



Report

National Food waste Strategy

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ABSTRACT

The National Food waste Strategy provides a framework to support collective action towards reducing food waste by aligning with Sustainable Development Goal 12—ensure sustainable

consumption and production patterns with particular focus on contributing to Goal 12.3 “By 2030, halve per capita food waste at the retail and consumer levels and reduce food losses along the production and supply chains, including post-harvest losses” —in the United Nations Transforming our world: 2030 Agenda for Sustainable Development. The Government of Uganda has put in place policy frameworks to prevent and reduce food loss and waste. The country’s Uganda Vision 2040 overarching development plan underscores the need to reduce food loss and wastage and improve food safety. The Nation Development Plan III (NDP III) provides for the establishment of food technology incubators and a national food chain management system. NDP III also prioritizes agro-industrialization with the aim of creating jobs, making households food secure, and minimizing post-harvest food loss and waste. In the Agriculture Sector Plan (2015/16-2019/20), the government allocated over UGX 450 billion (\$127 million) to interventions that would directly address food loss and waste. These included an efficient Food Agricultural Statistics (FAS) system to support policymaking, and the promotion of new food processing technologies. Green and digital technologies are increasingly being used in Uganda to address food waste, including in storage, recycling and preservation. Aseptic packaging is widely used in the food and beverage industry to extend shelf life. Micro-cold transportation is used to provide cold chain solutions to small business holders. Hotels are using mobile phone applications (Jumia Foods and Glovo) to allow customers to pre-order their meals, helping hotels better predict or estimate food demand for a given day. Hotels are also using QR code-based applications to allow customers to make orders directly to chefs. However, the food waste remains a huge challenge in Uganda. An estimated 37% of the households in Uganda and 20% of people in the capital Kampala live with food insecurity.¹ According to the Kampala Capital City Authority (KCCA), solid waste generation increased from 407,890 tons in 2011 to 785,214 tons in 2017; three-quarters of the waste is organic and biodegradable. Moreover, 28% of city-wide emissions come from landfills, waste incineration and solid waste management collectively, making the waste sector the second biggest contributor of greenhouse gas emissions in Kampala after energy generation.² Food waste currently represents the largest part of solid waste generation in Kampala. The food waste survey estimates that average household food waste generation in the city is 89 kg per person per year. The project found that in Uganda the absence of food waste regulations, culture and norms, inappropriate handling of food products, lack of food storage facilities, poor infrastructure, limited access to and high cost of electricity, inadequate food management practices and skills, and lack of understanding and awareness are the major causes of food waste. Addressing food waste requires lifecycle interventions instead of a singular action

targeting a particular stage of the food chain. Interventions at the production and transportation stages can also help to reduce food waste in households. Data is key, especially data to illustrate the economic, environment and social costs and consequences of food waste. An enabling environment is needed, with more attention to the informal sector that works on food service and waste collection. It also needs to connect infrastructure, urban planning, economic incentives, capacity support and mandatory regulations into a holistic approach. Given the role of women in the informal sector and in food consumption, such interventions should take into full consideration and systematically integrate gender equality into its planning and implementation. More support is needed to empower women to access green technologies, services and information and to participate in decision making related to food waste. Financiers also need to improve finance for new technological innovations and business models. Researchers could fill in the gaps in data, technical standards, impact assessment, cost valuation, R&D and productive capacity. Civil society groups could leverage the latest findings in behavioural science and support grassroots campaigns to advocate for change in perception and lifestyle that relate to food consumption and food waste.

1 INTRODUCTION

The National Food waste Strategy provides a framework to support collective action towards reducing food waste by aligning with Sustainable Development Goal 12—ensure sustainable consumption and production patterns with particular focus on contributing to Goal 12.3 “*By 2030, halve per capita food waste at the retail and consumer levels and reduce food losses along the production and supply chains, including post-harvest losses*” —in the United Nations *Transforming our world: 2030 Agenda for Sustainable Development*.

