DEPARTMENT OF FORESTRY, FISHERIES AND THE ENVIRONMENT

NO. 6556 **29 August 2025**

NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT NO. 59 OF 2008)

STRATEGY FOR REDUCING FOOD LOSSES AND WASTE

I, Dion Travers George, Minister of Forestry, Fisheries, and the Environment, hereby publish the Strategy for Reducing Food Losses and Waste for implementation, as set out in the Schedule hereto.

DR DION TRAVERS GEORGE
MINISTER OF FORESTRY, FISHERIES AND THE ENVIRONMENT

forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

SCHEDULE

STRATEGY FOR REDUCING FOOD LOSSES AND WASTE

2025-2030

Table of Contents

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

ARB	**Advertising Regulatory Board**
ARC	Agricultural Research Council
BSF	Black Soldier Fly Industry
CGCSA	Consumer Goods Council of South Africa
CNG	compressed natural gas
CSIR	Council for Scientific and Industrial Research
CWE	Chemicals and Waste Economy
DBE	Department of Basic Education
DCOGTA	Department of Cooperative Governance and Traditional Affairs
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEA&DP	Western Cape Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries, and the Environment
DFI	Development Finance Institution
DHET	Department of Higher Education and Technology
DMRE	Department of Mineral Resources and Energy
DoEL	Department of Employment and Labour
DoH	Department of Health
DoT	Department of Transport
DPME	Department of Planning, Monitoring and Evaluation
DSD	Department of Social Development
DSI	Department of Science and Innovation
The dtic	Department of Trade, Industry & Competition
EPR	Extended Producer Responsibility
FAO	Food and Agriculture Organisation
FEFO	First Expired First Out
FIFO	First In First Out
FLW	Food Loss and Waste
FLWS	Food Loss and Waste Strategy
FLWVA	Food Loss and Waste Initiative
FRH	Food Recovery Hierarchy
FSC	Food Supply Chain
GHG	Green House Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HFNSP	Household Food and Nutrition Security Programme
ICAO	International Civil Aviation Organisation
ICT	Information and Communication Technologies
IDC	Industrial Development Corporation
IRL	Retail Laboratory
IS	Industrial Symbiosis
ITAC	International Trade Administration Commission of South Africa
IVC	In-vessel composting
IWMP	Integrated Waste Management Plans
LSFO	Least Shelf life, First Out'
NAMC	National Agricultural Marketing Council
NCPC-SA	National Cleaner Production Centre – South Africa
NDA	National Development Agency
NDP	National Development Plan

NEMA	National Environmental Management Act
NERSA	National Energy Regulator of South Africa
NOWCS	National Organic Waste Composting Strategy
ORASA	Organics Recycling Association of South Africa
PBO	Public Benefit Organisation
PRO	Producer Responsibility Organisations
SABS	South African Bureau of Standards
SALGA	The South African Local Government Association
SANBI	The South African National Biodiversity Institute
SAWIS	South African Waste Information System
SDG	Sustainable Development Goal
SMEs	Small and medium enterprises
TIA	Technology and Innovation Agency
WISP	Western Cape Industrial Symbiosis Programme

ACKNOWLEDGEMENTS

This Strategy is based on papers produced by expert groups and other additional information gathered by the project team. Every effort has been made to contact and acknowledge copyright holders.

We extend our gratitude for the valuable contributions from various government departments, industry, labour, civil society, academia, and researchers. The Strategy was peer reviewed by the Council for Scientific and Industrial Research.

EXECUTIVE SUMMARY

Food waste is a recognised global and South African issue. An estimated 10.3 million tonnes[1] of food is wasted per year in South Africa. This in a context where approximately 60% of South African households are food insecure (30%[2] at risk of and 31%[3] experiencing hunger), and more than 13 million children live in poverty[4]. Food waste also has a significant impact on the environment – precious water resources and energy are wasted, and biodiversity is impacted. If food wastage were a country, it would be the third largest greenhouse gas emitting country in the world. This has become unsustainable and continue to have compounding impacts on the economy of the country.

With about 31 million tonnes of food being produced every year, a staggering 10 million tonnes of that food ends up on landfills before it even makes it to consumer's shopping trolleys. This massive loss in produce is largely attributed to the production process – either before or during the harvesting process – and processing and packaging – whereby perfectly nutritious food items are set aside due to these not meeting strict specification requirements. As a result, millions of people are left with empty plates[5].

South Africa is a signatory to the United Nations Sustainable Development Goals (SDGs) with specific focus on SDG12 which seeks to "ensure sustainable consumption and production patterns. Target 12.3 calls for cutting in half per capita global food waste at the retail and consumer level and reducing food losses along production and supply chains (including post-harvest losses) by 2030.

The United Nations estimated that the global population will increase from approximately 8 billion in 2022 to 8.6 billion in 2030 and 9.8 billion in 2050. In line with this population growth, it is projected that global food production must increase by 70% by 2050. However, this upsurge in food production needs to be accompanied by food losses and waste reduction. Globally, about one-third of food produced for human consumption is lost or wasted each year (Gustavsson et al., 2011). Food waste comes with food insecurity in addition to economic and environmental impacts. In addition to reducing the associated economic and environmental impacts, food waste reduction therefore provides an attractive opportunity to improve food security in South Africa, the Department of Forestry, Fisheries and the Environment (DFFE) has developed the Food Losses and Waste Strategy as one of the key interventions of the National Waste Management Strategy (NWMS) 2020. NWMS, 2020 is a waste management policy directive that

[1] Oelofse, Polasi, Haywood, & Musvoto 2021
[2] South African National Health and Nutrition Examination Survey
[3] Statistics South Africa General Household Survey 2016
[4] Statistics South Africa 2015
[5] WWF, 2017. *Food Loss and Waste: Facts and Futures.* WWF South Africa

assimilates the department's strategic approach to waste management with the commitments and directives of the SDGs, South Africa's National Development Plan: Vision 2030 and the Chemicals and Waste Economy Phakisa Outcomes. NMWS creates an enabling policy environment and provide support to the private sector on opportunities for waste prevention and minimisation through product design, innovation and the adoption of new technologies and standards in relation to waste streams of concern due to their toxicity or volume and organic waste is one of those waste streams. As per NWMS (2020) organic waste contributes more than 50% of general waste disposed and has a comparative recycling rate of 49% and almost one third of organic waste consists of food waste. It is envisaged that the effective implementation of the FLWS will contribute to the waste diversion targets set out in the NWMS, 2020.

Food waste occurs at all stages of the food supply chain (FSC) from production, through packaging, storage and processing, distribution, and retail, up to the consumer level. Although high-level information was available, there has been a lack of research and data which identifies exactly where and why these losses are occurring, this FLWS therefore addresses that gap and gives effect to the findings and recommendations in the conclusion and implementation plan of this strategy.

The Food Losses and Waste Strategy was developed based on current research, reviews from sector experts and inputs from industry stakeholders, the result of this translated into a focused implementation plan building on the established FLWI with four strategic outcomes backed by strong legislative instruments and best practices, as follows:

- Outcome 1: Creating enabling environment for the implementation of FLWS interventions
- Outcome 2: FLW Beneficiation and Circular Economy
- Outcome 3: Collaboration, Capacity Building Awareness Raising
- Outcome 4: Food Waste Diversion and GHG Emission Reduction

The scene is set through an approach which is highly collaborative. Consultation was undertaken extensively and fundamental to the implementation and oversight of the plan across all stakeholders. The strategy will be valid for five (5) years from the date of approval and gazetting for implementation and will be reviewed periodically. The review of the strategy will be triggered by the need and submissions from sector experts and stakeholders involved in the food production and distribution value chain. This strategy is developed with an implementation plan to ensure successful implementation and risk reduction.

BACKGROUND AND RATIONALE

The United Nations Environment Programme's 2021 Food Waste Index reported that an estimated 931 million tonnes of food end up in the trash every year (UNEP, 2021). Approximately 33% of the food produced for human consumption in the world is lost or wasted. Approximately half of the 33% loss which is 16.5 tonnes take place during harvesting, with processing, packaging, distribution, and retail accounting for a further 45% of wasted food – the remaining 5% of food waste is the responsibility of consumers. The impact of food waste includes waste of resources such as water and energy through the supply chain, socio economic impact in respect of food security. Due to the growing environmental challenge but also social and economic concerns, food waste is increasingly acknowledged as an urgent issue among governments, businesses, NGOs, academics, and the general public.

Statistics South Africa (2022) reported that 11.6% South African households were experiencing hunger in 2021. It has also been documented that around 10 million tonnes of the food produced in South Africa goes to waste each year (Oelofse, 2021 and WWF, 2017). With the high levels of poverty and food insecurity in South Africa, this level of food waste does not make sense and unless addressed it could prove to be a threat to stability in South Africa. Firstly, the food produced could be consumed by people and secondly, the resources used to produce the food would not be lost. Food production involves the use of water, energy, labour, and other financial resources, which if wasted negatively impact both the environment and the economy. Packaging material and related issues, as well as damage to the environment should also be considered. As the number of people living in South Africa continues to grow, it is key that we produce and consume food in a way that means that South Africa will be food secure for generations to come. South Africa has committed to taking action to achieve the United Nations' Sustainable Development Goal 12.3, which stated that "by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains" (Food and Agriculture Organisation (FAO), 2015).

In 2017, South Africa generated approximately 54 million tonnes of general waste (DEA, 2018). Of this waste, more than 50% was classified as organic waste; and it was reported that food waste might account for about one-third of the organic waste (DEFF, 2020). In 2012, it was estimated that food waste cost South Africa R 61.5 billion per annum across the FSC, which translates to 2.1% of the annual gross domestic product (Nahman & de Lange, 2013). Food loss and waste have negative implications on the environment, human health and on food security in South Africa. Environmental and health impacts are associated with the large volumes of waste disposal in landfills, emissions of harmful gases, human toxicity, waste of resources, deforestation, and pollution.

The main drivers of food waste include population growth and urbanisation, which require both increased agricultural production and more complex distribution, processing, and retail value chains to be in place. Changes in diet and food preferences in middle-income countries such as South Africa tend towards more resource intensive production. Lack of capacity and awareness on the impact of food waste and the disparity in service between urban and rural areas exacerbate the food waste problem.

Within the Waste Minimization pillar of the NWMS, 2020, food waste was identified as one of the areas that require intervention due to the growing environmental but also social and economic concerns, associated with food waste. One of the focus areas of the NWMS under the Waste Minimisation Pillar calls for advancing organic waste as a resource through the development and implementation of focused strategy on preventing food waste that:

- Includes increasing awareness on the impact of food waste,
- Is aligned to implementation of the Chemicals and Waste Economy Lab Outcomes,
- Strongly integrates different disciplinary perspectives, and
- Maps the determinants of food waste generation to deepen the understanding of household practices and helps design food waste prevention strategies.

The FLW is a complex issue requiring sustainable solutions and synergies among a wide range of stakeholders, where new and existing networks, platforms, and initiatives on FLW must be streamlined and integrated. Empirical data on FLW suggest policy foci and strategic actions that stakeholders such as governments, the private sector, the donor community, research institutions, and international development organisations can and should take. From a governance standpoint, clear directional guidance and implementable interventions are imperative and should be benchmarked on strategic outcomes in achieving success.

PURPOSE

The overall purpose is to develop an action plan/policy instrument that seeks to address food loss and waste as a key intervention of the NWMS, 2020 while responding to other strategic priorities of government including NDP Vision 2023 and Multilateral Environmental Agreements such as the United Nations SDGs.

The idea of this policy instrument is to highlight the food losses and waste occurring along the entire Food Supply Chain (FSC) with the aim of contributing to the reduction of food wastage through the adoption of

new technologies, circular economy approaches and ultimately improving food security and mitigating the negative environmental impacts associated with food losses and waste, taking into consideration the best practices and policies that are best suited for the South African context.

The Food Losses and Waste Strategy will be applicable for implementation to:

- All organs of the State that have a responsibility for waste management;
- Private sector organisations, including Small, Medium and Micro Enterprises (SMME's) and Co-operatives (co-ops) that are involved in, and constitute the waste management sector;
- Civil society organisations involved in waste management, environmental awareness, environmental sustainability, and sustainable development; and
- Academia and research institutions that are involved in waste management, research and academic work relating to the three Pillars of the Strategy.

STRATEGIC FOCUS

VISION

Food losses along production and supply chains, including post-harvest losses and food waste at all levels line with the NWMS, 2020 food waste reduction target of 30% and the SDG 12.3 target of 50% reduction in per capita global food waste at the retail and consumer levels.

STRATEGIC OUTCOMES

The five strategic outcomes identified as the cornerstones for achieving the FLW reduction are as follows:

- Outcome 1: Creating enabling environment for the implementation of FLWS interventions
- Outcome 2: FLW Beneficiation and Circular Economy
- Outcome 3: Collaboration, Capacity Building and Awareness Raising
- Outcome 4: Food Waste Diversion and GHG Emission Reduction

The FLWS targets which are in line with the strategic outcomes are tabled under the Implementation Plan.

ALIGNMENT OF THE FLWS WITH EXISTING INSTRUMENTS

OPERATION PHAKISA: CHEMICALS AND WASTE ECONOMY

Operation Phakisa is a government initiative that aims to reduce the negative environmental impacts of waste, formalise, and protect informal workers in the waste sector, and contribute to South Africa's Gross Domestic Product (GDP) and economic transformation. It is a unique initiative that addresses issues highlighted in the NDP (2030), such as poverty, unemployment, and inequality, and is strategically designed to fast-track the implementation of solutions to critical development issues. The Chemicals and Waste Phakisa was launched in 2019 and Food Waste was identified as one of the priority waste streams as part of the initiatives that focused on improving product design and waste minimization.

SOUTH AFRICAN FOOD LOSS AND WASTE INITIATIVE

In 2020 the Consumer Goods Council of South Africa (CGCSA), in partnership with the National Department of Trade, Industry and Competition (***the dtic***) and the DFFE, launched the Food Loss and Waste Initiative (SA FLWI), an initiative to prevent food loss and waste from happening in the first place and when food loss and waste is unavoidable, it must be minimised and beneficiated or recovered in line with the food recovery hierarchy (CGCSA, 2020a). The South African Food Loss and Waste Initiative brings stakeholders across the food value chain together to reduce food loss and waste in South Africa by half by 2030 in line with SDG 12.3, to adopt the food utilisation hierarchy, and to identify food surplus and waste management solutions that respond to a circular economy and sustainable food systems agenda. As of 29 September 2023, there were 74 core and 41 associate signatories to the FLWI. Efforts to reduce food waste requires active involvement of all the stakeholders across the food supply chain. The initiatives such as the SA FLWI are very important in reducing food loss and waste.

FOOD WASTE PREVENTION & MANAGEMENT GUIDELINE FOR SOUTH AFRICA

Launched in 2021, the guideline[6] focuses on the drivers and possible actions that can be taken to prevent and manage food waste throughout the food supply chain. In this guideline, food waste is considered to include pre-consumer food losses and post-consumer food waste. The guideline aims to assist South Africa to decouple economic development and food wastage at the consumer level. The guideline raises awareness on food wastage throughout the supply chain, but specifically at consumer level and helps role

[6] https://www.csir.co.za/sites/default/files/Documents/Food%20waste%20prevention_LANDSCAPE%28EDMS%29%20-%2005-02-2021.pdf

players in the food supply chain to identify pain points where food waste is likely to occur and advises on what can be done to prevent avoidable food waste and minimise unavoidable food waste.

