating volumes or mass w.r.t. transportation

NOTE: The following assumptions are pertinent to the conversion calculations: Pre-treatment methods utilized were investigated to differentiate between two types of organic waste densities.

	kg/m³
Uncompacted Garden Organic Waste	100
Chipped Garden Organic Waste	300

The organic waste densities were then applied to different vehicle volumes to obtain a reduction factor for the conversion.

Units of Volume	Estimated Volume (m³)	Uncompacted (Tons/Load)	Chipped (Tons/Load)
Bakkie and Trailer	2.5	0.25	0.75
Volume (m³)	1	0.1	0.3
5t Truck Loads	8.5	0.85	2.55

Excerpt from the NOWCS Status Quo Report, 2012 – Section 3.2.2

Once organic feedstock sources and quantities are known, then planning the location of both collection and / or treatment facilities (existing and new) can follow, in the same way the assessment and planning for general waste transfer facilities is undertaken.

2.2.2 Organic waste diversion, feedstock area identification and composting market communication.

A third criteria that requires consideration, is the "market" or "demand" for, and the different composted products. Different situations will require different products (e.g. urban vs. agricultural, residential vs. commercial), and the demand may or may not be aligned to the supply of compost. The development of an organic waste specific "advertising" platform / website (similar to the City of Cape Town's

Integrated Waste Exchange[21] site) is required. This will assist in feedstock source identification and market generation (for both organic waste supply and compost products).

Refer to Chapter 4, "*Products and Marketability*" in the Guideline Document, 2012 for additional information on identifying markets. **Box 5** provides a preview of market demand versus compost type and quality.

The DEA is to task Provincial Integrated Waste Management Forums to identify large organic waste generators to divert from landfill and to possibly convert to compost.

Box 5: Demand of final product versus market type

Market demand versus compost type and quality

Market sector	Product
Residential & Urban amenities	Blended soils, and clean fine mulches.
Horticulture	Soil conditioners, blended growing media, organics fertiliser and mulch products. Potential to develop disease suppression products.
Agriculture & viticulture	Mainly demands clean water conservation and weed control mulches, as well as clean pasteurised and composted coarse mulches.
	Soil amendment and organic fertiliser products. Potential market for disease suppression composts.
Land/mine rehabilitation	Typically a low value market. Often an outlet for excess product rather than a viable market.
Bioremediation	Use for lower grade and value materials. Often an outlet for excess products rather than a viable market. Potential to develop a range of products for rehabilitation markets.

Excerpt from NOWCS Guideline Document for Composting, 2013 –

Integrated Waste Management Plans should aim to identify all relevant organic waste generators within the municipal boundaries and consult with DAFF and other relevant generators in order to maximise opportunities for composting.

The SAWIS should be adapted in order to allow for reporting of organic waste generation/composting in terms of "Category", "Type" and quantity as well as the geographic location thereof. Development of a "Waste Exchange" system to assist in the identification of feedstock and markets, and to assist in planning, collection and distribution of organic waste should also be undertaken.

2.2.3 Understanding the financial viability of composting

The development of a "full-cost accounting model" for composting that considers, amongst other things, airspace offset costs and environmental costs should be investigated in order to facilitate the development of sound business models at various scales.

[21] City of Cape Town's Integrated Waste Exchange - http://www.capetown.gov.za/en/iwex/Pages/default.aspx

Refer to **Section 1.9** of this Strategy Report on planning, strategy, guidelines, and typical costs when evaluating a composting opportunity. The Guideline Document (2013) provides more information on these components.

It is essential to note that each and every composting opportunity should be investigated and assessed individually, based on the unique situation. Each opportunity must be assessed on its own merits.

2.3 GOAL 3: PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENT COMPOSTING

With respect to **Goal 3** looking at necessary support structures and functions (enabling mechanisms) to further implement composting under NOWCS, **Table 11** identifies inherent challenges and goals together with conceptual thinking and recommendations for the NOWCS project.

Table 11: Goal 3 challenges and gaps versus conceptual thinking

Inherent challenges and gaps	Conceptual thinking/recommendation
Identification and addressing enabling mechanisms necessary for successful implementation of this Strategy that ultimately enables further organic waste diversion.	i. The development of "Norms and Standards" will result in responsible parties to control, manage, audit and regulate operations. ii. Registration will replace licencing and thus require effective processing and informed decisions. iii. Many opportunities may require financial support in some form or manner. Such funding must be identified from the outset from institutions, agencies and programmes such as the DTI, DWA, DBSA, MIG and the like. Unfortunately, in most cases (in today's environment), the move away from collect-transport-dispose is an additional cost to the process of handling waste. iv. Incentivisation to those enabling change is an effective "accelerator" for change. v. Opportunities exist in job-creation ("youth" being a current focus within South Africa, skilled, unskilled, formal and informal). vi. Private sector involvement exists and can be harnessed through negotiations or contracts (e.g. Public Private Partnerships (PPP), Service Level Agreements (SLA's), etc.) vii. Enabling mechanisms (for affecting any composting opportunities) does not always require a change in municipal structure. Many factors will have to be considered to determine feasibility, viability, structure and investment requirements. This is in accordance with the intent of Section 78 of the MSA. Affordability is a key tenant of the MSA. viii. The mechanisms to divert organic waste from landfill must be carefully considered. ix. The NOWCS understands that local governments are key role players.

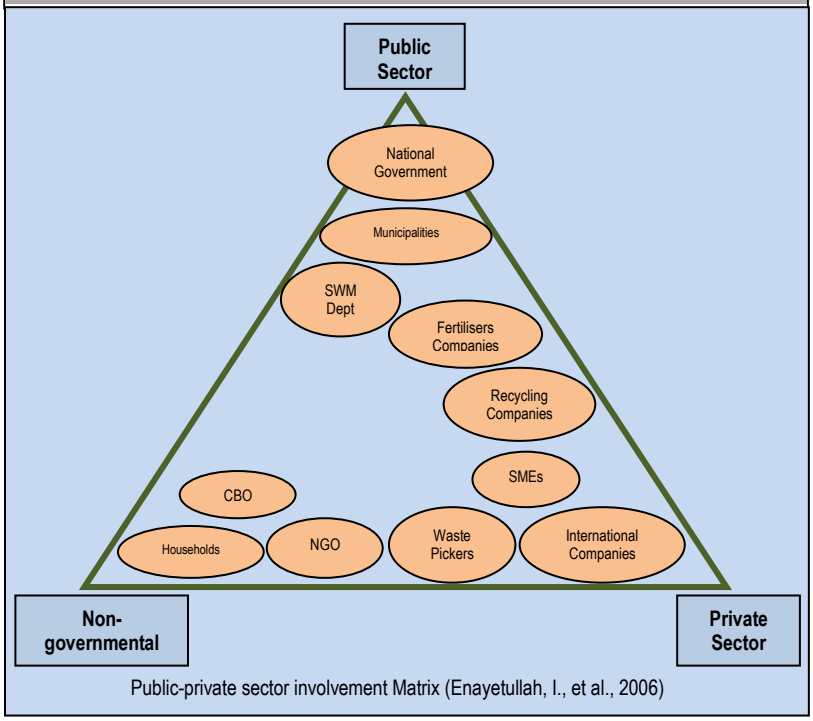
The issues needing to be addressed can be categorized as follows:

2.3.1 Support structure and functions

A clearly understood hierarchy of authority and decision-making (with DEA fulfilling the role of "Regulator") and proper lines of communication, monitoring, reviewing, enforcement and reporting, with effective "buy-in" and support from all Stakeholders, is necessary for the NOWCS to succeed in diverting organic waste from landfill disposal by means of composting and / or other appropriate technologies.