It also helps give effect to Uganda obligations under the United Nations Framework Convention on Climate Change and its commitment in National Determined Contribution to helping in reduce greenhouse gas emissions.

The government of Uganda has put in place enabling policy frameworks for food loss and waste reduction and these include the constitution of the republic of Uganda objective 12 (twelve) which compels the state to take appropriate steps to grow and store adequate food, vision 2040 which underscores the need to reduce food loss and wastage and improve food safety among others”. The Nation Development Plan III 2020/21 to 2024/25 (NDP III) which

provides for establishment of the National Food and Agriculture Statistics system, supports establishment of Food Technology Incubations, National Store and Relief Food Chain Management System and prioritizes agro-industrialization with the aim of creating jobs making households food secure and minimizing post-harvest food loss and waste.

Although Uganda has a policy framework for food loss and waste reduction, food waste in Kampala is estimated at 89kg/capita/year. This has significant impacts on the environment through the wasted use of resources such as land, water, energy and fuel to produce and distribute food. When disposed of in landfill, food waste has other environmental impacts such as the production of greenhouse gas emissions. The waste management accounts for 28% of greenhouse gas emission in Kampala.

The volume and value of wasted food presents a number of opportunities to identify where the greatest benefits can be achieved in avoiding food waste or where it can be repurposed. This approach is consistent with the idea of a circular economy where resources are kept in use for as long as possible while also minimising negative impacts. In Uganda, there is already a significant amount of work underway to target food waste that is making a difference nationally. The National Food Waste Strategy seeks to leverage these efforts, and identifies four priority areas where improvements can be made—policy support, business improvements, market development, and behaviour change. Implementation of the strategy to achieve our national goal of halving food waste by 2030 requires all Ugandans to work together and undertake meaningful action. Governments, industry, business, academia, food rescue organisations and all of the community have a role to play.

1.1 The Food waste challenge

Food waste exacerbates our triple planetary crisis, generating 8% of global greenhouse gas emissions, using finite land and water resources needlessly, adding significantly to soil and water pollution from agriculture, and negatively impacting biodiversity. One-third of the food produced for human consumption is lost or wasted, costing 2.6 trillion USD annually. Development and deployment of green technologies is key to the transition towards an Inclusive Green Economy, decoupling economic growth from resource use and tackling the planetary crisis of climate, pollution and biodiversity loss. Green technologies are increasingly being used to reduce food waste at consumer level, including in storage, packaging, pre-treatment, portion control, compost, traceability and supply-demand matching. This offers

huge business opportunities for companies, including SMEs and start-ups who have been at the frontline of green innovation and sustainable value chains.

Urban food waste is primarily handled by landfilling, which leads to added expenses, energy use, and greenhouse gas emissions, particularly methane, which is released from anaerobic degradation of organic waste in landfills (Gunders 2017). Food waste management magnifies impacts from urban water and wastewater treatment and the transportation infrastructure used for waste collection and hauling. Even though urban populations globally consume 70% of food (FAO 2017), the associated ecological, health, and economic impacts are shared by the rural systems where food is produced and where waste is often disposed. Much of the urban food waste stream is not “waste,” but is actually edible food that could be used to alleviate food insecurity.

An estimated 37% of the households in Uganda and 20% of people in the capital Kampala live with food insecurity.¹ According to the Kampala Capital City Authority (KCCA), solid waste generation increased from 407,890 tons in 2011 to 785,214 tons in 2017; three-quarters of the waste is organic and biodegradable. Moreover, 28% of city-wide emissions come from landfills, waste incineration and solid waste management collectively, making the waste sector the second biggest contributor of greenhouse gas emissions in Kampala after energy generation.² Food waste currently represents the largest part of solid waste generation in Kampala. The household food waste measurement in Kampala shows that average household food waste generation in the city is 89 kg per person per year. Based on data collected as the desired 3 meals per day¹. Hunger is high among primary school going children with 66% not accessing any meal while at school.