SA FLWI FOOD DONATION BEST PRACTICE GUIDELINE

The Food Donation Best Practice Guideline[7] was developed by a working group established as part of the South African Food Loss and Waste Initiative (SA FLWI). The working group was tasked with finding solutions and overcome barriers faced by those who are willing to donate food. Before this guideline was developed, the food Industry raised concerns that while there is willingness to donate surplus food, it is not easy to do so in South Africa for various reasons. The purpose of this guideline is to inspire farmers, food manufacturers and retailers that have surplus food to donate this food to people or organisations, in line with what is recommended by the Food Waste Management Hierarchy (CGCSA, 2022).

NATIONAL FOOD AND NUTRITION STRATEGIC PLAN

The National Food and Nutrition Strategy Plan (NFSP) envisions to see optimal food security and enhanced nutritional status for all South Africans. The FLWS strategy guards against food waste and loss thus contributing to food security in the country. This is in line with SDG 1 which calls for an end to poverty in all its manifestations by 2030.

LEGISLATIVE AND REGULATIVE FRAMEWORK

THE CONSTITUTION

The management of waste and food loss prevention in South Africa falls within the mandates of the Department of Environment, Forestry and Fisheries (DEFF) and the DALRRD . This mandate is derived from sections 24 (Environment) and 27 (Food Security) of the Constitution of the Republic of South Africa (Act 108 of 1996) which states:

"Everyone has the right (section 24) –
(a) to an environment that is not harmful to their health or wellbeing; and
(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –
(i) prevent pollution and other degradation;

[7] https://www.csir.co.za/sites/default/files/Documents/Food%20waste%20prevention_LANDSCAPE%28EDMS%29%20-%2005-02-2021.pdf

(ii) promote conservation; and
(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

"Everyone has the right (section 27)
(b) sufficient food and water."

NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT AND NATIONAL WASTE MANAGEMENT STRATEGY

To give effect to the Constitutional mandate, the DEFF has developed and promulgated policies, legislation, strategies, and programmes. Key amongst these is the National Environmental Management: Waste Act, 2008 (Act No 59, 2008) (hereinafter referred to as "the Waste Act") as amended and the National Waste Management Strategy (NWMS). The NWMS is a statutory requirement of the Waste Act and provides a coherent framework and strategy for the implementation of the Waste Act, NWMS outlines government's policy and strategic approach to waste management within the South African government's context and agenda of socio-economic development that is "equitable, inclusive, sustainable and environmentally sound". NWMS 2020, which revises and updates the 2011 strategy:

- Assimilates our strategic approach to waste management with the commitments and directives of the SDGs 2030 and South Africa's National Development Plan: Vision 2030;
- Unequivocally locates waste management as one of the key underpinnings of South Africa's economy and social fabric; and
- Integrates and provides an enabling environment for the DEFF's 2017 Chemicals and Waste Economy Phakisa and government's 2019 Good Green Deeds Programme.

South Africa's legal framework governing waste management is robust and underpins the country's food waste management. The following listed national legislative instruments and Multilateral Environmental Agreement (MEA) inform and guide the approach and directives of the FLWS (**Table 1**).

Table 1: Legislative Framework, International Standards and Multilateral Environmental Agreement

LEGISLATIVE FRAMEWORK	LOCAL & INTERNATIONAL STANDARDS, INITIATIVES AND MULTILATERAL ENVIRONMENTAL AGREEMENTS
▪ **Constitution of South Africa Act, 1996** ▪ **Agricultural Product Standards Act, 1990 (Act No. 119 of 1990)** ▪ **Marketing of Agricultural Product Act, 1996 (Act No. 47 of 1996)** ▪ **National Health Act, 2003 (Act No 61 of 2003)** ▪ **Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No 54 of 1972)** ▪ **Perishable Products Export Control Act 9 of 1983** ▪ **National Environmental Management Act, 1998 (Act 107 of 1998)** ▪ **National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)** ▪ **National Waste Management Strategy (NWMS, 2020)** ▪ **Climate Change Act, 2024 (Act No 22 of 2024)** ▪ **National Environment Management: Air Quality Act** ▪ **Marketing of Agricultural Products Act, 1996 (Act No. 47 of 1996)** ▪ **Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1984)** ▪ **Animal Improvement Act, 1998 (Act. No. 62 of 1998)**	▪ Sustainable Development Goals (SDGs) ▪ National Development Plan (NDP: Vision 2030) ▪ Codex Alimentarius Commission (CAC) ▪ South African Bureau of Standards (SABS) ▪ International Standardization Organization (ISO) ▪ Global Food Safety Initiative and Consumer Goods Council of South Africa (CGCSA-GFSI) ▪ Food Loss and Waste Initiative (FLW). ▪ Basel Convention on Transboundary Movements of Hazardous Wastes and their Disposal ▪ Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade

NATIONAL DEVELOPMENT PLAN (2030): VISION 2030

The National Development Plan (NDP), Vision 2030, aims to boost economic growth, create jobs, reduce inequality, and alleviate poverty. NWMS 2020 and the FLWS respond to the NDP directive of "implementing a waste –management system through the rapid expansion of recycling infrastructure and encouraging the composting of organic domestic waste to bolster economic activity in poor urban communities" and to the need to "cut down on solid waste disposal".

SUSTAINABLE DEVELOPMENT GOALS

The United Nations Sustainable Development Goals (SDGs) were launched in 2015 as the 2030 Agenda for Sustainable Development to end poverty and set the world on a path of peace, prosperity, and opportunity for all on a healthy planet. The SDGs include Goal 12 which focuses on ensuring Sustainable Consumption and Production patterns. SDG 12 has a number of indicators including indicator 12.3 which states that "by 2030 halve per capita global food waste at the retail and consumer level and reduce food losses along production and supply chains including post-harvest losses". This target will not only help countries identify where food loss and waste occur but can also provide information which Governments, citizens and the private sector can consider in order to reduce food waste. As South Africa has committed to taking action to achieve SDG 12.3, the FLWS can be used as a vehicle to achieve this goal.

CONTEXTUALISING FOOD LOSSES AND WASTE IN SOUTH AFRICA

WHAT IS FOOD LOSS AND FOOD WASTE

The FSC typically includes various stages such as agricultural production, harvesting, post-harvest storage or handling, processing, packaging or distribution, retail and finally, consumption (**Figure 1**).

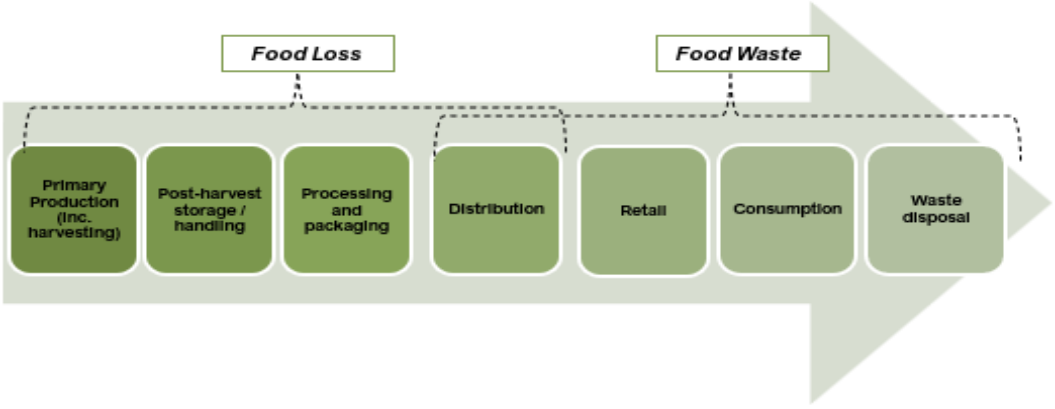

Figure 1: Stages of the food supply chain showing interconnected terms "food loss" and "food waste".

Food spoilage upstream of the FSC, usually at the post-harvest stage and processing stages, is termed 'food losses', while further downstream, towards the end of the FSC, usually at the retail and

consumption stages, is termed 'food waste' is used, and often links to the retailer or consumer practices and behavioural issues (Parfitt, 2010; Gustavsson J. C., 2011). Food loss and waste (FLW) is evaluated only for products destined for human consumption and excludes animal feed and food residues, parts of which are not recognised as edibles (Green Cape, 2020). Food intended for human consumption but exits the FSC is considered FLW (Green Cape, 2020).

AESTHETICALLY UNAPPEALING FOOD

This refers to fruits and vegetables that might not appear deformed or with defects but are still safe to eat with same nutritional value and taste as the normal appearing fruits and vegetables but often displaying imperfections such as bumps, bruises, discoloration, or odd shapes. These defects may be due to environmental factors, such as weather conditions or from transportation.

UNDERSTANDING THE FOOD SYSTEM

MECHANISMS OF THE FOOD SYSTEM

The food system consists of several activities within the FSC: production, processing, distribution, access (sale/purchase), consumption, and waste (WWF-SA, 2019). Food production processes result in several environmental impacts, such as biodiversity loss, deforestation, desertification, and soil degradation, intensifying water scarcity, reducing water quality and damaging marine ecosystems (WWF-SA, 2019). This leads to the advocacy for new sustainable food systems that consider trade-offs between nutritional value, the economy, and the environmental and social impacts of the food produced (Rediscoverdairy, 2021). According to the WWF-SA (2019), should the current agri-food system persist without due consideration and implementation of relevant policies, including the NDP (2030), the SDGs and avoiding an average temperature increase of 2°C, poverty will continue to persist by 2050. In addition, over a third of food would continue to be wasted, resulting in an increase in the number of people who go hungry and those who are obese and natural resources would continue to be depleted (WWF-SA, 2019). For implementable structural transformation, the WWF-SA (2019) proposed a socio-ecological approach, where the social, economic, and political dimensions are entrenched with the ecological component (nature). Several critical actors whose behaviour influences the complex socio-ecological system are identified, including smallholder farmers, commercial farmers, the food industry, government, consumers, and research institutions (WWF-SA, 2019). To achieve this, it proposes that priority should be on the following five areas, one of which the FLWS addresses. They include:

1. Inclusive regenerative farming
2. Optimal water use
3. Responsible sourcing (promotion of responsible procurement practices)

4. Reducing food loss and waste *(this strategy)* (evidence-based action)
5. Dietary shift (institute consumption patterns with positive environmental and health outcomes)

FOOD RECOVERY HIERARCHY

The SA FLWI promotes the use of the Food Recovery Hierarchy (FRH), which was developed by the United States Environmental Protection Agency (USEPA) (**Figure 2**).

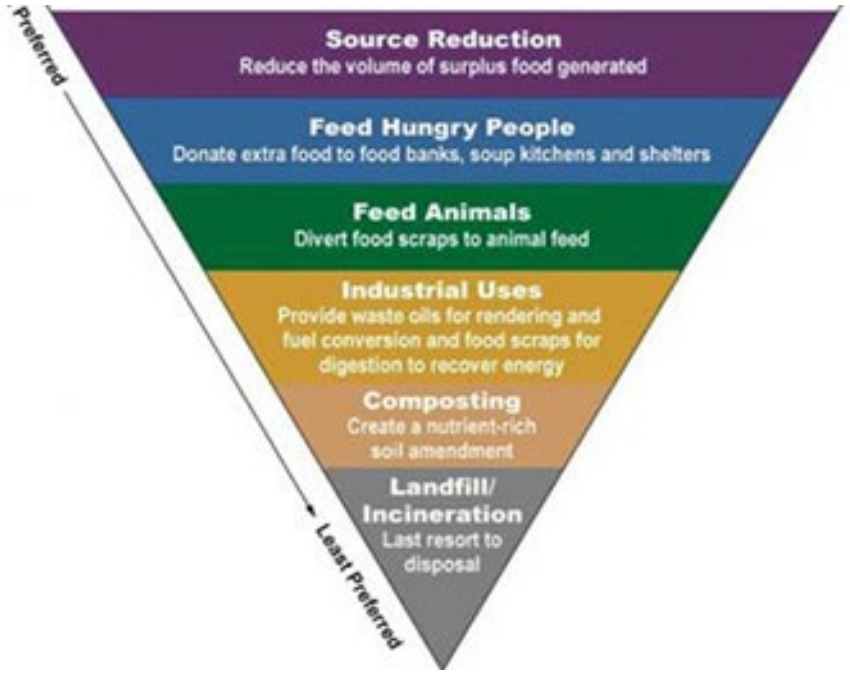

Figure 1: The Food Recovery Hierarchy adopted by the United States Environmental Protection Agency[8]

The FRH was created to depict the most to least preferred destinations for surplus food. This includes the reduction in the loss of natural resources such as water and energy, improved revenue potential through the conversion of waste into value-added inputs and the reduction in financial loss because of food loss and waste (Shai, 2021). It prioritises actions for diverting FLW from landfill, thus ensures *(i)* improved food utilisation and food loss and waste prevention and reduction and *(ii)* the redistribution of edible, nutritious surplus food for human consumption and enabling secondary markets for surplus food within the FSC. est practices begin at the top tier of the pyramid, where the aim is to reduce surplus food generated first before moving to next tier, with the bottom tier being preferable.

[8] https://19january2017snapshot.epa.gov/sustainable-management-food/food-recovery-hierarchy .html

STATUS QUO ASSESSMENT

This section presents the results of the quantifications of FLW at each stage of the FSC, existing issues impacting the food losses and waste in South Africa and also present environmental and socio-economic results of the evaluation done as part of the FLW status quo analysis. More information on the FLW status quo relating to existing initiatives, opportunities, and barriers of FLW are presented under Appendix A.

QUANTITIES OF FLW AT EACH STAGE OF THE F IN SOUTH AFRICA

The quantities of food waste at each stage of the FSC for South Africa are presented in Figure **3**. This is comparable to the result published by Oelofse, Polasi, Haywood, & Musvoto, (2021), indicating that 10.3 million tonnes or 45.4% of food materials are lost or wasted annually.