Box 6 provides a graphical representation of typical involvements between the public and the private sector.

Box 6: Public-private sector involvement matrix



Public-private sector involvement Matrix (Enayetullah, I., et al., 2006)

Definitive jurisdiction with regards to the regulatory authority is required. DEA is the regulatory authority for the waste feedstock, registration, and composting operation, whereas DAFF becomes the regulatory authority of the final product - compost (which is no longer a waste product). Synergies in undertaking quality control for composting facilities between DEA and DAFF require identification.

2.3.2 Creation of opportunities

Through legislative, financial, institutional, administrative and advisory support by national, provincial and local government, opportunities need to be created so that treating and recycling organic wastes become more viable and sustainable as well as leading to meaningful job creation. This is not only the responsibility of government. A viable facility should include consideration of meaningful job creation whether it be a government facility; PPP-managed facility or wholly private facility.

2.3.3 Financial support and incentivisation

It is widely recognized that composting and other organic waste treatment and recycling methods are considered financially non-viable without appropriate support and incentivisation. There is a need to develop a "full cost accounting" model that takes into account financial off-sets accruing to local authorities through landfill diversion achieved (airspace savings) as well as the environmental and economic benefits (e.g. job creation; realizing the value in organic waste as a resource).

Government funding / subsidisation sources need to be investigated as to whether this would be required to enable municipalities to promote and implement organic waste treatment facilities (e.g. Department of Trade and Industry, Development Bank of South Africa, MIG, grant / green funding, employment opportunity funding, etc.). However, this does preclude identification of other sources of funding outside of government.

2.3.4 Synergies with the private sector and regionalisation

Although the responsibility of managing municipal solid wastes vests with municipalities, the treatment and recycling (beneficiation) of organic wastes is not regarded as a local government service delivery function (City of Cape Town Section 78:3 Review – legal opinion) and such activities may be undertaken by the private sector through Public-Private-Partnering (PPP) or other such mechanisms. Furthermore, it is apparent that synergies exist for the sharing of costs and facilities between various (neighbouring) municipalities and authorities on a regionalization basis.

As mentioned above, in terms of the Constitution, the Municipality is responsible for providing solid waste services which include the removal of recyclable waste. Once this 'waste' is removed from the waste stream, the waste then enters the "beneficiation stream" and at that point no longer necessarily forms part of the municipal service.

Integrated Waste Management Forums (National and Provincial) need to identify expertise for a high level composting forum. A specialist composting forum is needed to serve industry as a part of the above mentioned Integrated Waste Management Forum, thereby providing for a better means of communication between authorities and stakeholders.

Municipalities, through Provincial Integrated Waste Management forums, should seek synergies and opportunities to combine resources to assist one another to promote and develop organic waste treatment facilities such as composting facilities.

Municipalities are to consider measures to include the private sector to achieve more cost-effective organic waste recycling solutions (e.g. providing land, infrastructure and guaranteed feedstock). Funding sources from public and private sources should be considered, as well as initiatives for providing employment opportunities to attract seed or donor funding. Existing and potential markets need to be interrogated to determine market quality requirements and to determine ways of increasing demand for compost.

2.4 GOAL 4: UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS

With respect to **Goal 4** looking at education, skills transfer and awareness requirements for NOWCS, **Table 12** identifies inherent challenges and goals together with conceptual thinking and recommendations for the NOWCS project.

Table 12: Goal 4 challenges and gaps versus conceptual thinking

Inherent challenges and gaps	Conceptual thinking/recommendation
Public and Municipal awareness and education campaigns and programmes regarding certain waste types and composting needs to be undertaken.	i. Provision of effective communication, literature and training (accredited and non-accredited) will go a long way to sustainable, effective composting and organic waste diversion, whether it is on a regional level or a de-centralised level. ii. Greater understanding of potential composting complications, composting processes, and regulatory processes will lead to correct decisions being made when managing a composting opportunity. It leads to more "informed decisions" being made, which avoids corrective actions.

As of 1 January 2013, the National Waste Information Regulations (GNR 625, 2012) compel individuals conducting listed waste management activities to register, record, and report waste data to the

respective Provincial Waste Information System (WIS)[22]. In addition to this, the Draft Waste Classification and Management Regulations (GNR 613-615, 2012) aim to ban or prohibit a significant portion of certain materials or substances from being taken for disposal at landfill. One of these materials is garden waste.

As a means to address the limitations set out in these new Regulations. Training will assist with not only separation at source, but diversion of organic waste from landfill by means of potential home composting in urban / residential areas, as well as possible communal composting within the informal, lower-income areas.

South Africa currently does not have comprehensive government-run education and awareness programmes specifically on composting of organic waste either at the household or industrial level.

There are programmes, such as the City of Cape Town's current '*WasteWise*' programme and the Nelson Mandela Bay Municipality's 'All Hands on Waste Campaign', that deal with educating communities on separation of waste at source and the promotion of reuse and recycling above disposal.

As part of these programmes, home composting is encouraged as a means to divert organic and garden waste from the general waste stream and create a usable 'product' which is beneficial for the individual and the community at large.

Capacity building within municipalities is required in order to ensure organic waste quantities are measured, recorded, and monitored accurately. To assist with this capacity building, the compilation and distribution of an Information Booklet on how to quantify, measure, record and monitor waste quantities easily and pragmatically per stream, supplemented with workshops to understand the current waste generation and disposal context within their area of jurisdiction, should be drafted.

Councillor Induction Programmes should include understanding and awareness of organic waste management and composting (as an opportunity).

[22] For those Provinces that have Waste Information Systems, otherwise reporting should be undertaken using the National Waste Information System

There is limited knowledge of the National Waste Information Regulations (GNR 625, 2012) and associated obligation by individuals conducting a listed waste management activity which from 1 January 2013 are required to register, record, and report to the respective Provincial Waste Information System (WIS) or to the National WIS with respect to activities taking place in provinces that do not have their own WIS. In order to address this gap, it is suggested that invitation letters are issued to known composters encouraging registration (assuming the registration process is adopted), and should be included in general awareness campaigns.

There is a significant amount of international information regarding home composting. However, South African composting manuals and guidelines are somewhat limited. The development of a user-friendly, easy to read and comprehendible guidebook / pamphlet / flyer on making compost and the benefits thereof is therefore required.

National campaigns (linked to existing campaigns) should be undertaken to educate and generate awareness amongst the general public on producing compost easily and effectively as well as on the benefits of using compost, contamination prevention and separation at source.

Food waste pilot studies (possibly incorporating tertiary students) to establish the most effective means of composting, based on the affected communities and receiving environment with the intention to create communal composting areas should be encouraged. These pilot studies should form part of local authority implementation plans, and once piloted, successes and experiences should be shared with other communities via workshops.

Promoting the use of compost and organic fertilizers can be facilitated via the development of 'best practice' guidelines for agriculture and farming sector regarding methods of composting, and the inclusion of compost knowledge and awareness and waste management in school and tertiary curriculum. Research on composting methods, using different feedstock materials, composition, benefits, uses, ratios etc. should be used to update the curriculum.

When considering alternative partnership scenarios (Public-Private, etc.), Implementing Authorities should approach National Treasury for guidance on suitability, pitfalls and benefits of Service Level Agreements, Public Private Partnerships, annual contracts, etc. so they may consider sharing the operations with a private entity.