1.2 Benefits of preventing Food waste.

Some food manufacturers and businesses may be concerned that helping customers reduce their food waste may result in customers buying less food overall, which could result in less food sales and falling revenues. If so, then why do food retailers and manufacturers participate in food loss and waste reduction programs? First, according to interviews, store managers indicated that such programs help them extend product shelf life (for instance, through improved packaging) and reduce product losses, both in stores and along their supply chains,

¹ National Planning Authority (NPA) and world Food Programme (WFP) strategic Review of sustainable development goal 2 in Uganda

which results in financial benefits to the stores. Second, an econometric study indicated that a reduction in food sales at UK retailers during a 2007–12 study period did not necessarily translate into a one-to-one reduction in revenue. Rather, consumers plowed approximately 50 percent of their savings back into retail purchases, often on high-value food items (referred to as “trading up”) or on other nonfood items (WRAP 2014). Third, interviewees cited several nonfinancial benefits to engaging in food waste reduction programs. These included increasing employee pride, fulfilling a sense of ethical responsibility, and strengthening customer relationships. Hegnsholt et al. (2018) noted that companies that are effective at addressing societal challenges tend to be rewarded with customer loyalty. Likewise, donating surplus food to charities can strengthen a company’s brand, public reputation, and employees’ pride in where they work.

Reducing food loss and waste would lower these environmental impacts, by essentially reducing the amount of food otherwise needed to be produced to adequately feed a growing human population. This means using fewer natural resources such as water and land, applying less fertilizer, and reducing current rates of food loss and waste by 50 percent also would have significant benefits for climate, land, and biodiversity. Relative to the 2050, business-as-usual scenario identified by WRI, the World Bank, UNEP, and others in *Creating a Sustainable Food Future* (Searchinger et al. 2018), such a halving would reduce greenhouse gas emissions by 1.5 Gt CO₂ eq per year by 2050. This amount is more than recent energy and industry emissions from Japan. Such a halving also would avoid the conversion of 278 million hectares of natural ecosystems into agricultural land between 2010 and 2050. This is an area roughly the size of Argentina. Since habitat conversion is the number one cause of biodiversity loss (Millennium Ecosystem Assessment 2005), halving food loss and waste can be a strategy for addressing the current biodiversity crisis. The EAT-Lancet Commission (Willett et al. 2019) estimates that doing so could reduce projected biodiversity losses by up to 33 percent relative to its business-as-usual scenario.

Reducing food loss and waste might play a modest role in creating jobs. For example, ReFED’s *Roadmap to Reduce U.S. Food Waste* (ReFED 2016) estimates that, if the roadmap’s 27 solutions were implemented, an additional 15,000 jobs would be created and sustained in the United States. The majority of these jobs would be created in the recycling sector, due to opening of more composting and anaerobic digestion facilities to process increased amounts of food scraps. The donation and storage sector, which includes food recovery organizations, has the next highest potential to create jobs, followed by food donation transportation. Australia’s *Fight Food Waste Cooperative Research Centre* estimates that reducing food waste in Australia