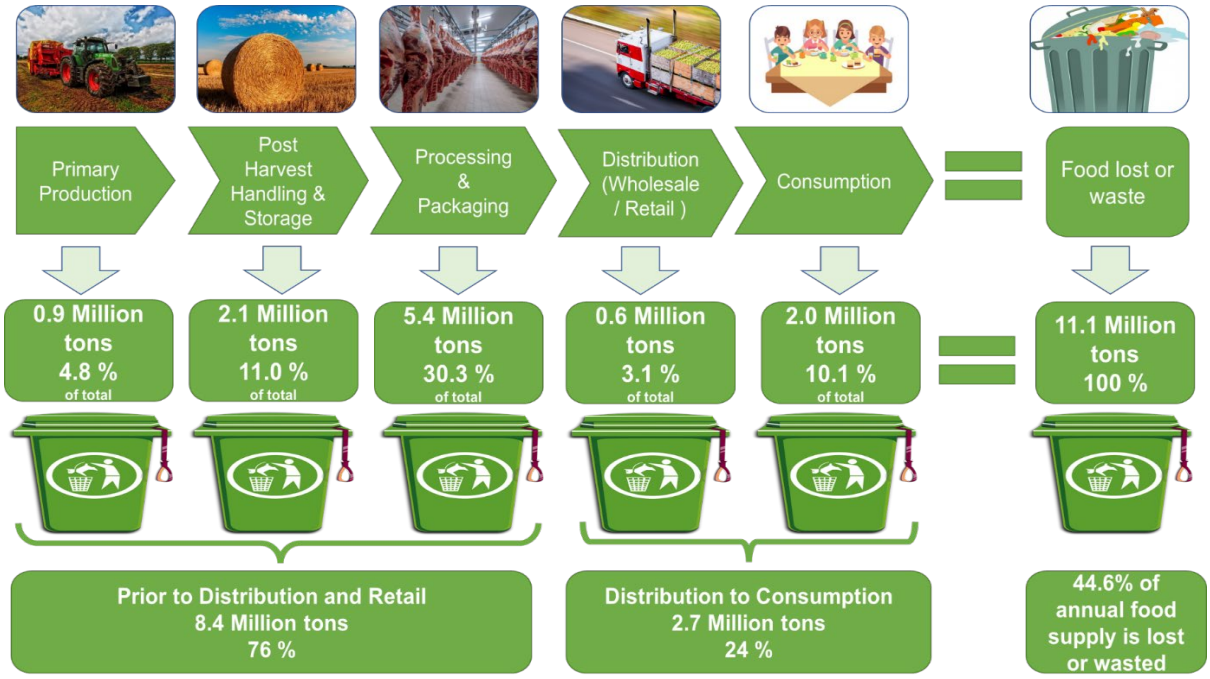

Figure 3: Average annual food losses and waste along food supply chain in South Africa (2010 to 2019)

In quantifying food loss and waste at each stage of the FSC, the percentage of food waste entering each stage of the supply chain was adopted from Oelofse *et al.*, (2021). According to Oelofse *et al.*, (2021), this was calculated by multiplying the quantity of food entering each stage of the FSC for each commodity group (as per FAO data) by the lost percentage or wasted. For example, the quantity of food entering the post-harvest stage of the supply chain was calculated as the quantity of food entering the agricultural production stage, less food waste at the agricultural stage, and so on for each stage in the FSC.

IDENTIFIED ISSUES IMPACTING FOOD LOSSES AND WASTE

The issues impacting FLW have been grouped into three broad sectors, ranging from practices at the industrial level to behaviour at the household level and access to tools, infrastructure, and technologies. Evidence provided in each subsection is based on published data sourced from peer-reviewed articles and, in some cases, supported by input from stakeholders.

INDUSTRY PRACTICE

Smallholder farmers, have been negatively affected by the Private standards (best practices and standards by retailers) which are used to source agricultural produce, making it difficult to access supply chains and sell their produce. Agricultural producers, typically smallholder farmers, have also been negatively affected by the Agricultural Product Standards Act (APS Act), making it challenging to access supply chains and sell their produce (Mensah & Karriem, 2021). Stakeholder consultation with a major retail group in the local food industry, as part of the FLWS development, suggested that the specifications around class 1, 2 and 3 groups of produce might become a barrier to reducing FLW because the economic value of lower classes of produce (class 2 and 3) are so low, that storing and transporting them for sale becomes economically impractical and they might run at a loss. The conduct of market agents who source primarily from established agricultural producers to the exclusion of smallholder farmers is also hindrance towards food accessing wholesale fresh produce markets. Market agents are regulated in the Agricultural Produce Agents Council 12 of 1992.

FOOD LABELLING

The South African Regulations relating to the Labelling and Advertising of Foodstuffs (2020) require pre-packaged foodstuff and products to have date markings indicating the quality and safety in terms of suitability for consumption, such as “use by” or “best before” date. The interpretation of these dates has been reported to cause some confusion which may result in food waste generation (WWF, 2017). Engagement with a major retail group in the local food industry, as part of the FLWS, suggested a misunderstanding among stakeholders and consumers regarding the interpretation of “best before” and “use by dates. The foodstuff may still be edible past the “best before” date displayed in all these cases. More awareness among consumers is required in this regard.

A policy drive towards creating more guidance, support, awareness and educating consumers is anticipated to help to reduce FLW significantly.

Awareness On The Amount Of Food Being Lost And Wasted

The lack of public awareness of FLW is an issue relevant to both industry and household levels. According to Le Roux, van der Laan, Vahrmeijer, & Annandale (2018), it is erroneously believed that more food losses and waste occur at the market and retail stages of the FSC when compared to those at the processing and packaging stage when in fact, this was not the case. A policy drive towards creating more awareness and educating producers, traders and consumers will significantly help to reduce FLW.

Waste Management Alternatives

In South Africa, the choice of waste management option is driven mainly by economic factors rather than environmental factors (Adeleke, Akinlabi, Jen, & Dunmade, 2021). Consequently, the potential to implement reuse and recycling concepts over disposal in landfills is influenced by the high demand for materials, low labour costs, a high rate of unemployment, and advanced recycling skills.

The cost of landfilling, as well as cost of associated logistics, combined with the environmental and climate change impacts, land use (availability) issues present opportunities for diverting food waste to safer alternatives such as composting and anaerobic digestion.[9]. In recent years, on-site waste management alternatives such as composting and anaerobic digestion have demonstrated a cost-effective, environmentally friendly alternative to disposal in landfills. Policy reviews must therefore consider mechanisms to assist agricultural producers through the provision of incentives and/or subsidies to encourage them to apply waste management improvement strategies and alternatives on their farms.

Behavioural Issues at Household Level

At the household level, behavioural issues are centred around attitude towards waste (indifference); cultural beliefs or practices regarding food purchase, preparation, and consumption; the cost of the alternatives to waste disposal; an overall lack of awareness and information regarding food waste; reuse, recycle and waste management options available to the public. Several other behavioural issues affecting FLW are related to retail, one being the confusion in labelling issues such as sell-by-dates, use-by-dates and what they mean to the consumer at home (WWF (2017)).

[9] *Available at: biocycle.net/cost-environmental-impacts-of-food-waste-recycling-options/*

Policy review must consider various mechanisms to drive awareness, information dissemination, and alternative waste management service delivery within the retail and consumption supply chain. This may also require consideration for incorporating food waste information into the school curriculum at the primary and secondary level to educate children from a young age and increase awareness of the implications of unsustainable food practices.

Tools, Infrastructure, And Technology

Tools, infrastructures, and Information & Communication Technologies (ICT) that promote market access are crucial for reducing postharvest losses, food security, and poverty. Through these means, producers (farmers) can manage postharvest loss issues, enhance food retention, and have a broader motivation to engage in food loss reduction strategies with expanded market access. However, governments and development partners must adopt the appropriate policies to create successful and efficient market access systems (FAO, 2015).

Tools and Machinery

Inadequate access to tools and technology is a significant barrier to expanding the agricultural sector and reducing food loss and waste, especially in rural areas. Policy options must consider mechanisms to drive cost reduction and cushion the effect of price and exchange rate volatility within the sector.

Infrastructure

Infrastructure such as roads, rails and storage facilities are essential for the bulk distribution and storage of food materials and for reducing FLW in the FSC. Two main areas of logistics within the agricultural sector are Farm to factory (primary freight) and Factory to wholesale/retail (secondary freight). One of the focal points of concern for South African farmers and a barrier to reducing FLW is farmers' ability to access markets where their goods will be sold (Dewey & Nelson, 2022). This is because an efficient and cost-effective transport system affects farmers in getting their products to the market on time, consequently reducing FLW.

Rail And Road

Poor rural and inaccessible rail and road transport infrastructures are significant obstacles to free market operation. It also limits market access as logistics companies do not have the incentive to collect produce from farmers in areas where there is poor transport infrastructure. A significant barrier to the use of rail networks is the failing infrastructure and inadequate access for producers. Infrastructure improvement,

especially rural transport infrastructure, is necessary to ensure that farmers can transport their produce to the retail sector or consumers.

Another significant barrier farmers face in South Africa includes high transport costs incurred at their own expense. A solution would be creating support groups/associations whereby they transport their fresh produce together as a unit, thereby subsidising individual transport costs (Greenberg , 2016). The conception and establishment of such groups coupled with efficient and accessible transport infrastructures could be facilitated at district, provincial and national levels, ensuring cohesion and consistency of the structures across the supply chain.

Storage Facilities

Many agricultural producers (especially in rural areas) have limited access to storage facilities, thereby promoting food losses during distribution. Interventions to facilitate the introduction of a network of small players hosting storage facilities should be considered to encourage the reduction of FLW during storage and distribution. Storage conditions are also important to requirements as prescribed by legislation and good practices

Information And Communications Technologies

Implementing ICT strategies that link farmers to markets is crucial, especially to the final customer. To this end, farmers can predict customer demand, establish professional relationships with consumers, communicate directly and provide relevant information about food availability, quality, and other important food-related information. Online resources like websites and apps connecting farmers to markets could also benefit farmers and local communities (FAO, 2015). These apps connecting farmers to markets already exist and could be expanded.

Assessing The Environmental And Socio-economic Impact of FLW

The FSC requires the intensive use of land, water, energy, and other finite natural resources. The use of these resources generates direct and indirect environmental impacts. Thus far, however, few (if any) studies have performed a standardised and fully comprehensive environmental footprint assessment detailing the potential impacts of FWL for South Africa. This strategy section seeks to establish a foundation that assesses environmental and social impacts, including climate changes and general human health indicators and translates them into an enhanced understanding of the cost of food wastage.

ASSESSING THE ENVIRONMENTAL FOOTPRINT OF FLW

In assessing the environmental footprint of FLW in South Africa, the FRESH Food Loss and Waste Value Calculator version 1.2 was used. These environmental indicators include greenhouse gas emissions (kg CO_2 eq), water scarcity footprint (m^3-eq), soil quality index (points), freshwater eutrophication (kg P eq), and marine eutrophication (kg N eq). In quantifying environmental impacts for these indicators, the total footprint considered production impacts, other relevant life cycle impacts, and impacts due to destination activities of food material lost or wasted. **Figure 4** below illustrates the footprint equivalence of FLW in South Africa between 2010 and 2019.

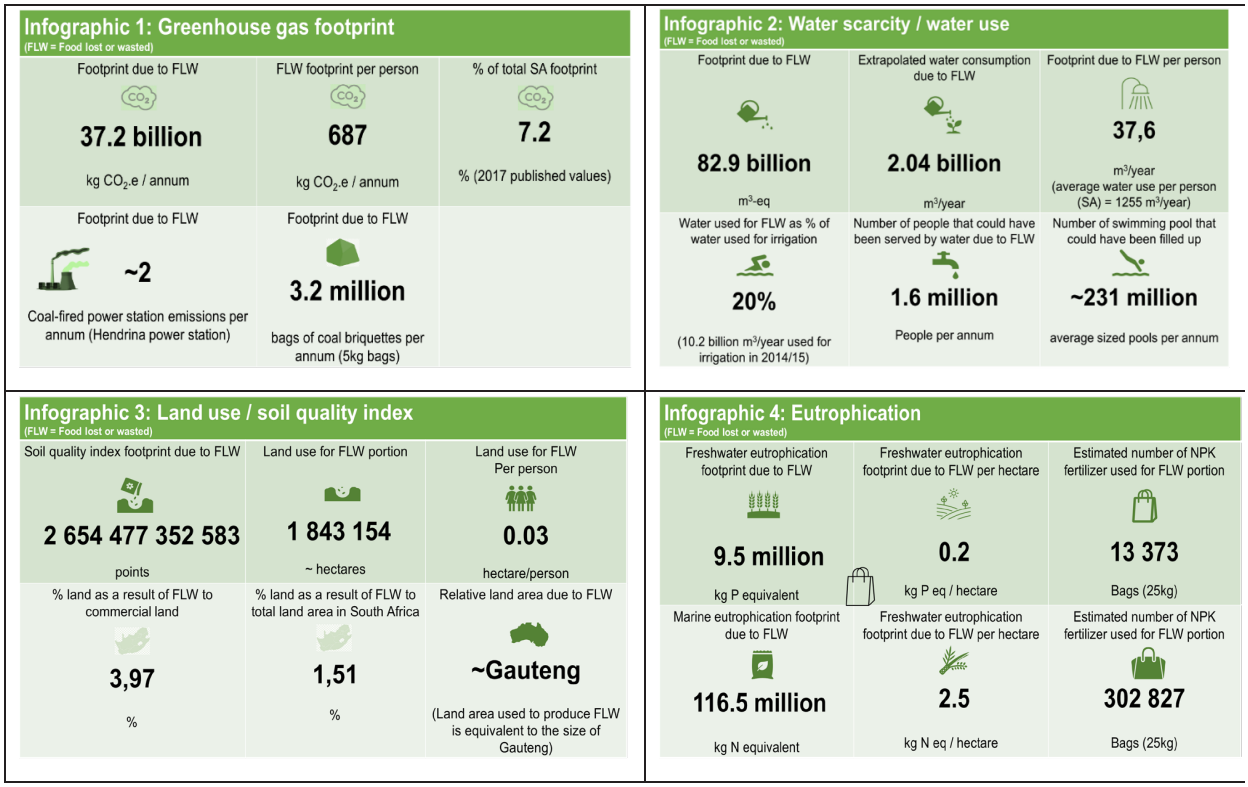

Figure 4: The footprint equivalence of FLW in South Africa between (2010 – 2019)

GREENHOUSE GAS (GHG) EMISSIONS

The food supply system is considered a significant contributor to anthropogenic GHG emissions. This stems from the inefficiencies in the entire lifecycle of food, encompassing production, processing, transportation, preparation, and storage, which result in significant waste. Additionally, when food ends up in landfills and decomposes, it releases methane, a potent greenhouse gas that has a greater impact on global warming than CO2 emissions from agricultural production represent the most substantial source of GHGs, followed by emissions from landfills, while animal feed plays a crucial role in both emissions

and potential sinks for GHGs. Addressing these aspects strategically is key for comprehensive GHG reduction efforts within the food supply system.

Water Scarcity Footprint

The water scarcity footprint measures the impact of water consumed throughout the life cycle of producing the food material, including water to irrigate crops, input during manufacturing processes, and preparing and cooking food. It considers water scarcity and quality within a region. Agricultural production usage contributed significantly, while the "other" category (fish, seafood, milk, sugars etc.) substantially reduced the water scarcity footprint. Water consumptive use was extrapolated from the footprint using characterisation factors.

Soil Quality Index

The soil quality index, or land use indicator, shows the deterioration of soil quality. This impact is measured in points, a relative indicator of the aggregating effects on land related to biotic production capacity, erosion, mechanical filtration of water, and groundwater replenishment.

Freshwater And Marine Eutrophication

Freshwater and marine eutrophication results from the discharge of nutrients (primarily nitrogen, (N) and phosphorus, (P)) into water bodies due to concentrated animal feeding operations and the application of pesticides and fertilizers. This causes increased activity by organisms such as cyanobacteria and algae, ultimately leading to a relative loss of aquatic organisms. Agricultural production usage was the most significant contributor for both marine and freshwater eutrophication.

Biodiversity Loss

Nationally about 80% of the land in South Africa is used for agriculture (Biodiversity International, 2019). Agriculture has a direct impact on deforestation, resulting in about 60% to 80% deforestation globally, thus food that ends up being loss or wasted forms a portion of biodiversity that is lost (CEC, 2019). Globally, food production is estimated to result in about 70% of terrestrial biodiversity loss, 50% freshwater biodiversity loss and about 52% of agricultural land being degraded, making it the main driver of biodiversity loss and water pollution (WWF, 2020).