2.5 GOAL 5: INCORPORATE COMPOSTING INTO MUNICIPAL PLANNING, RESPONSIBILITIES AND CREATE ROLES FOR THE PRIVATE SECTOR

With respect to **Goal 5** looking at incorporating composting into municipal planning, responsibilities and creating any roles for the private sector for NOWCS, **Table 13** identifies inherent challenges and goals together with conceptual thinking and recommendations for the NOWCS project.

Table 13: Goal 5 challenges and gaps versus conceptual thinking

Inherent challenges and gaps	Conceptual thinking/recommendation
Clear roles and responsibilities for the regulation of composting operations and waste treatment processes.	i. The "Norms and Standards" would dictate the relevant roles and responsibilities. DEA would ascertain and implement the necessary resources for the control of organic waste diversion and (in this case) composting controls. ii. Generators and responsible authorities would need to ascertain responsible (informed) person(s) to facilitate the diversion and beneficiation of organic waste, including reporting and recording. iii. Private sector has experience and skills for composting operations. This should not be lost but rather encompassed into future operations and existing operations should be promoted. iv. Each Authority should clarify inter-departmental coordination. Synergies need to be established. Services need to be integrated in municipalities to further increase the demand for compost.

In order to meet their organic waste diversion goals, municipal solid waste managers and particularly the Waste Management Officers[23] will need to review their integrated waste management plans to ensure that sufficient physical and financial resources are allocated to developing and implementing a

[23] Waste Management Officers (WMO) as defined in Section 10 of NEM:WA

proper organic waste management strategy. For most municipalities, this will necessitate changes to current departmental planning and operating structures.

The roles of the private sector should be taken into account when municipalities undertake their organic waste management planning. **Box 7** summarises possible management models for contracting a composting facility.

Box 7: Typical management models for composting

Options
Municipally owned - Municipally operated
Municipally owned - Community operated
Municipally owned -Privately operated
Privately owned - Privately operated

Enayetullah, I., et al., 2006.

Roles and responsibilities within the municipal structure need to be reviewed and amended (if necessary) to include the identification of a responsible person (typically the WMO in the Municipal environment) to "champion" the beneficial use of organic waste (and any other waste).

A shift from the traditional collect, transport and disposal systems, towards the waste treatment hierarchy is required. Acknowledging that waste minimisation requires multiple role players. Local municipalities should assess the need for expertise from private industry and consider various partnership scenarios, if required.

Guidelines have been developed by the National Treasury for public-private partnerships and should be considered, if necessary.

3 INSTRUMENTS FOR IMPLEMENTING CHANGE

This Chapter is in response to **Table 7** "Goals and Objectives" and provides the actions for each of these Goals (Refer to **Appendix A**).

The following section describes the actions and instruments that need to be undertaken to address the current challenges and regulatory framework, as described in **Section 2.1** that could optimize the diversion of organic waste from landfill for composting.

In essence, the following key elements (instruments) need to be addressed and amended (if applicable) together, in synergy, to effect change. These being:

- DEA needs to lead the process and ensure that there is sufficient budget and a task team to effect the Goals, meet the objectives via the Action Plan, and to implement the NOWCS. DEA needs to ascertain a high-level review of financing requirements.
- Government Gazette notice 615 of 2012 needs to be implemented by the DEA to impose the responsibility on Municipalities and other responsible parties managing waste, to divert a certain percentage of organic waste from landfill and to require proof of beneficiation.
- All WMOs need to evaluate and provide specific reporting on feedstock availability for further beneficiation within their jurisdiction, in particular response to the National Waste Management Strategy (2011). This would be under a directive by DEA in response to the Government Gazette notice being implemented.
- WMOs need to report on resources and skills to promote and facilitate organic waste diversion and composting (in this instance).
- WMOs need to identify if any organic waste diversion opportunities lend themselves to job creation (skilled and unskilled/ formal and informal).
- DAFF needs to undertake the same process as above, to provide specific reporting on feedstock availability.
- WMOs and Municipal Managers need to report, under their IWMP's, projects proposed to be undertaken by them to beneficiate organic waste (in this instance) by means of composting operations. This then needs to be included in their IDP's.
- DEA needs to amend the SAWIS and update the SAWIBR for reporting by composters on their production i.e. amend "GW20" of NWIBR (625 of 2012).

- DEA, in consultation with DWA, DAFF, needs to establish and implement clear regulations, being "Norms and Standards", to help formalize the composting industry further and to allow clear controls, licensing, registration, regulation, quality management, information sharing, communication and facilitation between regulators, financiers, composters and the public.
- DAFF Regulations and Acts, such as Act No. 36 of 1947: GNR 732 Regulations regarding fertilizers, as amended, must be reviewed and content considered for inclusion into the "Norms and Standards" and / or aligned with "Norms and Standards". Other legislation, as listed in the "Goals and Objectives" tables and **Section 2.1** on legislation must be reviewed in response to the new "norms and standards" for any necessary amendments.
- DEA needs to include in the "Norms and Standards", a certification standard for compost quality. This is to be aligned with current Department of Agriculture Regulations.
- DEA needs to include in the "Norms and Standards", clear roles and responsibilities for reporting, controls of registrations and operations, support (financial and skills). This must be done in compliance with relevant legislation e.g. the Constitution (Act No. 108 of 1996).
- DEA to review the Water Research Commission guidelines, namely, the "*Guidelines for Utilisation and Disposal of Wastewater Sludge*"[24] which specify quality requirements of using sewage sludge as feedstock material for manufacturing compost.
- The "Norms and Standards" need to include volume / tonnage of each category of organic waste being used and report thereon, as prescribed under the National Waste Information Regulations (GNR 625, 2012. Reporting must also be conducted on the quality of compost being produced and process being used.
- Existing composters need to register in response to the new "Norms and Standards".
- DEA needs to establish a Forum, such as a "branch" under the Provincial and District Integrated Waste Management Forum, to provide for effective communication, liaison and sharing of knowledge. This Forum needs to establish a communication platform for public and private effected parties to use.
- DTI, with DEA and DBSA, need to identify any Grants, e.g. MIG, or other funding mechanisms for the promotion and the incentivisation of sustainable and viable composting opportunities. This includes assistance in linking private enterprises and the public sector in partnerships or Service Level Agreements to undertake composting.
- Government (via DEA) can play a pivotal role in unlocking economic development via addressing the Municipal Finance Management Act (MFMA) and associated limitations placed

[24] WRC Report No. TT 261/06

on waste management as a municipal function. This needs to be addressed through broad guidelines on implementing Section 78 processes for outsourcing municipal functions using guidelines developed nationally for project development.

- Department of Co-operative Governance and Traditional Affairs (COGTA), with DEA, needs to develop and distribute education material (information booklets and best-practice guidelines) to enhance capability in composting. DEA to liaise with SETA on development and / or review of any existing (accredited) education material.
- DEA needs to consider Private sector involvement into composting opportunities, within the restrictions set out in the Municipal Finance Management Act (No. 56 of 2003), but as identified by the WMO and DAFF.
- Existing Composters need to report on operations (especially categories).

4 STRATEGY REVIEW AND UPDATE

This Strategy should be a public, 'living', actively used and functional report which is practical and implementable to both DEA and other government departments.

The DEA must take ownership of this Strategy document and the responsible departments / organisations must implement the actions detailed in this Strategy (within the assigned timeframes) or as adopted, to ensure that an acceptable level of diversion of organic waste from landfill disposal is achieved, in this instance, using composting as a treatment method.