by 30 million metric tons could directly and indirectly generate up to 5,200 jobs, mostly in rural areas (Fight Food Waste CRC 2018). Start-up companies that tackle food loss and waste upstream in the food supply chain can be a source of job creation, too. For example, Protix, a company that uses food waste to feed insects, which in turn are processed into high-value protein for animal feed, now operates in 12 countries and expects to employ over 100 people by the end of 2019 (Protix 2019). Evidence is also emerging from low-income countries. For example, qualitative data from The Rockefeller Foundation's YieldWise Initiative found that a number of individuals employed by nongovernmental organization (NGO) implementers have successfully transitioned into working for companies that provide technologies and technical assistance to the smallholder farmers they previously trained and advised (Rockefeller Foundation 2019). As well as creating jobs, activities that reduce food loss and waste can also add value to food products along the value chain, which can create additional income for workers. For example, Psaltry, a cassava processing company based in Nigeria, provides locally sourced cassava products and starch for the industrial sector to create products as diverse as confectionary and building materials. The company reduces postharvest losses by strategically placing its processing facility, which employs over 300 people, close to smallholder farms. The company sources material directly from smallholder farmers, encouraging farmers to commercialize their cassava production and earning farmers additional income (Psaltry 2019). That said, the impact of reducing food loss and waste on the net number of jobs is an underresearched area. Data on job creation often does not consider how many jobs may be lost if food loss and waste were reduced. For example, if on-farm losses are substantially reduced through mechanization, less labor may be needed. More quantitative research is needed on the relationship between the reduction of food loss and waste, on the one hand, and job creation, on the other

1.3 Scope and definitions of food waste

For the purposes of the National Food Waste Strategy, "food waste" is defined as food (see below) and the associated inedible parts removed from the human food supply chain in the following sectors: Retail, Food service, Households "Removed from the human food supply chain" means one of the following end destinations: landfill; controlled combustion; sewer; litter/discards/refuse; co/anaerobic digestion; compost / aerobic digestion; or land application.²

² Adopted From Food Waste Index by United Nations Environment Programme

Food is defined as any substance – whether processed, semi-processed or raw – that is intended for human consumption. “Food” includes drink, and any substance that has been used in the manufacture, preparation or treatment of food. Therefore, food waste includes both: • “edible parts”: i.e., the parts of food that were intended for human consumption, and • “inedible parts”: components associated with a food that are not intended to be consumed by humans. Examples of inedible parts associated with food could include bones, egg shells peelings etc

2 INTERVENTION MADE TO REDUCE FOOD WASTE IN UGANDA

2.1 Policy Framework for Food Loss and Waste Reduction

The Government of Uganda has put in place policy frameworks to prevent and reduce food loss and waste. The country’s Uganda Vision 2040 overarching development plan underscores the need to reduce food loss and wastage and improve food safety. The Nation Development Plan III (NDP III) provides for the establishment of food technology incubators and a national food chain management system. NDP III also prioritizes agro-industrialization with the aim of creating jobs, making households food secure, and minimizing post-harvest food loss and waste. In the Agriculture Sector Plan (2015/16-2019/20), the government allocated over UGX 450 billion (\$127 million) to interventions that would directly address food loss and waste. These included an efficient Food Agricultural Statistics (FAS) system to support policymaking, and the promotion of new food processing technologies. The Global Food Security Strategy (GFSS) Uganda Country Plan (2018) aims to address food waste at the processing stage. Under the 5th Schedule of the East African Community Customs Management Act (2004), Uganda gave tax exemptions to licensed hotels on importation of technologies, including those that relate to food waste (such as cookers, fridges and freezers, IT accessories and software). In addition, the Environment Management Act (2019) calls to control waste generation to the greatest extent possible through the circular economy, while the KCCA Strategic Plan (2020) promotes urban agriculture to increase the supply of fresh food and vegetables, and support food handlers to minimize food contamination and associated food waste and loss.

2.2 Food Waste Reduction Initiatives by Public and Private entities

A joint study by KCCA and the Uganda Ministry of Energy and Mineral Development assessed the quality of organic waste (biodegradable matter) for possible use as input to a proposed biogas plant for electricity generation. Another joint study by KCCA and the Korea

International Cooperation Agency explored the possibility of treating and recycling food waste from markets for the purpose of converting to animal feed. Through a public-private partnership, KCCA is working with a company, PROTEEN (U) Ltd., to collect food waste from markets and feed it to black soldier fly larvae to produce high-quality protein for animal feed. Around 5-10 tones per week of food waste is collected from markets to feed the black soldier flies. KCCA is also piloting a project to separate food waste at the Usafi Market in Kampala where food waste is collected in different bins and sold as animal feed.