According to the WWF Living Planet report (2020) the biggest anthropogenic threat to nature and our ecosystem is the way we produce and consume food, thus calling the need for the transformation of our global food system. This could be achieved through food waste reduction and diet shifts (Read, Hondula,

& Muth, 2022). According to the CEC (2019), only the FAO study conducted in 2013 had attempted to determine the impact of food waste on biodiversity loss using three indirect variables namely; (1) the effect on deforestation thus land use, (2) Impact on the International Union for Conservation of Nature (IUCN) Red List of critically endangered, endangered and vulnerable species of mammals, birds and amphibians (IUCN 2018) and (3) Impact on the Marine Trophic Index (Biodiversity Indicators Partnership 2018) using qualitative and semiqualitative approaches.

Assessing Socio-economic Impacts

Production Value Of FLW

The gross value of agricultural production for 2016 was quantified using the 2022 FAOSTAT food balance sheet data. **Figure 5** presents the quantification results.

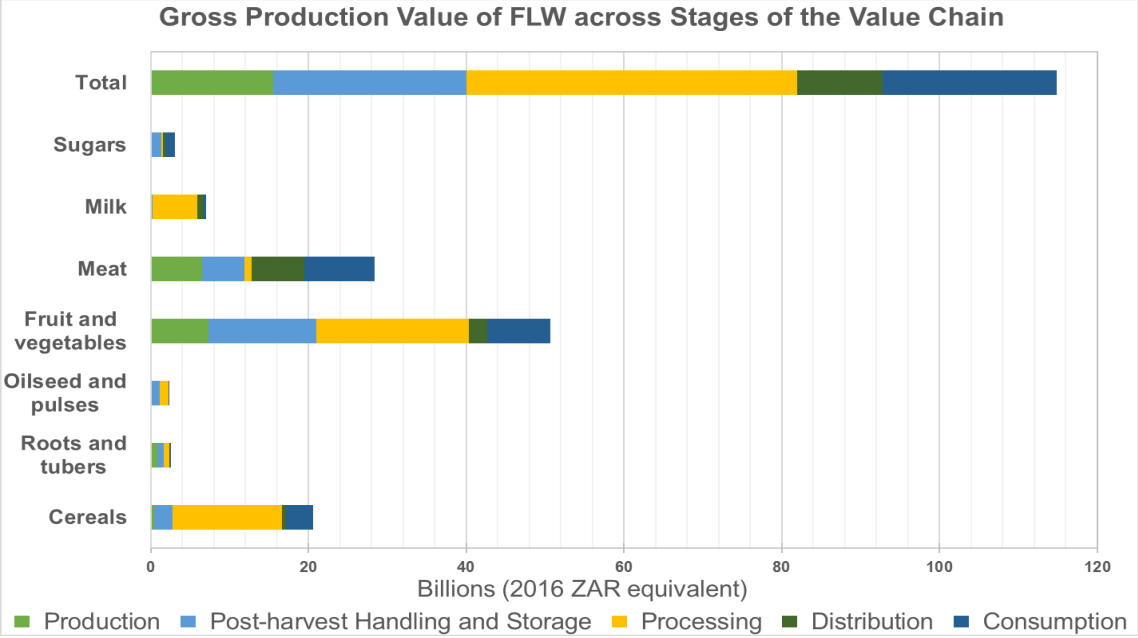

Figure 5: Gross production value of FLW across stages of the supply chain (2016 ZAR equivalent)

National Gross Domestic Product

The economic burden of FLW value chain in South Africa is equivalent to 2.1% or R61.5 billion of the national GDP WWF report 2017.

Food Security

South Africa is generally a food-secure country at the national level and is a net exporter of agricultural and processed food products[10]. However, food insecurity exists at the household level since food security goes beyond sufficient supplies to ensure food accessibility, affordability, utilisation, nutrition, and stability over time. The reduction of food loss and waste along the supply chain, from production to consumption, is essential to improve food security while reducing pressure on natural resources, as indicated in the Sustainable Development Goals Target 12.3, which aims to halve global per capita food waste by 2030.

Food Access In South Africa

The chart indicates that out of almost 17,9 million households in SA in 2021, almost 80 percent (14,2 million) reported that they had adequate access to food, while 15 percent (2,6 million) and 6 percent (1,1 million) stated that they have inadequate and severe inadequate access to food, respectively.

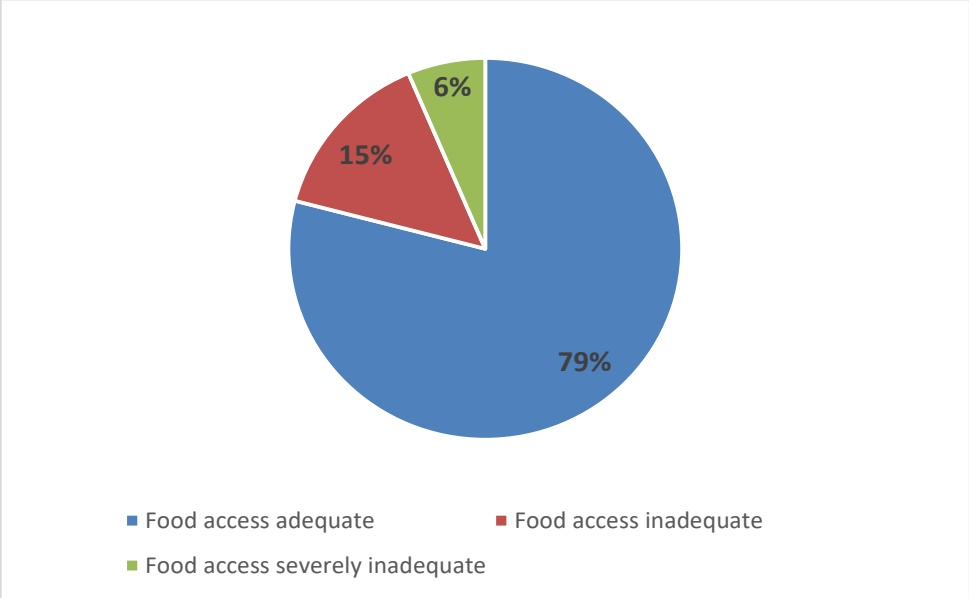

Figure 6: Distribution of households by the level of adequacy in accessing food (STATS SA 2021)

Employment

The agricultural sector plays a vital role in South Africa's economy, offering employment and business opportunities to sustain livelihoods. There are strong 'upstream' and 'downstream' linkages between the sector and the rest of the economy, enhancing foreign exchange reserves, providing raw materials for the industrial sector, and serving as a market for goods and services from other sectors.

[10] Report available here.

FOOD LOSSES AND WASTE STRATEGY IMPLEMENTATION PLAN

The National FLWS Implementation Plan is structured according to the four strategic outcomes that this strategy aims to address. These include:

- Outcomes1: Creating enabling environment for the implementation of FLWS interventions
- Outcomes 2: FLW Beneficiation and Circular Economy
- Outcomes 3: Collaboration, Capacity Building and Awareness Raising
- Outcomes 4: Food Waste Diversion and GHG Emission Reduction

The outcomes are subdivided into implementable and measurable action plans that are achieved in alignment with the government Mid-Term Development Plan (MTDP) timeframes (2025/2026 – 2029/2030). Monitoring and review will be conducted in the third financial year of the MTDP. The Department of Forestry, Fisheries and the Environment (DFFE), as the main coordinator, will lead the oversight role through a committee comprising all relevant government departments and various stakeholders. Table 2 below outlines the FLWS implementation plan.

Table 2: Food Losses and Waste Strategy Implementation Plan

OUTCOME 1: CREATING ENABLING FOR THE IMPLEMENTATION OF THE FOOD LOSSES AND WASTE STRATEGY

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
1.1. Food losses and waste prevention and minimisation	Guidelines/Norms and Standards for prevention and of food losses and waste at different levels of the food supply chain developed/reviewed and adopted	Develop/review and adopt Guidelines/Norms and Standards for prevention of food losses and waste at different levels of the food supply chain	2027/2028	DFFE, DALRRD and relevant Provincial Departments
	National FLW Prevention Plan towards achieving SDG 12.3 developed and adopted	Develop a mandatory National FLW Prevention Plan towards achieving SDG 12.3. The plan should include a breakdown of national targets on FLW Circularity and a roadmap for provincial and local authorities towards achieving the set goals in their areas of influence.	2027/2028	DALRRD and DFFE

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
	Number of municipalities implementing the bin system allowing separation of source	Strengthening the existing Separation at Source Programme to facilitate the introduction of a proper bin system in all municipalities for allowing separation at source	2026/27	DFFE and Municipalities
1.2. Promotion of regenerative/climate-smart agriculture	Regulations to enable the adoption and implementation of regenerative/climate-smart agriculture developed / reviewed and adopted	Regulations to enable the adoption and implementation of regenerative/climate-smart agriculture developed/reviewed and adopted for implementation	2027/2028	DALRRD
1.3. Facilitating access to organic treatment technologies/facilities	Permitting regulations for organic treatment technologies/facilities reviewed, and adopted	Review and adopt permitting regulations for organic treatment technologies/facilities adopted for implementation	2027/2028	DALRRD and DSI

OUTCOME 2: FOOD LOSSES AND WASTE BENEFICIATION AND CIRCULAR ECONOMY

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
2.1Strengthen the existing Industrial Symbiosis (IS) initiatives (refer to Outcome 3: Adoption of the Food Recovery Hierarchy)	Number of Districts with added Programmes on FLW Industrial Symbiosis.	Strengthen and expand FLW Industrial Symbiosis in various districts	2027/2028	DFFE, the dtic & NCPC-SA
2.2. Employ Science and Technology in Reducing FLW circularity	The number of indigenous technologies identified and developed industrial scale	▪ Establish scientific interventions to identify, adopt, further develop, and industrialise indigenous and contemporary technologies for the reduction and treatment of FLW (Refer to Outcome 3: FLW	2027/2028	DALRRD, DSI
2.3. Investigate and develop a strategic intervention framework aimed at establishing: ▪ **Favourable biogas industry sector-specific tariff** ▪ **Subsidies/tax exemption for the biogas industry**	Strategic Intervention Framework comprising of favourable biogas tariffs, subsidies and industry-specific Norms & Standards developed and adopted.	Establish and adopt of: ▪ Favourable biogas industry-specific tariff. ▪ Subsidies/tax exemption. ▪ Biogas industry-specific Norms and Standards (this may include reviewing the Atmospheric Emission Licence	2027/2028	The dtic, DALRRD, DFFE

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
▪ Less stringent regulatory requirements for biogas facilities.		(AEL) requirements for consideration and adoption as Norms and Standards)		
2.4. Review existing Resource Efficient and Cleaner Production (RECP) methodologies for agriculture and agro-processing sectors to consider mainstream FLW and Circular Economy initiatives applicable to South Africa.	RECP methodologies reviewed and adopted for implementation	Review and adopt RECP for agriculture and agro-processing sectors	2027/2028	DFFE, the dtic & NCPC-SA
2.5. Access to FLW Treatment /Technology	Number of established forums per province / per local community / per annum Framework implemented	Establish communal forums made up of large and small-scale holders within proximity of each other in a district. These forums should be inclusive of women and youth (See Outcome 3: Community Engagement towards FLW policy development)	2027/2028	DALRRD

OUTCOME 3: COLLABORATION, CAPACITY BUILDING AND AWARENESS RAISING

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
3.1. Awareness campaign programme on Date Labelling	Awareness raising programme on various food labels and their implication developed and implemented	Develop and implement and awareness raising programme on various food labels and their implication	2027/2028	The dtic and DoH
3.2. Awareness campaign on Food Recovery Hierarchy (FHR)	National awareness campaign on the Food Recovery Hierarchy (FRH) developed and implemented	Develop and implement a national awareness campaign on the FRH, showcasing: ▪ Availability of cost-effective possibilities, destinations, initiatives, and solutions for waste management that are present within the FRH. ▪ The effects of poor planning and implementation of food waste management solutions. ▪ The following may also be considered for incorporation in the awareness campaigns:	2027/2028	The dtic and DFFE

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		○ Engagements to be made in local languages ○ Collaborated efforts by government departments on food losses and waste and economic opportunities (including relevant industries) ○ Target events such as the world food day or world consumer rights month (March) to raise awareness on food recovery hierarchy for example and the relevant stakeholders. GCIS, CGCSA Food Waste Initiative. ○ Key organisations to communicate common/one message through GCIS and social media platforms ▪ Integrate food waste awareness and education into school curricula,		

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		empowering future generations to adopt sustainable food practices.		
3.3. Establishment of Finance and Investment Schemes	▪ Increase in the Public and Private sector investment in FLW development in rural areas. ▪ Functioning pre- and post-harvest finance and investment schemes for smallholder farmers ▪ Accessibility of financial instruments for small-scale farmers.	▪ Develop a funding strategy that creates affordable financial & investment schemes/instruments for large-scale and smallholder farmers, particularly for members of established communal forums. ▪ Provide incentives for small financial service providers who promote innovative tools for reducing FLW. ▪ Increase investments in local input and climate resilience. ▪ Provide incentives to encourage the private sector to invest in research and development programmes for pre-harvest loss reduction, particularly in early-stage funding of innovations. Introduce a farm	2027/2028	The dtic /DCOGTA/ SALGA/Communal Forums

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		mechanisation program to leverage small-scale farmers.		
3.4. Community Engagement Towards FLW Policy	▪ The number of established Communal Forums per province / per local community / per annum. ▪ Number of women and youth involved in communal forums on FLW Annual Reports on Communal Forums and FLW Policy Interventions	Develop and adopt a policy strategy for FLW reduction aimed to: ▪ Establish Communal Forums made up of large and small-scale holders within proximity of each other in a district. These forums should be inclusive of women and youth. ▪ Promote FLW community-led policy formulation. Expand grower associations at the district/local level through which famers can engage in group price negotiation and obtain training and other essential services.	2027/2028	DALRRD/DCOGTA/SALGA /DBSA
3.5. Public-Private Partnership Building and Sensitisation	▪ An established public-private partnership on FLW stakeholder	▪ Establish multi-dimensional and cross-sectoral partnerships for FLW baseline measurement.	2027/2028	DALRRD /NCPS-SA/DCOGTA/SALGA/CGCSA/ /DSD/Communal Forums

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
	▪ Established public-private collaborations in FLW intervention projects and awareness programs	▪ Enhance infrastructural development, (risk sharing) through public-private partnerships for processing and value addition. ▪ Promote multi-stakeholder partnerships to engage small-scale traders in post-harvest technology adoption. ▪ Create alliances on food waste reduction. ▪ Develop a public-private sector joint agenda on innovation. ▪ Initiate food waste sensitisation programmes in the workplace of food industry. ▪ Develop educational campaigns for FW reduction. ▪ Support digital social innovations to reduce food waste.		

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		▪ Create a global coalition of actors advocating on food loss and waste reduction. Build synergies, support policy coherence and coordination on FLW.		