Legislative changes or updates, coupled with changes to the national context within which organic waste is produced and ultimately managed countrywide will necessitate that this strategic framework be revised and updated to ensure that the information as well as action items remain relevant and appropriate. Furthermore, as action items are implemented, these may either result in additional recommendations being identified, and / or require that implemented items be removed from the tables above. Due to this likelihood, combined with the changing environment within which we live, the nature of the actions listed in this strategy could change. Accordingly, this Strategy document will require revision to ensure that it is kept relevant, implementable, and is able to respond to advances in environmental and engineering best practice.

Furthermore, systematic reviews will also evaluate the success of the various actions detailed in the Strategy document, in addition to auditing compliance by various responsible departments (in terms of implementing the action items tabulated in this document).

The first review should occur within five years of the approval date of the Strategy and thereafter when the need arises.

The DEA should be responsible for undertaking the review which must include stakeholder input and consultation.

5 CONCLUSION AND WAY FORWARD

5.1 CONCLUSION

The development of this National Organic Waste Composting Strategy (NOWCS) has followed a comprehensive four stage approach incorporating a Literature Review, Status Quo Analysis, Stakeholder Engagement Process and the development of this Strategy.

Key findings arising from the Status Quo analysis and Stakeholder Engagement Process that were taken into account in developing the NOWCS include:

- It is a requirement of the National Waste Management Strategy, 2012, that municipalities are required to divert 25% of recyclables from landfill sites by 2016. The Environmental Management: Waste Act, 2008, Draft Waste Classification and Management Regulations (GNR615, 2012) specifically refers to the diversion goals of 25% of garden waste from landfill sites. Baseline reduction goals need to be set for compostable organic waste which municipalities are required to achieve in terms of their integrated waste management planning and strategies. Such goals should consider organic waste generation rates rather than current (baseline) disposal rates, thus acknowledging Municipalities that are currently implementing successful diversion practices.
- The National Waste Information Baseline Report (2012) (NWIBR) estimates the total organic waste (garden and food waste) generated in South Africa to be in the region of 3 million tons for the year 2011, of which approximately 35% is currently recycled and the remainder (about 2 million tons) is landfilled.
- There is generally a lack of detailed information available regarding organic waste quantities and composition to enable the proper planning and design of treatment facilities to be undertaken (what is not known or measured cannot be planned or managed!).
- It is clear, however, that strategies and specific actions are required to achieve an acceptable level of diversion of organic waste from landfill disposal.
- Composting is currently the technology most commonly employed in South Africa for the treatment and recycling of organic waste but is not the only technology that needs to be considered when developing strategies and action plans. Many factors including local-specific conditions, quantities and types of organic wastes, consumer demand, competing demand for

feedstock, cost considerations, operational skills required, etc. need to be properly assessed when selecting a preferred technology.

- Separation of organic wastes at source and on-site treatment of organic wastes should be promoted as widely as possible.
- Municipalities need to ensure that the provisions and requirements of Section 78 of the Municipal Systems Act are followed where the collection, treatment and disposal of municipal organic wastes is outsourced to private contractors.

This Strategy focusses on composting as a viable and feasible organic waste treatment option available to achieve meaningful and sustainable diversion of organic waste from landfill disposal, establishing diversion goals and clear plans of action that can be implemented, measured and monitored going forward.

This Strategy is a living document, providing overarching goals and associated objectives which need to be adopted, embraced, and realized, to enhance composting as an opportunity and as a means of job creation and (industry) growth. The short, medium and long-term goals developed in terms of the Strategy for achieving these objectives are summarised as follows:

Goal 1: Review legal and regulatory requirements
Goal 2: Understand and facilitate feedstock sources and opportunities
Goal 3: Provide the necessary support structure and functions to implement composting
Goal 4: Undertake education, skills transfer and awareness
Goal 5: Incorporate composting into municipal planning, responsibilities and create roles for the private sector

The Strategy will be updated and amended as the short, medium and long term goals and action plans are carried out. The first review will take place within five years of the approval date of the Strategy and thereafter when the need arises.

5.2 ACKNOWLEDGEMENTS

The development of this NOWCS involved significant engagement with a variety of stakeholders, both public and private. The Project Team would like to thank all stakeholders for their valuable time and their input given to this project.

6 REFERENCES

British Standards Institution. 2011. *Specification for Composted Materials. http://www.wrap.org.uk/content/bsi-pas-100-compost-specification.*

City of Cape Town. 2010. *Assessment of Alternative Service Delivery Mechanisms for Waste Management in Cape Town per S.78(3) of the Municipal Systems Act*. Cape Town

Department of Environmental Affairs. 2012. *National Waste Information Baseline Report.* Department of Environmental Affairs, Pretoria.

Department of Agriculture, Forestry and Fisheries. September 2012. *Regulations Regarding Fertilizers,* Notice 732 of 2012. Pretoria.

Department of Agriculture. 1998. *Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act* (No. 49 of 1996). Pretoria

Department of Environment and Conservation (NSW), 2004. *Environmental Guidelines: Composting And Related Organics Processing Facilities*, Sydney: Department of Environment and Conservation (NSW).

Department of Justice and Constitutional Development. 1996. *Constitution of the Republic of South Africa* (No. 108 of 1996). Department of Justice and Constitutional Development, Pretoria.

Department of Environmental Affairs. 1998. *National Environmental Management Act* (No. 107 of 1998). Department of Environmental Affairs, Pretoria

Department of Environmental Affairs. 1998. *National Environmental Management: Waste Act* (No. 59 of 2008). Department of Environmental Affairs, Pretoria

Department of Environmental Affairs. 1998. *National Environmental Management: Air Quality Act* (No. 39 of 2004). Department of Environmental Affairs, Pretoria

Department of Environmental Affairs 2011. *National Waste Management Strategy,* Pretoria.

Department of Environmental Affairs 2011. *Draft Waste Classification and Management Regulations,* Notice 435 of 2011*. Pretoria.*

Department of Environmental Affairs 2012. *Draft Waste Classification and Management Regulations,* Notice 613- 615 of 2012*. Pretoria.*

Department of Water Affairs. March 2006. *Guidelines for the Utilisation and Disposal of Wastewater Sludge. Volume 1: Selection of Management Options. TT 261/06. Pretoria.*

Department of Environment and Conservation (NSW). 2004. *Environmental Guidelines: Composting and Related Organics Processing Facilities*, p 17. Sydney.

Enayetullah, I., Rothenberger, S., Maqsood Sinha, A. H. M. & Zurbrügg, C., 2006. *UNESCAP - Decentralised Composting for Cities of low- and Middle - Income Countries - A Users' Manual.* Bangladesh: Waste Concern.

Jeffares & Green (Pty) Ltd. December 2012. *National Organic Waste Composting Strategy: Final Status Quo Report.*

Jeffares & Green (Pty) Ltd. March 2013. *Guideline Document for Composting: Final Report.*

O'Leary, P. R.; Walsh, P. W. 1995. *Decision Maker's Guide to Solid Waste Management, (530-R-95-023)*. United States Environmental Protection Agency.

Sustainable Victoria, 2009. *Guide to Best Practice for Organics Recovery,* Victoria, Australia.