Green and digital technologies are increasingly being used in Uganda to address food waste, including in storage, recycling and preservation. Aseptic packaging is widely used in the food and beverage industry to extend shelf life. Micro-cold transportation is used to provide cold chain solutions to small business holders. Hotels are using mobile phone applications (Jumia Foods and Glovo) to allow customers to pre-order their meals, helping hotels better predict or estimate food demand for a given day. Hotels are also using QR code-based applications to allow customers to make orders directly to chefs. The 2020 lockdown due to the COVID-19 pandemic led to an expansion of urban farming (which now accounts for about 35% of food in Kampala). Urban farmers have embraced the use of improved varieties of vegetables with extended shelf life, which minimize food waste. With support from the European Union, KCCA launched the “Farm to Plate Virtual Market” (K-Smart Market, a digital mobile phone application) to facilitate urban farmers and food vendors to sell directly to consumers. This shortens the food supply chain and eliminates associated waste and loss. Middle- and high-income earners are increasingly using home appliances with micro-computers or digital controllers to minimize food waste in the kitchen and during storage. The inevitable food waste, such as fruit and vegetable peelings, can be converted to energy through waste-to-energy technologies. The Kampala City Abattoir, for example, uses blood, fat and carcass waste to generate biogas for electricity. There are also emerging projects in Kampala that are converting organic waste, including food waste, to produce briquettes for cooking and compost for urban farming. The Fruiti-Cycle company has designed an electric tricycle with a refrigerated storage unit, which uses an evaporative cooling system that is solar powered, to prolong the shelf life of fresh produce during distribution. The storage unit is detachable and can be used in the local market by vendors to preserve their produce for up to five days. Sparky Dryer, an eco-friendly dehydrator built with steel and wood, runs on biofuel and burns with zero-carbon emissions to dry fruits, vegetables, cereals and grains. It dehydrates foods five times faster than electric dryers and 10 times faster than open sun drying. Scaling up such technologies can open up new opportunities for preventing and reducing food waste by informal retailers who lose about 30%

to 40% of food they stock for sale. Challenges have been identified for further uptake of such technologies, including poor infrastructure (transport, electricity, ICT), lack of tech design and productive capacity, and shortage of experienced professionals with technical skills to harness green technologies for food waste management.

2.3 Institution Framework For Implementation of Food Waste Reduction Strategies

Food waste along the life cycle stages results from a number of factors that broadly affect the food system, including demographic shifts that influence consumption habits, poorly coordinated policies and regulations on issues such as food safety, difficulty in accessing finances to invest in equipment that reduces food waste, a varying demand, or insufficient motivation for action, among others. Relevant interventions that can be undertaken by actors such as policymakers, financiers, intermediaries, innovators, researchers, and civil society tend to be those that address the underlying drivers of poor infrastructure, policies and regulations, access to financing, demographic shifts, economic conditions, as well as norms and attitudes

Key stakeholders	Potential interventions
Policy makers including Ministry of Works and Transport, Ministry of Trade, Industry and Cooperatives. Ministry of Water and Environment, Ministry of Local Governments, Ministry of Energy and Mineral development, Ministry of Gender Labor and Social Development, Local Government Authorities,	<ul style="list-style-type: none"> • Develop, facilitate, promote, and/or improve climate-smart infrastructure (e.g., roads, electricity, and community/cooperative storage) and access to informal retailers. • Implement policies to prevent unfair trading practices (e.g., blockers in food markets who tend to speculate the food prices by hoarding food). • Remove barriers to food redistribution via policies (e.g., liability limitations, tax breaks) that make it easier for food suppliers to donate safe (but unsold) food to charities or to those in need. • Support policies to standardize food date labeling practices to reduce confusion about product safety and quality, and improve consumer understanding of the meaning of date labels.