OUTCOME 4: FOOD WASTE DIVERSION AND GREENHOUSE GAS (GHG) EMISSION REDUCTION

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
4.1. Carbon Offset as an Incentive for FLW Baseline Reduction	FLW Carbon offset strategy developed and adopted	▪ Conduct a case study to determine-baseline for FLW ▪ Develop a FLW Carbon offset strategy to promote carbon offset as an incentive for diverting waste from landfill to other destination projects within the FRH. Strategy to include measures for capacity development	2027/2028	DALRRD , DFFE/DSI/NRF Research in Waste and Climate Change

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		awareness raising and management of existing data gaps on quantity. ▪ Develop and implement specific mechanisms/protocols to determine qualified FLW offset projects		
	Number of established FLW carbon offset projects qualified per annum.	Develop and implement specific mechanisms/protocols to determine qualified FLW offset projects	2027/2028	DALRRD & DFFE
4.2. Food Redistribution/Donation Programmes	▪ Established Liability protection on food donations ▪ A National food distribution programme implemented as part of NSNP. ▪ Developed Food Donations Norms and Standards.	Government intervention in support of organisations that feed the hungry to include: ▪ Review and identify possible interventions such as amendment of relevant regulations to enable food donation without jeopardising food safety and developing National norms and standards for food donation.	2027/2028	DSD

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		▪ Create an enabling and supportive environment for food donors to access edible food. ▪ Promote food donation as a Corporate Social Responsibility (CSR). ▪ Promote partnerships between companies and organisations distributing donated food. ▪ Identify and provide incentives to companies that adopt, and fund organisations involved in distributing donated food to the hungry. ▪ Develop and adopt a food redistribution programme/framework/strategy that is aligned with the established Communal forums ▪ **Establish** Food distribution warehouses as a natural part of society's infrastructure. Such can be		

INTERVENTION	KEY PERFORMANCE INDICATOR	TARGET	TIMEFRAME	ORGANISATION LEADING IMPLEMENTATION
		incorporated in the National School Nutrition Programme (NSNP) implemented by the Department of Basic Education (DBE) ▪ **Provide** liability insurance protection for brand owners, food service establishments and retail stores donating directly to final recipients ▪ **Provide** liability protection on food donations that includes guidance on limitations on liability protection and any steps the donor (including brand owner) or food recovery organisation must follow to receive such protection.		

ROLES AND RESPONSIBILITIES

The DFFE is the primary custodian of the FLWS and its implementation. However, implementing the FLWS Implementation Plan requires a high degree of cooperation and synergies among government departments, spheres of government, the private sector, academia, research institutions and civil society. Table 3 outlines roles and responsibilities with regards to the FLWS implementation plan.

Table 3: Roles and Responsibilities regarding the Food Losses and Waste Strategy Implementation Plan

ENTITY	RESPONSIBILITY
Department of Forestry, Fishery, and the Environment (DFFE)	The Department is the custodian of the FLWS and is responsible for coordinating and ensuring the implementation of the National FLWS Implementation Plan.
Department of Planning, Monitoring and Evaluation (DPME)	The DPME is responsible for government wide monitoring and evaluation of national outcomes in line with the National Development Plan 2030. In collaboration with the DFFE, the DPME monitors and evaluates the NWMS 2020 targets and will equally be responsible for monitoring and evaluating the FLWS implementation.
Provincial Environmental Departments	The provincial environmental authorities are responsible for developing Provincial Integrated Waste Management Plans (IWMPs), planning and guiding public and private investment in regional waste management facilities (including landfills, material recovery facilities and recycling processing plants) that may draw waste from multiple local municipalities and/or districts. They are also responsible for addressing waste management issues specific to the provincial economic, social, and environmental profile and ensuring support for District and Local Municipalities in waste data collection for SAWIS/provincial Waste Information System, waste monitoring, reporting and evaluation of IWMPs. Management, monitoring and reporting on greenhouse gas (“GHG”) emissions.

Department of Health (DoH)	The DoH is responsible for regulating food safety and quality that potentially affects food during production, handling, storage, processing, and distribution as a waste prevention measure. By ensuring the proper storage, collection, transportation, handling, treatment, and disposal of food as a waste.
Department of Trade, Industry & Competition (The dtic)	The dtic has an interest in the socio-economic impact of FLWS and a critical role to play in promoting waste minimisation and the circular economy through cleaner production and industrial symbiosis, as well as an interest in industries associated with a secondary economy around waste, such as the recycling industry.
The Department of Agriculture, Land Reform and Rural Development (DALRRD)	The DALRRD regulates the agriculture sector and is an essential partner to the DFFE in implementing the National FLWS, reducing food losses and managing agricultural waste, representing a significant volume of organic waste, including food waste. The role of the DALRRD is critical in ensuring the beneficiation opportunities of organic waste, especially around waste-to-energy projects involving biogas and other waste-derived fuels with the FRH.
Producer Responsibility Organisations (PRO), Food & Packaging Industry, Associations, Stakeholders and Entrepreneurs	Food packaging industries are vital in formalising the food packaging industry EPR plans, evaluating quality standards and packaging best practices for manufacturing food packaging materials to prevent FLW generation.
National Cleaner Production Centre South Africa (NCPC-SA)	The NCPC-SA has an interest in the socio-economic impact of FLWS and a critical role to play in promoting waste minimisation and circular economy through cleaner production and industrial symbiosis, as well as an interest in industries associated with a secondary economy around waste, such as the recycling industry.

Department of Science and Innovation (DSI). **Council of Scientific and Industrial Research (CSIR).** **Technology and Innovation Agency (TIA).** **Agricultural Research Council (ARC).** **Department of Higher Education and Technology (DHET), including Universities.**	These entities are role players in research, development, and innovation. They contribute to the Waste Research, Development, and Innovation Roadmap (Waste RDI Roadmap). They build technical capacity within the waste sector while undertaking research to support development and innovation. In particular, the TIA has a critical role in supporting innovation and the uptake of new technologies within the FLW reduction.
Local Municipalities	Local Municipalities are the primary custodian of waste management within local communities. Working closely with the compliance monitoring and enforcement arm of the DFFE, they play a central role in implementing the FLWS. Local Municipalities are critical in the establishment of the FLW Communal Forums within their jurisdictions and are responsible for waste compliance and enforcement as dictated in their Bylaws.
Communal Forum	Relevant stakeholders in the grass-root implementation of the FLWS.
Food Recovery Hierarchy Related Industries (FRH), (e.g., Biogas Industry, Black Soldier Fly Industry (BSF) etc.), Industry Associations, Stakeholders, and Entrepreneurs	Industries operating within the FRH, such as the biogas and BSF industries, are critical in advancing FLW circularity and adopting and rolling out novel FLW recovery technologies.
Department of Employment and Labour (DoEL)	Performing an oversight function for all FLWS processes impacting on H&S activities to ensure compliance with all occupational health and safety regulations.
Department of Social Development (DSD)	The Household Food and Nutrition Security Programme (HFNSP) is a DSD national initiative. Through its established network of Provincial Food Distribution Centers (FDCs) it supplies food sourced from bulk procured food, donated

	food, and local producers. FDCs supplies the Community Food Depots which then distribute to Community Nutrition Development Centers (CNDCs) and Food Agencies. The HFNSP is vital for the role-out of the Feed Hungry People (Tier 2 of the FRH) and can be used to redirect "food"
Tourism Department and its entities	Perform an oversight function for all FLWS processes, particularly within the hospitality industries.
Private Sector, including Civil Society, NGOs	The awareness of this group of role players is critical in achieving a culture of compliance and civic responsibility around food waste, impacting significantly on FLW circularity. The private sector is involved throughout the waste sector as generators of waste, providers of waste-related services, recyclers of waste and consumers of recycled materials – as well as providing an important interface to consumers. The involvement of the private sector is therefore critical to the implementation of the FLWS and the National Waste Management Strategy.
Financial Institutions, including commercial banks and Private Equity (PE) Firms.	As part of the CASP, financial institutions such as the Land Bank and DBSA can provide financial services through the Micro Agricultural Financial Institution of South Africa. Private investors, such as PE firms, can invest in R&D of novel FLW technologies that feed into the FRH.
Food producers and generators of FLW.	Ensure the adoption and implementation of interventions to reduce the generation of FLW within their operations.
Consumer Goods Council of South Africa (CGCSA)	The CGCSA is critical in advancing the South African Food Loss and Waste Initiative with a vision to adopt and achieve the UN SDG 12.3 (*By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses*).
South African Food Loss and Waste Initiative (SA FLWI) signatories	SA FLWI signatories are central to advancing the SA FLWI and ensuring, through collective measures, to reducing food loss and waste in South Africa by 50% by 2030. As of 29 September 2023, there were 74 core signatories and 41 associate signatories to the Voluntary Agreement.
South African Bureau of Standards (SABS)	The SABS is a role player in standard setting. It has an interest in the socio-economic impact of FLWS and a critical role to play in promoting waste minimisation and the circular economy through cleaner production and industrial

	symbiosis, as well as an interest in industries associated with a secondary economy around waste, such as the recycling industry.
Organisation &involved in food donation	Critical role players in advancing the Food Redistribution/donation Programmes.
Department of Basic Education (DBE)	The BDE is critical in implementing the National School Nutrition Programme (NSNP), an initiative which aims to provide a healthy meal to poorer primary and secondary schools in the country. It is a national initiative which has over 9 million beneficiaries from about 20 000 schools. Food for this initiative is usually procured through the Government Bulk
	Procurement Programme. The NSNP is vital for the role-out of the Feed Hungry People (Tier 2 of the FRH) and can be used to redirect " The DBE also has a role to play in educating learners about prevention and reduction of FLW.
Department of Transport (DoT)	The DoT is responsible for regulating the transportation of goods and services and a role player in regulating the safe haulage and distribution of food. It is also involved in regulating and tracing transboundary waste including maritime services (waste from airborne cargo and maritime cargo and dumping at sea.
Statistics South Africa (Stats SA)	Collates and provides national statistics on food security and tracks compliance with SDG 12.3.
Department of Cooperative Governance and Traditional Affairs (DCOGTA) South African Local Government Association (SALGA)	DCOGTA and SALGA play vital roles in collaborations with the DFFE and Local Municipalities to develop models for the financing of waste infrastructures, such as drop-off/buy back centers and storage facilities for recyclables, which may leverage EPR Schemes, Industrial Waste Management Plans, and/or additional fiscal transfer mechanisms such as conditional grants.

MONITORING AND EVALUATION

The Food Losses and Waste Strategy will be revised every 5 years. Monitoring and evaluation measures are aligned with NWMS 2020 as follows:

- Annual reporting systems will be aligned with existing instruments to review progress – and where necessary, to adjust targets or actions based on new information or new developments within the sector;
- Databases that record compliance and enforcement activities, such as the National Environmental Compliance and Enforcement Report will also be utilised for reporting; and
- Several national departments have a significant role to play in the implementation plan of the FLW Strategy. The DEFF will establish the relevant institutional mechanism for ongoing engagement with these departments and government entities and where required, develop MoUs to provide for transparent reporting and intergovernmental cooperation around the relevant aspects of the FLW Strategy.

REFERENCES

Adeleke, O., Akinlabi, S., Jen, T., & Dunmade, I. (2021). Towards sustainability in municipal solid waste management in South Africa: a survey of challenges and prospects. Transactions of the Royal Society of South Africa, 76:1, 53-66.

Agricultural Research Council. (2016). Estimating the Biogas Potential for Electricity Generation from the Agro-Waste Industry: A Resource Assessment for South Africa. Pretoria: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Agricultural Research Council. (2016). Estimating the Biogas Potential for Electricity Generation from the Agro-Waste Industry: A Resource Assessment for South Africa. Pretoria: Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH.

Averda. (2022). South Africa wastes 10-million tonnes of food every year. https://www.averda.com/rsa/news/south-africa-wastes-10-million-tonnes-of-food-every-year.

Bio2Watt. (2022, February). Retrieved from https://www.bio2watt.com/bio2watt%E2%80%99s-bronkhorstspruit-biogas-plant-(pty)-ltd.html

Biodiversity International. (2019). Agrobiodiversity Index Report: South Africa - Country profile.

Bokashi Bran. (2022). Retrieved 2022, from https://bokashibran.co.za/bokashi-bran/what-is-bokashi-composting/

CEC. (2019). Technical Report: Quantifying Food Loss and Waste and Its Impacts. Montreal, Canada: Commission for Environmental Cooperation.

CEC. (2021). Why and How to Measure Food Loss and Waste: A Practical Guide - Version 2.0. Montreal, Canada.: Commission for Environmental Cooperation.

CEC. (2022). Why and How to Measure Food Loss and Waste: A Practical Guide 2.0. Retrieved from Commission for Environmental Cooperation: http://www.cec.org/flwm/

CGCSA. (2016). CGCSA-GFSI Global Markets Programme: Overview. Retrieved from Food Safety Initiative: www.cgcsa.co.za

CGCSA. (2016). Consumer Goods Council South Africa. Food Loss and Waste: Overview.

CGCSA. (2020). Retrieved from www.cgcsa.co.za

CGCSA. (2020a, June). Consumer Goods Council of South Africa Report. Food Loss and Waste Initiative 2018-2020. Retrieved from Consumer Goods Council of South Africa Report.

CGCSA. (2020a). Consumer Goods Council of South Africa Report. Food Loss and Waste Initiative 2018-2020. Retrieved from Consumer Goods Council of South Africa Report.

CGCSA. (2020b). Consumer Goods Council South Africa. Food Loss and Waste (FLW) Initiative Signatory Benefits.

CGCSA. (2020c). South Africa's Food Loss and Waste Initiative: Implementation plan. Consumer Goods Council South Africa.

CGCSA. (2022, June 28). Consumer Goods Council South Africa. Food Loss and Waste: Overview. Retrieved from https://www.cgcsa.co.za/service-offering/food-safety-initiative/food-loss-and-waste/

CSIR. (2022). Retrieved February 2022, from https://www.csir.co.za/advanced-agriculture-and-food

Dame-Korevaar, A., Boumans, J. M., Antonis, A. F., van Klink, E., & de Olde, E. M. (2021). Microbial health hazards of recycling food waste as animal feed. Elsevier B.V.

DEA. (2013). National Organic Waste Composting Strategy.

DEA. (2015). Assessment of the potential to produce biochar and its application to South African soils as mitigation measure. Pretoria: Department of Environmental Affairs.

DEA. (2018). South Africa State of Waste Report.

DEFF. (2020). A Circular Economy Guideline for the Waste Sector- A Driving force towards Sustainable Consumption and Production. Department of Environment, Forestry and Fisheries.

DEFF. (2020). National Waste Management Strategy.

Deloitte. (2013). The food value chain - A challenge for the next century. Deloitte Touche Tohmatsu Limited.

Deloitte. (2015). Reducing Food Loss Along African Agricultural Value Chains.

Dewey, R. L., & Nelson, J. C. (2022, March 26). The Transportation Problem of Agriculture. Retrieved from https://naldc.nal.usda.gov/download/IND43893743/PDF

DFFE. (2021). Biogas Guidebook for Small to Medium-Scale Industrial Biogas Plants in South Africa. Pretoria: Department of Forestry, Fisheries, and the Environment.

DSD. (2018). Household Food & Nutrition Security Programme: DSD Portfolio Committee Briefing.

DSI. (2022, March). Retrieved from https://www.dst.gov.za/index.php/about-us

DST. (2014). A waste Research Development and Innovation Roadmap for South Africa. Pretoria: Department of Science and Technology.

The dtic. (2021). A Guide to ***the*** Incentive Schemes 2020/21.

The dtic. (2020). 2019/2020 Annual Incentive Report Industrial Financing Branch (IFB).

EnviroServ Waste Management. (2022). Retrieved July 2022, from https://www.enviroserv.co.za/case-studies/

Environmental Protection Agency. (2022). United States Environmental Protection Agency. Retrieved from Sustainable Management of Food: Reduce Wasted Food by Feeding Animals: https://www.epa.gov/sustainable-management-food/reduce-wasted-food-feeding-animalsFood and Agriculture Organisation. (2019). State of Food and Agriculture (SOFA) Report 2019: New insights into food loss and waste - IFPRI

Food and Agriculture Organisation. (2011). Global Waste and Food Loss. Food and Agricultural Organization.