Pers. comm. S. Oelofse (CSIR), 2013.

http://dictionary.reference.com/browse/biosolids [Accessed: 30 January 2013]

http://www.capetown.gov.za/en/iwex/Pages/default.aspx [Accessed: 20 January 2013]

APPENDIX A: ACTION PLAN

Error! Reference source not found. summarises the issues and actions identified during the stakeholder engagement and highlights detailed actions for implementing the NOWCS

Table 1: Modify Legal and Regulatory Requirements (Action Plan)

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
1	S + M	DEA	**1. Regulatory processes**	• In terms of Section 7(1)(c) of the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA), Norms and Standards should be developed for storing, treating and processing organic waste to negate the need for licenses etc.
1	S + M	DEA, DWA, DAFF	"Regulatory processes" continued…	• **Streamline** regulatory processes to achieve a registration process, **thereby avoiding Licencing-requirements**: Waste Management License (WML) and associated environmental processes in terms of the NEM:WA and National Environmental Management Act (Act No. 107 of 1998), in addition to the renewal of licenses in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 49 of 1996). Need to review National Waste Management Strategy (2011) and draft Guidelines (GNR 613 – 615 of 2012).
3	L	Local	"Regulatory processes" continued…	• Develop a by-law to prohibit/limit disposing of green waste into the Wheelie bins or waste collection vessels (any By-laws to include alternative treatments or disposal).

[25] 1=High Priority, 2=Medium Priority, 3=Low Priority

[26] Short= 0 to 2 years, Medium= 2 to 5 years, Long= >5 years

[27] "Responsibility" means a body to coordinate and drive the action, not necessarily to physically undertake the task and the implementation.

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
1	S + M	DEA	**2. Lack of Norms and Standards and Guidelines**	• Develop guidelines/ minimum standards that focus on location and construction, design, as well as managing and operating the composting facility responsibly from an environmental, health and safety aspect. • On-going annual performance reporting in accordance with DEA norms and standards.
1	S + M	DEA, DWA,DAFF	"Lack of Norms and Standards and Guidelines" continued…	• Categorise organic waste in terms of their potential to have an environmental impact (in terms of their nature/ type). E.g. develop norms and standards for Category 1 (refer to **Table 9**) organic waste which would preclude the need for a Waste Management License. • Strategy will include typical table categories which correlate with current strategies used in baseline study. Category table needs to be workshopped with input from specialists. • *Forms part of Norms and Standards*
1	S	DEA	**3. There is no recognised common definition for organic waste , composting, and green waste.**	• Specifically for "organic waste". ***Refer to Section for the proposed definition of organic waste.*** Develop a legal definition which is applied to all related legislation. • Must tie in with the definition of "waste" in the Act (to be amended).

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
2	M	DEA,SALGA	**4. Management planning pertaining specifically to organic waste is not evident.**	• Municipalities must designate an 'organic waste champion / officer' (could be a Waste Management Officer (WMO) in terms of NEM: WA) to measure, record and monitor organic waste quantities / stream. • Powers of WMO with regards to organic waste recording, reporting and planning needs to be clarified. • Organic waste management planning to be evident in Integrated Waste Management Plans (IWMPs).
1	S	DEA	**5. There is a lack of quantifiable data on organic waste volumes produced within each province and significantly less data that differentiates between the different organic waste types. This lack of characterisation data of waste (particularly for the organic waste stream) means that waste is not monitored and managed effectively.**	• Revise the South African Waste Information System (SAWIS) which would allow for average or approximate percentages in terms of the different waste streams to be uploaded. • Revise Waste Information Regulations • Record organic waste as a type and report organic waste as a category. Refer to **Table 9** for the proposed categorisation of organic waste types.

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
2	From Registration	Composter	**6. There is a lack of quantifiable data on organic waste volumes produced within each province and significantly less data that differentiates between the different organic waste types. This lack of characterisation data of waste (particularly for the organic waste stream) means that waste is not monitored and managed effectively.**	• Registered Composters must develop their own plans specific to their context / receiving environment whereby quantities are first measured, recorded and then monitored to establish a "characterisation" of their waste-source for their jurisdiction. Based on this data, localized strategies must be developed to divert organic waste from landfill.

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
1	S	DWA,DAFF,DEA	**7. Certifying compost is costly and limits the variety of type of feedstock as input material.**	• Establish technical quality-characteristic specifications for marketing compost. • See Norms and Standards. Certification Table to be included in Norms and Standards document. • Department of Water Affairs (DWA), Department of Agriculture, Forestry and Fisheries (DAFF), the Department of Environmental Affairs (DEA) and Department of Science and Technology to adopt certification categories, waste types and usability table. • Approach DAFF to propose amendment of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 49 of 1996).
3	L	DEA	"Certifying compost is costly and limits the variety of type of feedstock as input material" continued…	• Develop good practice guidelines per industry sector regarding undertaking composting effectively and competently. • Develop when need arises.
3	L	DEA, IWM F[28]	**8. Limited composting is being undertaken within the residential sector due to a lack of knowledge/ information.**	• Develop guidelines for undertaking composting on an individual (residential) scale, as well as for communal composting.

[28] Integrated Waste Management Forum by DEA

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
2	M	SALGA,DEA	**9. Avoidance of organic waste reaching disposal facilities.**	• The adoption of Draft Regulation GNR 615 of 2012 and National Waste Management Strategy. • Investigate opportunity for local by-laws to promote diversion of organic waste from landfill. • Consider limiting the level of public contribution to the diversion of organic waste as a solution. (e.g. Public required to transport greens to public drop-offs or prohibit garden waste in wheelie bin).
1	S	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• <u>Goal:</u> o Establish baseline.
1	M	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• <u>Goal:</u> o Establish particular composting reduction goals.
1	L	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• <u>Goal:</u> o Implement reduction measures.
2	S+ M+ L	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• Incentivise ratepayers who dispose of less waste as a result of undertaking on-site/ home composting. o Recognition programme, o Tax/ Tariff/ Rates rebate o Awards at municipal level and on individual level, o Municipality to motivate and encourage individuals.

MODIFY LEGAL AND REGULATORY REQUIREMENTS				
Priority[25]	**Timeframe[26]**	**Responsibility[27]**	**Gaps**	**Actions and outcomes**
2	M	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• Require Authorities to consider new collection strategies to enhance diversion of organic waste. • Consideration of separation at source. • Review Waste Collection Standards in light of NOWCS.
2	L	DEA	"Avoidance of organic waste reaching disposal facilities" continued…	• Develop programmes/ initiatives for the creation of communal composting areas.

Table 2 summarises the issues and actions identified during the stakeholder engagement and highlights detailed actions for implementing the NOWCS.

Table 2: Understand and Facilitate Feedstock Sources and Opportunities (Action Plan)

UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES				
Priority[29]	**Timeframe**[30]	**Responsibility**[31]	**Gaps**	**Actions and outcomes**
3	L	DEA	**1. Composting of organics as an option.**	• Consider integrating NOWCS into a future "Organic Waste Management Programme". • Incorporate NOWCS into National Waste Management Strategy (2011).
2	M	DEA	**2. Facilitate market communication**	• Adapt SAWIS or develop a "Waste Exchange" system to assist in the identification of feedstocks, markets and assist in planning, collection and distribution. • Establish a web link on SAWIC website to the identified "Waste Exchange" website. o Waste Exchange available to everyone. o Must be able to see who has exchanged.
1	S	DEA	**3. Identification of key feedstock areas.**	• DEA to task Provincial Integrated Waste Management Forums to identify large organic waste generators to divert and possibly compost organic waste.