<p>Ministry of Agriculture Animal Industry and Fisheries Uganda National Bureau of Standards</p>	<ul style="list-style-type: none"> • Include food waste reduction lessons in school curricula and include food waste reduction training in public procurement programs. • Provide municipal support for informal retailers to access clean water, storage areas, equipment that improves food safety, and training on how to reduce food contamination. • Make measurement and reporting of food waste by food service entities and companies' mandatory
<p>Financiers (Commercial and Development banks), Uganda Development Bank African Development Bank, Ministry Finance Planning and Economic Development</p>	<ul style="list-style-type: none"> • Increase the number of charitable institutions funding food loss and waste prevention activities. • Create financing instruments and product lines (e.g., funds, bonds, loans) dedicated to reducing food waste. • Increase start-up financing for new technologies and business models that would reduce waste, as well as financing to scale up proven technologies and models. • Increase development cooperation between high-income and low-income countries targeting waste. • Introduce “pay-as-you-go” programs to make technologies affordable for smaller operations (e.g., for solar powered refrigeration units and mobile processing).
<p>Researchers, Universities Research institutions (Makerere University - College of Food Science and Technology Center for Research in Energy and Energy Conservation (CREEC) Kyambogo University Uganda Industrial Research Institute</p>	<ul style="list-style-type: none"> • Research new and innovative technologies to preserve food quality and extend shelf life. • Develop innovative products from perishable food commodities, such as fruits and vegetables, to promote whole food utilization. • Undertake research to fill data gaps and standardize reporting of food loss and waste data in order to better compare results, create benchmarks, and provide clearer direction for stakeholders. • Assess impact of interventions to improve evidence base of what works and the return on investment.

	<ul style="list-style-type: none"> • Develop sector-specific guidance that provides the motivation and technical information for businesses to take action (e.g., promote industry roadmaps for food loss and waste reduction) • Develop and improve availability of processing and preservation facilities (including aggregation centers and mobile low-carbon options). • Develop alternative outlets during peak season through organizing opportunities to markets with other seasonality's. • For unmarketable crops, improve flow of information to find alternative buyers.
NGO, Civil society organization and Sector Association (Uganda Hotel Owners Association)	<ul style="list-style-type: none"> • Raise awareness and shift social norms so that food waste is considered “unacceptable” for all, including higher-income consumers. • Encourage public and private sector leaders to pursue the Target-Measure-Act strategy on food waste. • Act as a channel for the sharing and reporting of food waste data and progress.

3 DRIVERS AND CAUSES OF FOOD WASTE IN UGANDA

3.1 Causes of food waste at life cycle stage of food waste in Uganda

The cause of food waste are varied and complex, and occur at every point along the consumption chain. Examples of how food waste can occur are outlined below.

Stage in consumption chain	causes
Processing and manufacturing	Product damaged during handling Spoilage due to contamination or inadequate temperature control

	<p>Excessive trimming of vegetables for processed foods</p> <p>Changes in production due to consumer demand</p> <p>Equipment failure</p> <p>Spillage on conveyor belts and transfer points</p> <p>Inefficient inventory management</p> <p>Damage to packaging resulting in food unfit for sale</p>
Distribution	<p>Spoilage due to inadequate temperature control in transport and storage</p> <p>Damage due to improper handling</p> <p>Use of inappropriate equipment and facilities like non conditioned storage rooms and distribution trucks</p>
Retail	<p>Poor stock management, including over ordering, improper stock rotation, storage and handling practices</p> <p>Produce no longer meets quality standards</p> <p>Last minute order changes that can leave suppliers with excess product</p> <p>Limited access to facilities to recycle or repurpose food waste</p>
Hospitality and food service	<p>Poor stock management, storage, and handling practices</p>
Households	<p>Confusion over ‘use-by’ and ‘best-before’ date labelling</p>