Food and Agriculture Organisation. (2015). Series of International Conferences on Food Loss and Waste Reduction.

Food and Agriculture Organisation. (2018). SDG 12.3.1: Global Food Loss Index. Rome: Food and Agriculture Organization of the United Nations.

Food and Agriculture Organisation. (2018b). Food loss analysis causes and solutions. Case study on groundnut supply chain in Malawi - Factsheet.

Food and Agriculture Organisation. (2018c). food loss analysis causes and solutions. Case study on Maize supply chain in Malawi - Factsheet.

Food and Agriculture Organisation. (2018d). Food loss analysis causes and solutions Case study on the maize value chain in the Democratic Republic of Timor-Leste.

Food and Agriculture Organisation. (2018e). Food loss analysis causes and solutions. Case study on cassava value chain in the Republic of Guyana – Factsheet.

Food and Agriculture Organisation. (2018f). Food loss analysis causes and solutions. Case study on tomato value chain in the Republic of Guyana - Factsheet.

Food and Agriculture Organisation. (2018g). Food loss analysis causes and solutions. Case study on mango value chain in the Republic of Guyana - Factsheet.

Food and Agriculture Organisation. (2018h). Food loss analysis causes and solutions. Case study on teff supply chain in Ethiopia – Factsheet.

Food and Agriculture Organisation, & World Health Organisation. (2018). Codex Alimentarius, Understanding CODEX. Rome: www.fao.org.

Food and Agriculture Organisation. (2011). Global Waste and Food Loss.

Food and Agriculture Organisation, IFAD, UNICEF, WFP and WHO. (2021). The state of food security and nutrition in the world 2021: transforming food systems for food security, improved nutrition, and affordable healthy diets for all. Rome: World Health Organization.

FAOSTAT. (2022). Food Balance Sheets 2010-2019. Accessed in March 2022.

FGE. (2022, February). Retrieved from http://www.fge.co.za/project/a-large-waste-to-energy-plant/

Food For Us. (2019). Food For Us: Reducing food waste, supporting social learning, creating value.

Food Forward SA. (2020). An evaluation of impact 2019/2020.

Food Forward SA. (2021). ANNUAL REPORT 2020/2021.

Food on the Table. (2022). Retrieved February 2022, from https://www.ctmarket.co.za/about-us/social-responsibility/

Foodeez. (2022, February). Retrieved from http://foodeez.co.za/

FOODFOORWARD SA. (2020). An evaluation of impact 2019/2020.

FSSC. (2022). FSSC 22000. Retrieved from www.fssc22000.com

GIZ. (2016). Biogas Industry in South Africa: An Assessment of the Skills Need and Estimation of the Job Potential.

Greenberg, S. (2016). Corporate power in the South African agro-food system and the consumer food environment. Cape Town: institute for Poverty, Land and Agrarian Studies, University of Western Cape.

GreenCape. (2020). Food loss and waste: A case for recovery, reduction, and recycling.

GreenCape. (2016). Western Cape Industrial Programme (WISP) case study: Apples to Apples.

GreenCape. (2020). Adapting waste to energy interventions for seasonal demand.

GreenCape. (2021). Food Waste Upcycling: Upgrading Food Waste to Insect Protein. Cape town.

Gustavsson, J. C. (2011). Global food losses and food waste.

Gustavsson, J., Cederberg, C., Sonesson, U., & Van, O. (2011). Global food losses and food waste.

Gustavsson, J., Cederberg, C., Sonesson, U., van Otterdijk, R., & Meybeck, A. (2011). Global Food Losses and Food Waste: Extent, Causes and Prevention. Düsseldorf, Germany: Study Conducted for the International Congress SAVE FOOD! at Interpack 2011. Food and Agriculture Organization of the United Nations.

HACCP. (2022). The benefits of HACCP. Retrieved from Training Academy HACCP Certification in South Africa: https://dqsacademy.co.za/the-benefits-of-haccp/

HAIQI ENVIRON. (2021). South Africa Green Hydrogen Through Biomass Gasification. SHANGHAI: HAIQI ENVIRONMENTAL PROTECTION TECHNOLOGY.

iCompost. (2019). iCompost Technology. Retrieved 2022, from https://www.icompost.co.za/

Katiyo, W., Coorey, R., Buys, E. M., & de Kock, H. (2020). Consumers' perceptions of intrinsic and extrinsic attributes as indicators of safety and quality of chicken meat: Actionable information for public health authorities and the chicken industry. Journal of Food Science.

le Roux, B., van der Laan, M., Vahrmeijer, T., & Annandale, J. G. (2018). Water Footprints of Vegetable Crop Wastage along the Supply Chain in Gauteng, South Africa. Water, 1-15.

MadamWaste. (2022). Retrieved 2022, from https://madamwaste.com/our-services/

Maltento. (2020). Maltento. Retrieved 2022, from https://www.maltento.com/

Mensah, C., & Karriem, A. (2021). Harnessing Public Food Procurement for Sustainable Rural Livelihoods in South Africa through the National School Nutrition Programme: A Qualitative Assessment of Contributions and Challenges. Sustainability.

Mérieux NutriSciences. (2022, March). Retrieved from https://www.merieuxnutrisciences.com/za/article/about-us

Nahman, A., & de Lange, W. (2013). Costs of food waste along the value chain: Evidence from South Africa. Waste Management, 2493-2500.

NCPC-SA. (2021). Industrial Symbiosis Programme (ISP). Retrieved from https://www.industrialefficiency.co.za/industrial-symbiosis-programme-isp/

Niassy, S., Ekesi, S., Hendriks, S. L., & Haller-Barker, A. (2018). Legislation for the Use of Insects as Food and Feed in the South African Context. In A. Halloran, R. Flore, P. Vantomme, & N. (. Roos, Edible Insects in Sustainable Food Systems (pp. 457-470). Springer International Publishing AG.

NOSH Food Rescue. (2022). Retrieved March 2022, from https://noshfoodrescue.co.za/about-us/

OEI. (2021). OIE Activities on animal production food safety. Retrieved from OEI World Organization for Animal Health: https://www.oie.int/en/what-we-do/

Oelofse, S., & Nahman, A. (2013). Estimating the magnitude of food waste generated in South Africa.

Oelofse, S. H., & Marx Pienaar, N. (2016). Household Food Wastage – A case study of middle to high income urban households in the City of Tshwane. Johannesburg: Proceedings of the 23rd WasteCon Conference.

Oelofse, S. H., Polasi, T., Haywood, L., & Musvoto, C. (2021). Increasing reliable, scientific data and information on food losses and waste in South Africa. Department of Science and Technology and Council for Scientific and Industrial Research.

Oelofse, S., Muswena, A., & Ramukhwatho, F. (2018). Household food waste disposal in South Africa: A case study of Johannesburg and Ekurhuleni. South African Journal of Science.

Oelofse, S., Nahman, A., Barjees Baig, M., Salemdeeb, R., Nizami, A.-S., & Reynolds, C. (2020). Food Waste Within South Africa and Saudi Arabia. City, University of London Institutional Repository: Routledge. ISBN 9781138615861 doi:10.4324/9780429462795-17.

Oelofse, S., Nahman, A., Barjees Baig, M., Salemdeeb, R., Nizami, A.-S., & Reynolds, C. (2020). Food Waste Within South Africa and Saudi Arabia. In: Routledge Handbook of Food Waste. Routledge. ISBN 9781138615861 doi: 10.4324/9780429462795-17.

Oricol Environmental Services. (2022). Retrieved August 2022, from https://www.oricoles.co.za/.

Parfitt, J. B. (2010). Food waste within food supply chains: quantification and potential for change to 2050. Philosophical transactions of the royal society B: biological sciences, 365(1554), 3065-3081.

Read, Q. D., Hondula, K. L., & Muth, M. K. (2022). Biodiversity effects of food system sustainability actions from farm to fork. PNAS.

Rediscoverdairy. (2021). Retrieved from https://www.rediscoverdairy.co.za/wp-content/uploads/2021/06/27.-Sustainable-Food-Systems.pdf

SABS. (2021). Food Safety Management Systems. Retrieved from https://store.sabs.co.za/iso22000

SAGIS. (2022). Producer deliveries, Consumption, Imports and Exports of Maize, 1924/25 to 2021/22 marketing seasons.

Shai, T. (2021). Mpumalanga Sustainable Agriculture Market Intelligence Opportunity Brief. Mbombela: Mpumalanga Green Cluster Agency.

Shoprite. (2021). Sustainability Report.

Skowno, A. L., Jewitt, D., & Slingsby, J. A. (2021). Rates and patterns of habitat loss across South Africa's vegetation biomes. S Afr J Sci.

STATS SA. (2019). Towards measuring the extent of food security in South Africa: An examination of hunger and food adequacy/.

STATS SA. (2021). General Household Survey 2020 Measuring the progress of development in the country.

The Compost Kitchen. (2019). Retrieved 2022, from https://www.compostkitchen.com/

UNEP. (2021). FOOD WASTE INDEX: Report 2021. Nairobi: UNEP.

UNEP. (2021). United Nations Environmental Programme, Food Waste Index Report.

USEPA. (2022). The United States Environmental Protection Agency. Retrieved from Sustainable Management of Food.: https://www.epa.gov/sustainable-management-food/industrial-uses-wasted-food

WWF. (2017). Food Loss and Waste: Facts and Futures. WWF South Africa.

WWF. (2018). Surplus food. Emerging climate-smart business opportunities.

WWF. (2020). Living Planet Report 2020: Bending the Curve of Biodiversity Loss. Switzerland: WWF.

WWF-SA. (2019). Agri-food Systems: Facts and Futures, How South Africa can produce more by 2050. Cape Town: World Wide Fund for Nature.

WWF-UK. (2021). The Future of Fees: A WWF Roadmap of Accelerating Insect Protein in UK Feeds.

Ywaste Recycle. (2016). Retrieved 2022, from https://www.ywaste.co.za/

ANNEXURES

ANNEXURE A: CURRENT FOOD LOSSES AND WASTE INITIATIVES IMPLEMENTED IN SOUTH AFRICA

Several initiatives directed at reducing FLW exist in South Africa. These FLW initiatives are presented below in line with the Food Recovery Hierarchy (FRH).

PROGRAMME	INITIATIVE
FOOD RECOVERY HIERARCHY: TIER 1 - SOURCE REDUCTION	
Research Initiatives	Research and Technological Innovation; Production, Processing and Packaging: Tools and Apps: PurEst®; STALKGRO; Susfarms® Progress Tracker; Mechanisation Reports; NCPC-SA Western Cape Industrial Symbiosis Programme (WISP)
CGCSA led Voluntary Agreement	The South African Food Loss and Waste Agreement
Umoya Dryers	Umoya Dryers promotes on-farm dehydration of out-graded fruit and vegetables for conversion to commercial foods or food ingredients. They design, build, and commercialize on-farm dehydration solutions and equipment, focusing on smallholder rural farmers and supporting commercial or industrial farming businesses.
FOOD RECOVERY HIERARCHY: TIER 2 - FEED HUNGRY PEOPLE	
FoodForward SA	They recover good quality and edible surplus food from the consumer goods supply chain and send it to community organisations serving the needy.
NOSH Food Rescue	An initiative that diverts, repurposes, and redistributes surplus food (prepared and perishable) to reduce food insecurity.
The Household Food and Nutrition Security Programme (HFNSP)	Supplies food sourced from bulk procured food, donated food, and local producers.
Food on the Table	This initiative donates food to feed the poor, disadvantaged, destitute and marginalised (Food on the Table, 2022)
Food Masters South Africa	Dehydrates edible fruits and vegetables, which are unsuitable for the market.
Foodeez	An initiative that purchases non-perishable goods that are short-dated, damaged, and surplus food (Foodeez, 2022).

Memcon	Recovers proteins, lactose, and mineral from cheese whey. Thus, reducing food waste in the dairy industry (Memcon, 2022).
Woolworths and WWF partnership	Waste management efforts include fit-for-purpose packaging, on-pack information, donations of surplus food to more than 1 000 charities every year and promoting supply chain efficiency and sustainable farming practices.
FOOD RECOVERY HIERARCHY: TIER 3 - FEED ANIMALS	
Maltento	Produces regenerative products and uses regenerative processes in creating insect-based protein products (Maltento, 2020)
Oricol Environmental Services	Divert over 60% of waste from going to landfill by either converting it to resource, recycling, or waste treatment
FOOD RECOVERY HIERARCHY: TIER 4 - INDUSTRIAL USE	
EnviroServ	Assists the food industry in reducing dough waste at bakeries (EnviroServ Waste Management, 2022).
Biochar from sawmills	The recovery of energy and biochar production offers a potential solution to managing these sources of waste, which also recovers value from an otherwise wasted resource.
Elgin Fruit Juice Anaerobic Digester	Collects approximately 21 tonnes of fruit and vegetable waste per week from Cape Town Market to supplement its feedstock, potentially saving R550 000 each year in landfill gate fees, as its waste is being diverted to an anaerobic digester (GreenCape, 2020)
Bronkhorstspruit Biogas Plant	The plant uses about 120 000 tonnes of organic waste, producing about 20 000 of fertiliser per year. BMW is the off-taker of the generated electricity (Bio2Watt, 2022).
Cape Dairy Project (Pty) Ltd	It uses feedstock from Vyvlei farm, the largest dairy farm in the country, to produce electricity with a capacity of 4.2 MW (Bio2Watt, 2022).
New Horizons Waste-to-Energy Facility	It uses about 480 tonnes of municipal solid (organic) waste per day to produce a capacity of 4 MW (GIZ, 2016; FGE, 2022)
iBert	**iBert** has several small biogas plants, namely Bredasdorp (4 tonnes), Cavalier (20 tonnes), Jan Kemdorp (5.5 tonnes) and Riverdale (4 tonnes). These plants use abattoir waste. (GIZ, 2016)
FOOD RECOVERY HIERARCHY: TIER 5 – COMPOSTING	
Bokashi Bran	Divert food waste from landfill to produce high-quality Bokashi Bran compost of high quality. This solution is suitable for homes and commercial kitchens in managing food waste.
Compost Kitchen	Composite kitchen supplies their client with organic bins collected weekly (for a monthly fee), and the client receives 2kg of vermicompost every month, which they can use for farming

iCompost	**iCompost** is a product which consumers could buy for their households or companies. A kitchen waste composting appliance that turns food waste into compost in three steps (iCompost, 2019)
Ywaste	**Ywaste** produces compost from fruit and vegetables supplied by Cape Town Market (Ywaste Recycle, 2016).
Earth Bokashi	**Earth Bokashi** produces bokashi using food waste. Suitable for households, hotels and lodges, offices and canteens, supermarkets, and malls.
Compost Kitchen	An initiative that collects food waste from homes for a monthly fee and provides the household with vermicompost, which is used to grow fresh food.
Green Events	**Green Events** provides a waste diversion solution for companies/organisations. Waste is collected and used as feedstock for vermiculture (MadamWaste, 2022)
FOOD RECOVERY HIERARCHY: TIER 6 - LANDFILL/INCINERATION	
Sebenza Waste Site- Ekhurhuleni Municipality	This landfill site captures landfill gas from the decomposing waste.