[29] 1=High Priority, 2=Medium Priority, 3=Low Priority

[30] Short= 0 to 2 years, Medium= 2 to 5 years, Long= >5 years

[31] "Responsibility" means a body to coordinate and drive the action, not necessarily to physically undertake the task and the implementation

UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES				
Priority[29]	**Timeframe**[30]	**Responsibility**[31]	**Gaps**	**Actions and outcomes**
1	M	PROV	"Identification of key feedstock areas" continued…	• Provincial Integrated Waste Management Forums to identify large organic waste generators to divert and possibly compost organic waste
2	M	DEA(SAWIC)	**4. Geographic representation (GIS) of feedstock and market opportunities.**	• Generate and distribute a map on composting facilities, drop-off facilities etc. and their distances to main suburbs. • All information on system presented on map. • Should form part of SAWIS.
1	S	DEA,DWA,DAFF	**5. Develop standard categorisation of organics/waste – Compliance and Classification Criteria**	• *Similar to "Certifying compost, quality of output" above.*

UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES				
Priority[29]	**Timeframe**[30]	**Responsibility**[31]	**Gaps**	**Actions and outcomes**
1	S	DEA,DAFF	**6. Develop minimum standards / requirements for compost – source material, quality assurance, product standards, application standards etc. – similar to those detailed in the Wastewater Sludge Guidelines.**	• *Similar to "Certifying compost, quality of output" above.* • Norms and Standards apply. • DEA is the regulatory authority for the waste feedstock, registration, and composting operation. • DAFF becomes the regulatory authority of the final product (no longer a waste product).
1	S	DAFF	**7. Identify the "certification" or regulatory authority to manage quality of final product.**	• Consider the DAFF (similar to Fertilizer process).
1	S-M	COMPOSTER	**8. Composting is widely considered to be financially non-viable**	• Develop a "full-cost accounting model" for composting that considers airspace offset costs and environmental costs.

Table 3 summarises the issues and actions identified during the stakeholder engagement and highlights detailed actions for implementing the NOWCS

Table 3: Provide the Necessary Support Structure and Functions to Implementing Composting (Action Plan)

PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING				
Priority[32]	**Timeframe[33]**	**Responsibility[34]**	**Gaps**	**Actions and outcomes**

1	M	DEA	**1. Diversion of organic waste and implementation.**	• Develop IWMP to include and identify diversion strategies of organic waste.
				• Inclusion into:
				  ○ Integrated Development Plans,
				  ○ Integrated Waste Management Plans, and
				  ▪ Recycling breakdown - e.g. composting.
				  ○ Relevant Industrial Waste Management Plans.
				  ▪ Elements of organic waste to be included.
				• Hand in hand with training and awareness.
				• Revise *Guideline for the Development of Integrated Waste Management Plans, 2012* to include organic waste stream.
				• Organic waste categorisation to be adopted.
				• Training and awareness must be prioritised and standardised to ensure effective implementation. Include the development of standardised training manuals and awareness raising strategies that under-resourced municipalities can use.

[32] 1=High Priority, 2=Medium Priority, 3=Low Priority

[33] Short= 0 to 2 years, Medium= 2 to 5 years, Long= >5 years

[34] "Responsibility" means a body to coordinate and drive the action, not necessarily to physically undertake the task and the implementation.

PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING				
Priority[32]	**Timeframe[33]**	**Responsibility[34]**	**Gaps**	**Actions and outcomes**
1	M	IA[35]	"Diversion of organic waste and implementation" continued…	• Integrated Waste Management Plans to identify all relevant organic waste generators within the municipal boundaries and consult with DAFF and other relevant generators in order to maximise opportunities for composting.
2	S	DEA	**2. Departmental consultation and support required.**	• Assign expertise for high level composting forum to Integrated Waste Management Forum (National and Provincial). • Consider responsibility structure used by the Institute of Waste Management South Africa (IWMSA) for this forum for debate. • A specialist composting forum is needed to serve industry being a part of the above mentioned Integrated Waste Management Forum: o Easy to use, interactive, low level, technology based (consider existing business, social networks e.g. LinkedIn, Twitter, etc.) o Possibly link on DEA website-link to 'question platform'-requires administration. Possibly administered by member of Integrated Waste Management Forum. o Public can email/log concern. o Need for management/facilitator to address queries. o Problems: co-ordination and budget. o Need for better means of communication between authorities and stakeholders. o Consider expert members in forum within branches-breakdown further into "interest groups".

[35] IA: Implementing Authority

PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING				
Priority[32]	**Timeframe[33]**	**Responsibility[34]**	**Gaps**	**Actions and outcomes**
				• **<u>Important for strategy</u>**: Engagement with established composting bodies. • Key issue: need avenue to debate discuss, address queries.
1	S + M	DEA	"Departmental consultation and support required" continued…	• Develop Norms and Standards to establish appropriate quality standards, monitoring and the classification/categorisation for compost. • DEA to identify synergies with DAFF in undertaking quality control for composting facilities. • Consider thresholds-relate to categories. • Norms and Standards- Small, Medium and Micro Enterprises (SMME) and job creation is key.
1	M	DEA	"Departmental consultation and support required" continued…	• National and Provincial, District and Local authorities to address composting opportunities by means of the IWMPs and IDPs.
1	S + M	SALGA	"Departmental consultation and support required" continued…	• Municipalities, through Provincial Integrated Waste Management forums, seek synergies and opportunities to combine resources to assist one another to promote and develop organic waste treatment facilities such as composting facilities.

PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING				
Priority[32]	**Timeframe[33]**	**Responsibility[34]**	**Gaps**	**Actions and outcomes**
1	S	DTI, DBSA	"Departmental consultation and support required" continued…	• Identify and seek Government funding / subsidisation sources to enable municipalities to promote and implement organic waste treatment facilities (grant / green funding, employment opportunity funding, etc.). o Department of Trade and Industry (DTI) is the key department to engage with. Approach DTI with strategy-opportunity for funding. o Green funding through Development Bank of Southern Africa (DBSA). o Carbon Credits. o Access to funding needs to be easy. o SMME will not have funding. o Any options other than waste to landfill incurs greater expense. o Service level agreement between public and private (example-sharing transport cost).
2	M	DEA	**3. SAWIS and other information systems.**	• Waste Information Systems to be modified and implemented to capture full and updated information on organic wastes generated (in all Provinces), landfilled, and recycled to composting or other.

PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING				
Priority[32]	**Timeframe[33]**	**Responsibility[34]**	**Gaps**	**Actions and outcomes**

1	S	DEA	"SAWIS and other information systems" continued…	• Consider record keeping at "Waste Type" level and reporting at "Waste Category" level.
				  o Detailed reporting allows for effective communication.
				  o Will be addressed in Norms and Standards.
				• Norms and Standards will identify the trigger for registration and contain compliance criteria.
				• Offer a Waste Information Service helpdesk/ helpline for assistance within each Province.
				• Standardise the "organic" waste information reporting and application forms.

1	S	SALGA	**Composting is widely regarded to be financially non-viable and unsustainable**	• Municipalities to consider measures to include the private sector to achieve more cost-effective organic waste recycling solutions (e.g. providing land, infrastructure and guaranteed feedstock) • Funding sources from public and private sources to be considered. Initiatives for providing employment opportunities to attract seed or donor funding. *See "Departmental consultation and support required" above.* • Existing and potential markets to be interrogated to determine market quality requirements and to determine ways of increasing demand for compost

Table 4 summarises the issues and actions identified during the stakeholder engagement and highlights detailed actions for implementing the NOWCS

Table 4: Undertake Education, Skills Transfer and Awareness (Action Plan)

UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS				
Priority[36]	**Timeframe**[37]	**Responsibility**[38]	**Gaps**	**Actions and outcomes**
2	S	DEA	**1. Quantities are not measured, recorded, and/ or monitored.**	• Compile an Information Booklet on how to quantify, record and monitor organic waste easily and pragmatically, plus: o The registration process, o One page summary-flagging important issues, and o References to legislation.
2	S-M	DEA	**2. Awareness for registration**	• Invitation letters to be issued to known composters encouraging registration **(assuming the registration process is adopted)** • DEA to liaise with DTI regarding their database of all businesses.
3	M	DEA	**3. There is a lack of information (manuals and guidelines) regarding undertaking home composting in South Africa.**	• Develop a user-friendly, easy to read and comprehendible guidebook/ pamphlet/ flyer on making compost and the benefits thereof. • Many international versions- need South African DEA version.