ANNEXURE B: FOOD LOSSES AND WASTE OPPORTUNITIES, BARRIES AND ENABLERS

The existing opportunities, barriers, and enablers of FLW reduction that are evident in the FSC in South Africa are shown below in line six tiers of the Food Recovery Hierarchy (FRH).

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
FOOD RECOVERY HIERARCHY: TIER 1 - SOURCE REDUCTION					
1.1 Creation of circular farms/ circular economies	**Enabler:** The White Paper on Science, Technology, and Innovation (2019) and the National Waste Management Strategy (NWMS), 2020, introduces and promotes the use of circular economy. The Extended Producer Responsibility (EPR) Regulations could be used as a tool for circular economy. **Barrier:** Currently there is no legislative framework for circular economy. Thus, there are inadequate systems that regulate or	Legal Framework for Circular economy which speaks to how companies prior to retail could achieve circular economy. This could also be achieved through: - Voluntary Agreements (Collaboration between government and private sector) / Voluntary Initiatives - Cradle-to-Cradle certification (promotes record-keeping, understanding the lifecycle of products and recognition of companies/organisations which practice circular economy) - Industrial Symbiosis Programme (Collaboration between stakeholders, promoting linkages and synergies). Documentation of circular economies – Record keeping Opportunity for Research and Innovation in determining how companies/organisations could shift to circular economy	- White Paper on Science, Technology, and Innovation - NWMS (2020) - National Environmental Management: Waste Amendment Act 26 of 2014 (NEM: WAA). - Policy Framework relating to green economy. - The NEM: WA Regulations. Regarding EPR (No.1184 of 2020). - NDP. - SDGs. - Nationally Determined Contributions (NDCs). - Integrated Resource Plan 2019 (IRP 2019). - The Carbon Tax Act 15 of 2019. - The Carbon Offsets Regulations 2019.	DALRRD, , DSI, DFFE, DMRE, GreenCape, SALGA, Farmers Associations, Food Industry and Retail, CGCSA.	Across FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	promote circular economy.	Various practices, tools, and technologies which companies can utilise to shift to a circular economy - Regenerative farming Systems - Recycling of materials - Food Waste Upcycling - Use of renewable materials - Precision Farming o Global Positioning System (GPS) receivers o Differential Global Positioning System (DGPS) o Geographical Information Systems (GIS) o (CSIR, 2019) o Variable-rate application (VRA) (SA Grain, Author Blaker, 2021) Government could implement awareness campaigns for industry. Providing Case studies, workshops, and other means of disseminating of information. - Educating industry on impacts of food waste and loss and the need to move towards a circular economy. - Tools and technologies that could promote circular economy - Processes and products which promote circular economy			

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
		Creation of new food products or non-food products e.g., protein shakes using edible food waste and cosmetics for inedible food waste.			
1.2 Market Access for food products (e.g., fruits and vegetables)	**Enabler:** Marketing of Agricultural Products Act 47 of 1996 **Barrier:** Insufficient strategies to connect farmers to markets (end-user)	Forge professional relationships between farmers and consumers. Develop farmer-to-consumer connection mechanisms (e.g., through online tools, applications, and websites). Employ Information and communication technologies (ICTs) in marketing. Online resources like apps connecting farmers to markets already exist and could be expanded. Building the capacity of farmers' groups to facilitate appropriate communal storage, acquiring postharvest handling technologies and collective marketing of products that an individual farmer or household may not be able to afford. Strengthening of producer organisations in terms of structuring, collective infrastructure, equipment, and group marketing. Government and development partners/stakeholders to design appropriate sets of policies that result in	Agricultural Product Standards Act (No 119 of 1990). Marketing of Agricultural Products Act 47 of 1996	DoH, DALRRD, NAMC, NDA, ITAC, ARB, CGCSA, Food Retailers, Farmers,	Post-harvest

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
		effective and efficient market access systems.			
	Barrier: Products which are edible but do not make it to the market due to market standards	Use of Food Hierarchy - Secondary products (juicing, canned fruits) - Secondary Markets - Food Donation Market solutions, e.g., relaxed cosmetic marketing standards on agricultural products. Food should not be rejected based on superficial cosmetic issues rather should be about safety/quality standards (Stakeholder engagement document-WRC) Consumer campaigns: awareness and information			Post-harvest
	Barrier: Cost of compliance Expensive certification Efficient and cost-effective transport system/ transport cost Processing costs	Lowering of costs could result in more products in the market Adding more value to product. Assistance to small scale farmers through training and workshop, bring awareness on best practice methods			Post-harvest
1.3 Food safety and Quality		Government programmes which promote food safety and quality e.g., the SA-GAP certification programme for small holder farmers	The Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972. Regulations Fertilisers, Farm Feeds, Agricultural Remedies and	DFFE, DoH, DALRRD , tic, SABS	Across supply chain

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
			Stock Remedies Act, 1947 (Act no. 36 of 1984) Agricultural Product Standards Act, 1990 (Act No. 119 Of 1990) Codex Alimentarius International Food Standards Animals Protection Act, 1962 (Act No. 71 of 1962) Meat Safety Act, 2000 (Act No.40 of 2000) Veterinary and Para-Veterinary Professions Act, 1982 (Act No. 19 of 1982) Liquor Products Act, 1989 (Act 60 of 1989) General Hygiene Requirements for Food Premises, the Transport of Food and Related Matters (No. R. 638 of 2018) Animal Identification Act, 2000 (Act No. 6 of 2002) Animal Improvement Act, 1998 (Act. No. 62 of 1998) Animals Protection Act, 1962 (Act No. 71 of 1962) Performing Animals Protection Act, 1935 (Act No. 24 of 1935)		

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
			FSSC 22000 food safety systems certification The Cartagena Protocol on Biosafety Genetically Modified Organisms Act 15 of 1997 International Food Safety Authorities Network (INFOSAN) European Union Rapid Alert System for Food and Feed (RASFF) Animal Disease Act (Act 35 of 1984)		
1.4 Food Labelling	**Barrier: Yes** The Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972. Regulations Relating to the Labelling and Advertising of Foodstuffs (No. R.146 of 2010) requires date markings such as "best before", "sell by" and "use by" on the packaging of foodstuffs. These date	Compile or update of packaging design guidelines Smart Packaging technologies. Awareness programmes: education on food labels from farmers/ manufacturers to consumers (Stakeholder engagement document) Awareness programmes: Food safety versus Food quality. education on food labels from farmers/ manufacturers to consumers (Stakeholder engagement document). Awareness around what constitutes and unsuitable food (Stakeholder engagement document)	Codex Alimentarius International Food Standards The Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972. Regulations Relating to the Labelling and Advertising of Foodstuffs (No. R.146 of 2010) Agricultural Product Standards Act, 1990 (Act No. 119 Of 1990) The Consumer Protection Act (No. 68 of 2008)	DFFE, DoH, DALRRD , The dtic, SABS	Manufacturing , Retail, Consumption

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	markings are standardised, differentiating between safety-based and quality-based labels. The date for the quality-based labels ("best before", "sell by") means the quality of food would have been reduced but may still be safe for consumption while past the safety label ("use by") the food should not be consumed or sold. There is still confusion regarding these labels, thus may be contributing to food loss and waste. Differences in International standards Codex Alimentarius International Food Standards and Labelling and Advertising of	Training and capacity building of government officials			

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	Foodstuffs (No. R.146 of 2010)				
1.5 Research and Innovation	**Barrier: Yes/No** Lack of capital to invest in research and development channelled towards pre-harvest losses. **Enabler: Yes** **Legislation:** Research institutions formulated by government which could assist in finding ways and methods to prevent and manage food waste. e.g., Agricultural Research Council (ARC) through the Agricultural Research Act, 1990 (Act No. 86 of 1990)	Private sector investment in research and development programmes for pre-harvest loss reduction. Develop subsidy schemes to promote innovation. Develop and implement policies that promote research and development in postharvest loss technologies, practices, and management. Opportunity for research in innovative solution to prevent and manage food waste - Management/prevention of outbreaks and pest disease which also play a role in food loss and waste - Modified Atmosphere Packaging - Food security - 4th industrial revolution technology such as Big data marketing (IoT, Big data, Artificial intelligence) to help farmers connects to the consumers - Increase farmers' market access - Farmers will be better able to anticipate consumers' demand while informing consumers directly about the availability of produce and its quality.	Agricultural Research Act, 1990 (Act No. 86 of 1990) Fertilizers, Farm Feeds Agricultural Remedies and Stock Remedies, 1947 (Act No. 36 of 1947)	DSD, DALRRD, DSI, DoH, CSIR	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
		- Product improvement and extension of shelf life - Crop protection - Biotechnology - Type of farming (e.g., organic farming, regenerative farming, conservation agriculture, precision agriculture etc.)			
1.6 Farming Practices	**Barrier: Yes** The country has been experiencing load shedding since 2008, which has resulted in costly disruptions and has potentially resulted in loss of food for farmers which depend on Eskom for their refrigeration.	Postharvest tools and technologies Cooling technologies. - Smallholder's farmers access to refrigerated units for food transportation (e.g., trucks and train containers). - Distribution technologies, e.g., food packaging; inventory management systems, temperature control systems and tracking, development of new produce varieties with improved shelf life. - Increase access to ecological cooling systems for grain. - Popularize a multi-system approach to bio-control systems across the supply chain. Storage resources (e.g., metal silos, airtight bags) Digital apps (e.g., connected to sensors the can sense odour)	Foodstuffs, Cosmetics and Disinfectants Act (No. 54 of 1972)	DALRRD , DFFE,	Distribution

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
		Alternative pest treatment strategies (e.g., botanical pesticides) Improved inventory systems Capacity building (e.g., on reducing technical malfunctions, including inventory management; spillages). Establish an institution/programmes that can be responsible for the coordination of all activities in the promotion of the postharvest sector.			
1.7 Funding	**Barrier: Yes** Lack of access to affordable finance for agricultural investments especially for rural communities/ small scale farmers. Lines of credit are increasingly difficult for small and rural farmers	Create affordable financial instruments for smallholder farmers. Enable farmers to access and adopt post-harvest technologies. Credit schemes that are smallholder-friendly, built on public and private partnerships with banks. Funding to Improves storage and pest management practices, thus reducing post-harvest losses. Government grants to cover the incremental cost related to climate risk management. Climate resilience and local input investment. Formulate policies that can cover credit services to facilitate farmers' uptake of postharvest technologies.		DFFE, DBSA, GEF, DFI, The dtic,	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
		Promote multi-stakeholder partnerships to engage small-scale traders in postharvest technology adoption.			
FOOD RECOVERY HIERARCHY: TIER 2 - FEED HUNGRY PEOPLE					
2.1 Food donation of surplus edible food.	**Enabler: Yes** The South African Constitution (Act 108 of 1996) (section 27) requires every person to have access to sufficient food in a dignified manner: **Enabler: Yes** The Food Waste Voluntary Agreement (FWVA) promote the use of the Food Recovery Hierarchy. Food donation is good for corporate conscience and public	Employ Information and communication technologies (ICTs) - Allowing for the timely linkage of the donor and recipient (thus linking surplus food to those who are in need) Government collaboration with farmers, manufacturers, and retailers to get their excess food products to any NGO, PBO, food banks and homeless shelters for distribution to the food insecure. Government to develop guidelines for those who donate and those who receive the donation, in this way removing any confusion and ensuring that the surplus food is kept in a manner that it is safe for consumption.	The South African Constitution (Act 108 of 1996) (section 27) South Africa's Income Tax Act of 1962 VAT Act and the Tax Administration Act Consumer Protection Act (No. 68 of 2008)	DFFE, DSD, DoH, SARS, The dtic	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	relations and shows that companies are socially responsible. **Enabler:** The VAT Act and the Tax Administration Act provides for Tax Incentives for Businesses which donate their surplus food. **Barrier:** The Consumer Protection Act (No. 68 of 2008) section 61, of strict liability for damage caused by goods. Thus, the Liability is on the donor. Some donors may be reluctant in donating in attempts to safeguard or protect their brand.	Creation of food networks Liability protections for food donors Partnership with small farms to large retail stores as food donors. Community-based storage centres for excess food (community warehouse that collect food from a variety of sources, warehouse it, and then distribute it to food pantries, soup kitchens, shelters, and individuals through mobile distribution trucks) Awareness campaigns (hunger in our community and how we can all help make a difference).			
2.2 Secondary Products for	**Enabler:** Food that is edible and safe for	Creates environment for Industrial Symbiosis thus promoting circular economy.	Standards Act (Act 8 of 2008) Consumer Protection Act (Act 68 of 2008)	DFFE, DoH, The dtic, SABS	Post-Harvest

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
Human Consumption	consumption but not suitable for the market and viewed as waste	Upcycling/remanufacturing - Use of bakery waste and bran to make other edible products using insect farming. - Canned foods, Juicing Income stream diversification of small-scale producers.	National Regulator for Compulsory Specifications Act (Act 5 of 2008)		
2.3 Creation of Secondary Markets: No suitable market for edible produce. Thus, requiring for the creation of secondary markets	**Barrier:** The Regulations Relating to the Grading, Packing and Marking of Fresh Vegetables (R364 of 2013) intended for sale in the republic of South Africa. Grade 3 food may have no value when distribution costs are factored in, resulting in the farmer opting to not sell the fruits in the market. **Enabler: Yes** The creation of secondary market could provide access	Income stream diversification of small-scale producers Market diversification will ensure lesser produce has access to trade if high-end markets reject it. Incentivize entrepreneurship in the recovery and redistribution of food Increase in market participation for both producers and consumers Shared economy (e.g., commercial food surplus recovery network built on social networks)	Consumer Protection Act (Act 68 of 2008). Regulations Relating to the Grading, Packing, and marking of Fresh Vegetables (R364 of 2013).	DFFE, the dtic, SABS, ARC, CSIR	Post-Harvest

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	to farmers whose products where not suitable (safe for human consumption) to the primary market thus also allowing those who cannot afford primary markets to participate in the secondary market.				
FOOD RECOVERY HIERARCHY: TIER 3 - FEED ANIMAL					
3.1 Insect farming to manage food waste: animal feed protein	**Enabler:** The Fertilizers, Farm Feeds Agricultural Remedies and Stock Remedies, 1947 (Act No. 36 of 1947) allows for the registering to manufacture, import, or sell farm feed or pet feed. However, the regulation is not specific or does not refer to insects though it is assumed that its referral to "animal" also includes insects.	The insect farming industry is new in South Africa and could create a number of jobs. Cost savings as it is a cheaper method in making animal protein Incentivize entrepreneurship in the recovery and redistribution of food. Government to promote insect farming industry incentives, funding, awareness, training. Policy development or guideline for best practice methods for the industry. Legal framework for the insect farming industry Creation of new markets, products, and by-products of the insect farming industry	The Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947): The South African Policy on Animal Feeds (GN 511 in GG 31005 of 30 April 2008) The Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972 Municipal by-laws The Agricultural Product Standards Act (Act 119 of 1990) The Marketing of Agricultural Products Act (Act 47 of 1996) Standards Act (Act 8 of 2008)	DoH, DALRRD , the dtic, SABS, DFFE, SANBI	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	The Feeds and Pet Food Bill (2019) does not include invertebrates as part of "animals" **Enabler**: Protein Feed (Animal Feed) Water vapour by product Reduction of greenhouse gas emissions if waste had done to Landfill **Barrier:** The South African Policy on Animal Feeds (GN 511 in GG 31005 of 30 April 2008) highlights the importance of "food safety through feed safety" and the adoption of several global quality standards in the animal feed industry (Niassy, Ekesi,	- Protein shakes (human consumption, promoting industrial symbiosis) - Organic Fertilizer/compost (promoting circular economy) - Oils (promoting industrial symbiosis) Food security Awareness to the relevant authorities about what the process entails Awareness to those who could form part of the industry. Potential for training courses and capacity building Creation of New Local Markets (New agricultural products) Growth of the industry Carbon credits Opportunities for routing suitable organic waste for insect farms Medium risk waste could be used for animal feed Regulations/Standards that farmers should adhere to	SANS 489:2009 Edition 1 SANS 898:2011 Edition 1 SANS 909:2018 Edition 1 SANS 10049:2012 Edition 4.1 SANS 22005:2009 SANS 289:2016 Consumer Protection Act (Act 68 of 2008) National Norms and Standards for the Storage of Waste (Government Notice 926 of 2013) Agricultural Pests Act Agricultural Product Standards act National Climate Change Response Policy		