[36] 1=High Priority, 2=Medium Priority, 3=Low Priority

[37] Short= 0 to 2 years, Medium= 2 to 5 years, Long= >5 years

[38] "Responsibility" means a body to coordinate and drive the action, not necessarily to physically undertake the task and the implementation.

UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS				
Priority[36]	**Timeframe[37]**	**Responsibility[38]**	**Gaps**	**Actions and outcomes**
2	S	DEA	**4. Network based information sharing and skills transfer.**	• Refer to" *Departmental consultation and support required"* issue above.
2	S-M	DEA	**5. Web based information sharing.**	• Develop a website for public use that displays all organic waste information relating to sites in the various Provinces that receive/generate different organic waste types, etc. (e.g. the Integrated Waste Exchange website- IWEX[39]).
2	M-L	DEA	**6. There is a general lack of information and awareness regarding how to make compost and the different methods.**	• Educate and generate awareness amongst the general public (National campaigns) on producing compost easily and effectively as well as on the benefits of using compost, contamination prevention and separation at source. • Link with existing campaigns.
2	M-L	LG	**7. A large amount of food waste generated in some areas is being disposed of due to a lack of knowledge on composting and the benefits thereof.**	• Undertake pilot studies (possibly incorporating tertiary students) to establish the most effective means of composting based on the affected communities and receiving environment with the intention to create communal composting areas. • Forms part of local authority implementation plan • Once piloted, share successes and experiences with other communities via workshops.

[39] A free online system that enables waste generators and users to exchange waste materials (City of Cape Town: http://www.capetown.gov.za/en/iwex/Pages/default.aspx)

UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS				
Priority[36]	**Timeframe[37]**	**Responsibility[38]**	**Gaps**	**Actions and outcomes**
2	M	DEA (DoE)	**8. Promote the use of compost and organic fertilizers.**	• Develop 'best practice' guidelines for agriculture/ farming sector regarding methods of composting. • Investigate inclusion of compost knowledge and awareness and waste management in school and tertiary curriculum. • Encourage tertiary curricula to include organic composting. Agricultural students (colleges and universities) to be taught about use and benefits of organic compost and not just on chemical fertilizers (cradle-to-cradle waste management). • Initiate relationship with tertiary institutions educators. (On the benefits of having students undertake chosen research topics). • Compile a list of research opportunities. • Undertake more research on composting methods using different feedstock materials, composition, benefits, uses, ratios etc. which would be used to update the curriculum.
2	L	DAFF	"Promote the use of compost and organic fertilizers" continued…	• Investigate mechanisms for consumer markets and any current or future IndWMPs as "drivers" to promote use of organic farming methods with respect to the use of compost and organic fertilizers rather than artificial fertilizers.

UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS				
Priority[36]	**Timeframe[37]**	**Responsibility[38]**	**Gaps**	**Actions and outcomes**
2	M	DEA,DAF	**9. Communication to interested and affected parties**	• Publish articles in Farmer's Weekly/ Agri Magazine etc. • Communicate via the DAFF and/ or Agri SA/ AgriMark, Farmers Market, etc.
1	S + M	SALGA	**10. Many Municipalities lack detailed technical knowledge on effectively starting, operating and managing a composting facility.**	• Educate/ train/ upskill municipalities on how to measure, record and monitor waste quantities per stream via workshops to understand the current waste generation and disposal context within their area of jurisdiction. • Include organic waste management in Councillor Induction Programme.
1	M	DEA, Municipalities	**11. Contracts**	• Educate "Implementing Authorities" (IAs) on suitability, pitfalls and benefits of Service Level Agreements, Public Private Partnerships, Annual Contracts, etc. – so they may consider sharing the operations with a private entity. o Approach National Treasury for guidance on Public Private Partnerships. o Consider the scenario: private specialist waste (composting) business undertake the operations on site and would produce and sell the compost, while the Municipality is the enabler (provides licensed land to the private composter).

UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS				
Priority[36]	**Timeframe[37]**	**Responsibility[38]**	**Gaps**	**Actions and outcomes**
2	M	DEA	**12. There is limited knowledge of the National Waste Information Regulations (GNR 625, 2012) and associated obligation by individuals conducting a listed waste management activity which from 1 January 2013 were required to register, record, and report to the respective Provincial Waste Information System (WIS).**	• Similar to "Regulatory processes". • Include in general awareness campaigns.

Table 5 summarises the issues and actions identified during the stakeholder engagement and highlights detailed actions for implementing the NOWCS

Table 5: Adjust the Municipal Structure, Responsibilities and Create Roles for the Private Sector (Action Plan)

ADJUST THE MUNICIPAL STRUCTURE, RESPONSIBILITIES AND CREATE ROLES FOR THE PRIVATE SECTOR				
Priority[40]	**Timeframe[41]**	**Responsibility[42]**	**Gaps**	**Actions and outcomes**
1	S + M	SALGA	**1. Structure**	• Roles and responsibilities within the municipal structure need to be reviewed and amended (if necessary) to include the identification of responsible person to "champion" the beneficial use of organic waste (and any other waste). Consider support person to Waste Management Officer (WMO). • Shift from traditional collect, transport and dispose towards Waste Treatment hierarchy.
2-3	M	SALGA	**2. Partnership and Private sector** **Waste minimisation: multiple role players.**	• Local municipalities to assess the need for expertise from private industry. • Look at partnership scenarios-private only, private-public, or public only. o Will depend on treatment technology, capacity of municipality etc. • Refer to guidelines in place for public-private partnerships by National Treasury.

[40] 1=High Priority, 2=Medium Priority, 3=Low Priority

[41] Short= 0 to 2 years, Medium= 2 to 5 years, Long= >5 years

[42] "Responsibility" means a body to coordinate and drive the action, not necessarily to physically undertake the task and the implementation.

APPENDIX B: GOALS & OBJECTIVES

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
Goal 1: **REVIEW LEGAL AND REGULATORY REQUIREMENTS**			
Objective 1.1: Define "compostable organic waste", "green waste" and "composting".	1. Amend NEM:WA and associated Regulations. 2. The definition of "compost" and "municipal compost" must be aligned. 3. The proposed definition of "compostable organic waste" must be workshopped and agreed, as amended (if necessary). This also applies to "green waste" and "composting". 4. The definitions should not only focus on green waste and animal waste but should also include a broader spectrum of compostable substances e.g. wastewater sludge etc.	NEM:WA & referenced legislation. Public consultation. DEA Workshop with DWA, DAFF. New definitions to be included in "Norms and Standards".	Public & Government consultation
Objective 1.2: Develop norms and standards, amend current legislation and integrate standards with Department of Agriculture practices.	1. Establish "Norms and Standards" for composting processes. To include (as a minimum): • Registration process (to replace necessity for licencing or full EIA processes). • Identification of job creation necessities, in particular youth employment and skills transfer. • Reference to "Green Economy" and the implications thereof. • Reporting on environmental impacts and abbreviated impact assessment for establishing a composting facility (minimum reporting). • Categories of organic waste for composting (relates to registration). • Storage, treatment and processing. • Quality control requirements (testing, monitoring). • Standards. • Reporting and controls, SAWIS (with GIS info). • Development of facilities (design standards) & related OH&S and environmental	NWMS NEMA (Act 107 of 1998) NEM:WA (Act 59 of 2008) Department of Agriculture Regulations & Acts such as (Act No. 36 of 1947): GNR 732 Regulations Regarding Fertilizers, as amended. NEM:AQA (Act 39 of 2004) and related regulations. National Waste Collection standards By-laws where required	Public & Government consultation