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	Hendriks, & Haller-Barker, 2018). **Barrier:** Ammonia production in the system due to microbial growth. **Barrier:** Not all food waste can be used, especially those that have been contaminated (e.g., salmonella contamination).				
3.2 Recovery of inedible food for animals	**Enabler:** The Animal Disease Act (Act 35 of 1984) allows for food scraps/waste to only be feed to animals following treatment (ensuring that the food is safe for consumption and will not spread pathogens) of the food waste. **Barrier:** This option has a potential to be	-Promotion of circular economy and sustainable food production (Dame-Korevaar, Boumans, Antonis, van Klink, & de Olde, 2021)	Animal Disease Act (Act 35 of 1984 Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) The Feeds and Pet Food Bill (2019)	DoH, DALRRD	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	harmful due to microbial health hazards which may result in more food loss and waste rather than curbing the situation (Dame-Korevaar, Boumans, Antonis, van Klink, & de Olde, 2021).				
FOOD RECOVERY HIERARCHY: TIER 4 - INDUSTRIAL USE					
4.1 Converting food waste to Energy (e.g., Biofuel, Biogas, Landfill Gas to Energy, Plasma gasification, Gasification, Pyrolysis)	**Enabler:** The industry is well regulated and depending on various factors such as capacity, location, waste generated, construction and storage a number of licences or permits may be required. Either a basic assessment (BA) or a full Environmental Impact Assessment (EIA) may be required. The current legislation caters for the	Protection of the Environment (prevention of pollution, ecological degradation, reduction in incidents) Skills development in new technology. -Programs at university level. Government could provide for support in funding of this industry, providing incentives as it would decrease the use of fossil fuels. Promotion of the Sector Government support (incentives, funding, training, government programmes, capacity building) - Government could provide for support in funding of this industry, providing incentives as it would decrease the use of fossil fuels. - Promotion of the Sector	National Water Act, 1998 (Act 36 of 1998) Section 28 NEMA National Environmental Management: Waste Amendment Act 26 Of 2014 (NEM: WAA) National Environmental Management: Air Quality Act (NEM: AQA) National Environmental Management: Biodiversity Act (NEM:BA) National Environmental Management: Protected Areas Act (NEM: PAA) National Environmental Management: Integrated	DWS, DFFE, DoH, Local Government Departments Local Municipality, SAHRA, NERSA, ICAO, DMRE, GIZ	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	following technologies to be used in the south African landscape: - Biogas - Landfill Gas to Energy - Plasma gasification - Gasification - Pyrolysis **Barrier:** Skills required for these technologies may not be currently available, thus making it difficult to enter the industry **Barrier:** High Capital Costs to use these technologies. The process of licencing and permitting prior to construction is costly. for example, requires employment of relevant persons	- Awareness to potential investors and financer's - Awareness to government officials about the licencing and permitting process to provide better assistance for the biogas industry. - Awareness to those interested in the industry on what process should be followed and what services would be required Opportunity for infrastructure development. (e.g., Harvesting of gas on landfill sites)	Coastal Management Act (NEM: ICMA) National Forests Act (No. 84 of 1998) National Health Act 61 Of 2003 Hazardous Substances Act 15 of 1973 (HSA) National Heritage Resources Act (Act 36 Of 1998) Subdivision of Agricultural Land Act (SALA, Act 70 Of 1970) Conservation of Agricultural Resources Act (CARA, Act 43 of 1983) National Gas Act GAS ACT (Act 48 Of 2001) Electricity Regulation (Act 4 of 2006) Spatial Planning and Land Use Management Act, 2013 (SPLUMA) Civil Aviation Act (Act 13 of 2009) Civil Aviation Regulations 2011		

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	e.g., employing legal practitioners and environmental practitioners. Following this process, it is not guaranteed that one will get the Environmental Authorisation (EA).		National Policy in Thermal Treatment of General and Hazardous Waste GN 777 of 24 July 2009 National Domestic Waste Collection Standards 2010 Local Government: Municipal Finance Management Act 56 of 2003 Infrastructure Development Act 23 of 2014 National Building Regulations and Building Standards Act 103 of 1977 Biofuels Industrial Strategy		
	Enabler Use of Green Energy Technologies: The country has been experiencing load shedding since 2008, which has resulted in costly disruptions. The main power sauce currently uses fossil fuels, the use of alternative green energy will aid South Africa in reducing	- Facilities or industries which are off the national grid, thus self sufficient - Promotion of Circular economy - Reduction of the use of fossil fuels. Thus, reduction in greenhouse gas emissions. - Generating electricity that will be added to the national grid thus assisting with load shedding - Government support (incentives, funding, training, government programmes)	National Energy Act (Act 34 of 2008) Electricity Regulation (Act 4 of 2006) Municipal Financial Management Act & Municipal System Act (Section 78). Integrated Resource Plan 2019 (IRP 2019) The Carbon Tax Act 15 of 2019 The Carbon Offsets Regulations 2019	Eskom, DMRE, the dtic, DSI, DFFE, NERSA, IDC	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	greenhouse gas emissions and towards achieving their targets - e.g., Kyoto protocol **Enabler:** There are several government incentives/funding for green energy technologies - Tax incentives - The Industrial Development Corporation (IDC) provides funding through the AFD Green Energy Fund - 12I Tax Allowance Incentive through the Department of Trade, Industry and Competition (***the dtic***) - Renewable Independent Power Producer		National Development Plan NDP Green Economy Accord National Climate Change Response Policy (NCCRP) Biofuels Industrial Strategy draft position paper on the South African Biofuels Regulatory Framework REIPPPP		

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	Programme (REIPPP) through the Department of Mineral Resources and Energy (DMRE) - The Manufacturing Competitiveness Enhancement Programme (MCEP) through the Department of Trade, Industry and Competition (the dtic)				
4.2 Organic fertiliser	**Enabler:** Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947): GNR 732 of 10 September 2012 provides the provision for the creation, use and sale of organic fertilisers Section3 (1) of the Act requires for the	Promotion of Circular economy: Organic fertilizer could be used to enhance soil, which is used to grow crops, which their waste was used as feedstock to the digester thus creating loops. Nutrients readily available when compared to compost. Thus, healthier soils, less water use and thus improved quality of crops Creation of new markets Creation of new markets could mean job creation. The conversion of digestate to organic fertilizer and the selling of the product could create more jobs. Skills development	The Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act 36 of 1947) (Fertilizer Act, 2018) ISO 17025 Fertilizer Bill	DFFE, DALRRD , Local Municipality, NGOs, GreenCape, ARC, CSIR	Production

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	application for registering a fertilizer DFFE (2018) provides a guideline for registration of digestate derived from abattoir waste used as a soil conditioner or amendment.	Promotion of organic fertilizer rather than synthetic could provide an opportunity to decrease water pollution as a resultant of fertilizer Government support (incentives, funding, training, government programmes)			
FOOD RECOVERY HIERARCHY: TIER 5 - COMPOSTING					
5.1 Converting food waste to compost	**Enabler: Yes**/No The National Environmental Management: Waste Act (Act 59 of 2008 and 2014 Amendments; NEM: WA) imposes a general duty of care, in respect of waste management, that all waste producers should implement reasonable measures to reduce, re-use, recycle and recover waste	Tools and Technologies which could be used: - In-vessel composting (IVC) • Relatively low capital costs vs. large compost sites' ancillary purchases (turners, shredders, screeners) • Low to zero malodour emitted • Small footprint - can be located on-site thus reducing logistic costs and related carbon emissions. • Automated system requires minimal manual input. • Off ground enclosed system reduces site setup costs (leachate barriers) and easily meet EIA requirements - Open Window composting	National Waste Management Strategy (NWMS), 2020 The National Organic Waste Composting Strategy, 2013 Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947): GNR 732 of 10 September 2012 The National Environmental Management: Waste Act (Act 59 of 2008 and 2014 Amendments; NEM: WA) The National Environmental Management: Air Quality Act (Act No 39. Of 2004) National Waste Information Regulations (GNR 625, 2012)	DFFE, DALRRD , ARC, CSIR, NGOs, GreenCape	Post-harvest to Consumption stage

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	The National Organic Waste Composting Strategy, 2013. **Enabler: Yes** The National Environmental Management: Air Quality Act (Act No 39. Of 2004) is used to manage the offensive odour from composting.	- Controlled environment open composting - Anaerobic fermentation - Anaerobic digestion (AD) - Biological mechanical processing			
FOOD RECOVERY HIERARCHY: TIER 6 - LANDFILL/INCINERATION					
6.1 Waste to Landfill/Incineration	**Barrier: Yes** Disposal of organic waste to landfill is permitted as per National Norms and Standards for Disposal of Waste to Landfill; GN No. 636. This does not promote the beneficiation and circularity of food waste and loss. **Enabler:** Through the Local Government	An opportunity to declassify material that are currently classified as organic waste (GW20) in terms of the GNR 625 of 2012. Such organic materials should be deemed resources and redirected to promote IS and Zero Waste Concept. An opportunity to introduce a phased approach to restrict the disposal of other organic materials onto landfill which is currently permitted as only garden waste is restricted in terms of GNR 636. Electricity generation due to the heat generated during the combustion process or may be used for hydropower.	The National Environmental Management: Waste Act (Act 59 of 2008 and 2014 Amendments; NEM: WA) National Waste Information Regulations (GNR.625 of 2012) Norms and Standards for the Treatment of Organic Waste Norms and Standards for Organic Waste Composting (GN 561 IN GG 44762 OF 2021) Waste Classification and Management Regulations; GN No R 634.	DFFE, DoH, DALRRD , Waste Management Facilities.	Across the FSC

SCENARIO	BARRIER/ENABLER	OPPORTUNITY	APPLICABLE LEGISLATION	STAKEHOLDERS	FOOD SUPPLY CHAIN
	Municipal Systems Act (Act 32 of 2000), Municipalities can implement fees or tariffs for the landfills. Currently it is still cheaper to send waste to landfill. However other factors such as access or awareness regarding other options of the FRH.	Least preferred option on the food recovery hierarchy (FRH). Should only be when other options are not suitable or have been exhausted. Thus, there is opportunity for the government to investing in research of other suitable alternatives/innovative solutions for the treatment of waste or the promotion (through awareness programs) for exiting alternatives. An increase in landfill tariffs could assist in reducing the amounts of waste that come to landfill, thus forcing other options on the food recovery hierarchy to be used.	National Norms and Standards for the Assessment of Waste for Landfill Disposal; GN No. R 635 National Norms and Standards for Disposal of Waste to Landfill; GN No. 636		
6.2 Unavoidable organic waste/ harmful (pathogens)/ contaminated food	**Enabler: Yes** Incineration ensures that the harmful food products (e.g., pathogens) are no longer in circulation (Stakeholder report_ Mérieux NutriSciences meeting)	Infrastructure (e.g., Build plants that can generate electricity at the landfill site) Harvest methane gas produced to create electricity. Use of alternative methods to treat hazardous waste.	The National Environmental Management: Waste Act (Act 59 of 2008 and 2014 Amendments; NEM: WA) Fertilizers, Farm Feeds Agricultural Remedies and Stock Remedies, 1947 (Act No. 36 of 1947)	DMRE, DFFE, DoH, DALRRD	Food processing/ manufacturing

ANNEXURE C: FOOD LOSSES AND WASTE STRATEGY COMMUNICATION PLAN

POLICY / LEGISLATION / PROGRAMME	
1. Name of policy / legislation / Strategy:	Strategy for Reducing Food Loss and Waste
2. Objective:	• To provide the progress made on the development of Strategy for Reducing Food Loss and Waste. • To request the cluster and cabinet to approve the Strategy for Reducing Food Loss and Waste to be published for implementation
3. Key elements:	• The Strategy for Reducing Food Loss and Waste is developed in terms of Section 6 of the National Environmental Management Waste Act, Act No. 59 of 2008. • Through the implementation of the Strategy for Reducing Food Loss and Waste goals and objectives, the strategy intends to divert waste from going to landfill by increasing reuse through beneficiation through which new products can be produced. • By implementing the Strategy for Reducing Food Loss and Waste, new economic
COMMUNICATION PLANNING	
4. Communication objective(s):	5. To inform the public about coming into effect of the Strategy for Reducing Food Loss and Waste. 6. To request stakeholders to participate during the implementation of the Strategy
COMMUNICATION ISSUES AND KEY MESSAGES	

5. Potential communication issues and response / mitigation:	• The Strategy for Reducing Food Loss and Waste is the key policy document for waste management in South Africa • The Strategy for Reducing Food Loss and Waste will be published in the Gazette and published through print and electronic media for the general public including interested and concerned parties to access it using the gazette, website, South African Waste Information Centre (SAWIC), and social media channels. • Email will be also used to provide assistance and respond to queries quicker should
6. What is the key message; and supporting facts?	• The Strategy for Reducing Food Loss and Waste is the key policy document for waste management in South Africa and part of National Waste Management Strategy Implementation. • The strategy as a part of policy document for waste management in South Africa will facilitate coordination, streamlining and provide policy guidance on the regulatory framework and implementation initiatives meant for effective waste management and circular economy in the country.
TARGET AUDIENCES, MESSENGERS AND STAKEHOLDERS	
7. Target audiences:	General Public, industry, academia, civil society, government, etc
8. Primary messengers:	Department of Forestry, Fisheries and the Environment (DFFE)
10. Key stakeholders: Municipalities, Provinces, National Government Departments, Industry, Civil Society Organisations, Academia, Research Institutions and the Public in general.	
INFORMATION PRODUCTS	
11. Information products	Strategy for Reducing Food Loss and Waste
CHANNELS	
FREE CHANNELS	
12. Development / unmediated communication	None
13. Media liaison / PR	Department of Forestry, Fisheries and the Environment (DFFE)

14. Digital / social media	Facebook, Twitter, Instagram
PAID FOR CHANNELS	
15. Television	None
16. Commercial print	Government Gazette and normal SCM process to be followed for print media.
17. Radio: (SABC, commercial)	None
18. Community media: (radio, print & TV)	Print Media: Government gazette, Departmental Lekgotla newsletter, Waste Information Today newsletter and National Waste Management Booklet.
19. Outdoor	None
20. Online / Social media	The Strategy will be made available through the following; • Online through Departmental Website • Online through South Africa Waste Information Centre (SAWIC)
FINANCIAL IMPLICATIONS	
21. Budget	None, as the implementing Departments will be expected to fund the implementation within their current budget.