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
	elements. • Decision making hierarchy and control responsibility. • Costing model required for registration. • Identify communication channels for registration adherence (enforcement). • Identify Certification Table for certifying quality of final product (compost in this case) (e.g. product standard). 2. Amend NWMS. 3. Amend NEM:WA. 4. Integration with SAWIS, SAWIBR 5. Integration with Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947): GNR 732 Regulations Regarding Fertilizers, as amended. 6. Integration with Department of Water Affairs (DWA), Department of Agriculture, Forestry and Fisheries (DAFF), the Department of Environmental Affairs (DEA) and Department of Science and Technology.	(implementable at municipal level) OHSA (Act 85 of 1993) SANS/ SABS/ Fertiliser Farm Feeds and Agricultural Remedies and Stock Remedies Act. WMO. Register of composters. Nat. Water Act (Act 36 of 1998). SANS 10228. Green Scorpions. Any relevant Provincial Legislation and any local By-laws.	
Objective 1.3: Formalise diversion requirements (from landfill).	1. Implement Draft regulations (GNR 615, 2012). 2. Municipalities to establish organic waste volumes and characterisation for potential beneficiation (e.g. composting). 3. Revise *Guideline for the Development of Integrated Waste Management Plans, 2012* to include organic waste stream.	Legislation By-laws WMO (or organic waste champion) IWMP IDP New “Norms & Standards”	Public consultation Effect on landfill, CDM projects, methane generation

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
Objective 1.4: Amend reporting on waste quantum.	1. Require reporting on organic waste types/categories. 2. Update SAWIBR.	SAWIS SAWIBR	Understanding, knowledge, skill
Objective 1.5: Establish a certification standard for compost quality.	1. Establish technical quality-characteristic specifications for marketing compost. 2. Implement under "norms and standards".	New "Norms & Standards" Department of Agriculture Regulations	Monitoring and management of certification process and quality testing
Goal 2: **UNDERSTAND AND FACILITATE FEEDSTOCK SOURCES AND OPPORTUNITIES**			
Objective 2.1: Identify opportunities for composting operations with specific attention to job creation, diversion from landfill and achieving cradle-to-cradle approach.	1. Municipalities to establish existing organic waste volumes generated and characterise the organic waste stream. 2. Municipalities to evaluate opportunity for composting (or supplementary composting) 3. Task Provincial and District Integrated Waste Management Forums to identify large organic waste generators to divert and possibly compost organic waste	IDP IWMP Provincial and District Integrated Waste Management Forums WMO	**Note:** As stated above, to achieve the targets will require effort and investment. A consideration of revenue generation and the impact on municipal accounts and people's ability to afford these additional services, must be considered for each opportunity identified. Lack of capacity,

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
			knowledge, skill, resources (human and financial) Prioritisation of tasks.
Objective 2.2: Monitor and record the diversion, disposal and treatment of organic waste. Characterisation of organic waste.	1. Amend GW20 of NWIBR (625 of 2012) 2. Establish "Norms & Standards" 3. Adapt SAWIS accordingly	SAWIS SAWIBR NWIBR	Training, understanding, capacity, resources (human and financial)
Objective 2.3: Establish waste exchange/ website / Communication tool.	1. "Exchange" (communication) platform for public use. (e.g. website, LinkedIn, public forums, Centres of Excellence).	SAWIS or "waste exchange" platform. New "Norms & Standards"	Requires maintenance
Objective 2.4: Integrate NOWCS into a future "Organic Waste Management Programme"	1. Establish an "Organic Waste Management Programme" including other treatment options for organic waste. Include in education and awareness drives.		DEA Resources
Goal 3: **PROVIDE THE NECESSARY SUPPORT STRUCTURE AND FUNCTIONS TO IMPLEMENTING COMPOSTING**			
Objective 3.1: Establish clear authority responsibilities and decision	1. Include in new "Norms & Standards" 2. Resolve the apparent contradiction arising between NWMS and MFMA regarding the function of municipalities relating to the management and processing of organic waste.	DEA DWA DAFF	

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
making			
Objective 3.2: Identify funding support and incentives	1. Ring-fence funding for promotion of viable, sustainable composting initiatives. Same principles as MIG funding principles. 2. Job creation should be aligned with "jobs-fund" (by DBSA) and Expanded Public Works Programme (EPWP).	DTI DEA MIG DBSA Private funding Grants	
Objective 3.3: Understand synergies with Private sector/ support to municipalities and between municipalities.	1. Provide guidance on private involvement in contracts. 2. Cross-municipal border operations (resource and cost sharing).	SALGA Provincial and District Integrated Waste Management Forums COGTA[43]	
Objective 3.4: Establish forum for communication	1. Formalise forum for communication between parties (public and private). Consider as a supplement to Provincial Integrated Waste Management Forum. 2. Assign expertise for high level composting forum to Integrated Waste Management Forum (National and Provincial). 3. Offer a Waste Information Service helpdesk/ helpline for assistance.	Provincial and District Integrated Waste Management Forums. New "Norms & Standards"	Resources (human and financial)
Goal 4: **UNDERTAKE EDUCATION, SKILLS TRANSFER AND AWARENESS**			
Objective 4.1: Government run education and awareness programmes	1. Develop education material (information booklet and best practice guidelines) to develop capability at the various levels. 2. Distribute education material (information booklet and best practice guidelines) on	DTI DEA Website	Financing Human resources

[43] Department of Co-operative Governance and Traditional Affairs

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
	technicalities and benefits of composting at a: 3. Municipal level. 4. Community level (via Municipalities). 5. Residential/ household level. 6. Establish a website for information sharing. 7. Municipalities to understand alternatives to composting (organic waste beneficiation). 8. Municipalities to identify skill/knowledge shortages. 9. Provide guidance on composting technology selection/ alternatives (skills development). 10. Develop a user-friendly guide/toolkit for Municipalities in terms of composting and chipping.	COGTA SETA's Provincial and District Integrated Waste Management Forums. Research papers and results of studies made public via Forums.	
Goal 5: **INCORPORATE COMPOSTING INTO MUNICIPAL PLANNING, RESPONSIBILITIES AND CREATE ROLES FOR THE PRIVATE SECTOR**			
Objective 5.1: Identify clear roles and responsibilities	1. Include clear roles and responsibilities in the new "Norms & Standards". 2. WMO to report on departmental structure enabling role & responsibilities. 3. Each Authority to clarify inter-departmental coordination. Synergies need to be established. Services need to be integrated in municipalities to further potential demand for compost.	New "Norms & Standards"	
Objective 5.2: Identify responsibilities for reporting opportunities and controls	1. Waste Management Officer to understand role and task. 2. Include specific reporting responsibilities and requirements in the new "Norms & Standards"	DEA WMO New "Norms & Standards"	
Objective 5.3: Facilitate, enable and guide various levels of Public	1. Education programme with Municipalities. 2. Municipalities to assess the need for expertise from private industry.	DEA SALGA COGTA	Human resources. Capital resources

Goals & Objectives	Indicators, key actions and key items forming this objective	Instruments to achieve objective	Limiting factors
involvement (from Private, through Public-Private, to Public)			