	<p>Over-purchasing of food that is then thrown away</p> <p>Limited knowledge of how to safely repurpose or store food leftovers</p> <p>Limited access to food waste collection systems</p>
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3.2 Drivers of Food waste in Uganda

- (i) **Culture and norms;** Uganda has a diversity of cultures and practices compared to other countries. Culture and norms influence consumption behavior and often generates food waste for example in Uganda leaving food on a plate signifies satisfaction especially on custom visits, Furthermore, during the cultural and social events, food is prepared in large quantities, showing off “abundance” or to indicate wealth or hospitality. In other culture especially among the bantu ethnic group dislike of leftovers and it’s inappropriate to save a husband leftover (obuhoro). Often the large quantities of food end up not being wholly consumed and resulting in an increase in food waste that gets disposed.
- (ii) **The unfavorable or absence of food waste regulations and standards;** There are instances were some polices are barrier to reducing food waste for example in the labelling standards, food safety and quality require food to be discarded if it doesn’t meet the requirement. Such polices lack provision of recycling or reposing or converting such food products into animal feeds. In other case the regulation and standard are absent for in Uganda there are no regulations or standard that provide guidelines for sharing of unsold food or left over with communities that are food insecure. This leaves food services industries in Uganda with no choice but to dispose left over and unsold food into landfills.
- (iii) **Poor infrastructure,** the cases where the infrastructure is available it’s not of good quality or sufficient enough. The infrastructure includes reliable power supplies, reliable communication, usable roads, and access to markets storage facilities, cold chains, processing facilities, and distribution- or market-related logistics (e.g., handling facilities). Household and food retailers can’t affordable to store perishable under conditioned storage

majorly because of limited access to and high cost of electricity. The informal retailers (market) have limited convention storage capacity and lack modern storage facilities

(iv) **Inadequate food management practices and skills;** Lack of or inadequate management practices or use of equipment due to a lack of knowledge, skills, or incentives. Among food retailers, service providers and household, this could include poor use of mechanical and electrical appliances, lack of knowledge about planning and preparing meals, as well as how to assess product freshness and interpret date labels. Lack of awareness also include a limited understanding of how reducing food waste can provide direct (personal or business) benefits (e.g., enhanced product freshness, reduced costs)

(v) **lack of understanding and awareness** are the major causes of food waste Lack of awareness that food waste happens and has an impact, and how one contributes to the problem. Business owners, and consumers often do not think they waste food, but measurement suggests otherwise.

(vi) **limited access to finance:** Inability to access sufficient financing (e.g., investment, loans, grants) to purchase, implement, or scale technologies that would reduce food loss and waste. The food sector is dominated by informal sector who can meet the prerequisites required by banks in order access loans

4 RECOMMEND MEASURES TO PREVENT FOOD WASTE AT LIFE CYCLE STAGES OF FOOD WASTE

4.1 Proposed intervention to reduce food waste at retail stage (Distribution and market)

Food waste during wholesale and retail can result from factors including poor handling, not storing or transporting products at the right temperatures, equipment malfunctions, overstocking due to an inadequate assessment of supply and demand (or fear of empty shelves), and disposing of unsold food, among others. Relevant interventions tend to be those that address the underlying drivers of inadequate skills and knowledge, poor supply and demand forecasting, suboptimal packaging, inadequate equipment, concerns about possible risks, inflexible procurement requirements, and marketing strategies.

Key stakeholders	Potential interventions
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Retailers and wholesalers
(formal)

- Expand cold storage systems during wholesale and logistics to protect products vulnerable to heat damage.
- Find food rescue partners or establish online marketplaces that facilitate sale or donation of rejected shipments or short-life products.
- Use backhauling (or other logistics solutions) to enable return of reusable storage containers or rescue of surplus food for people in need.
- Invest in technologies to track temperature and ensure freshness, streamline routing, track movement of goods in and out of warehouses, and monitor food loss and waste.
- Improve training of staff in temperature management, product handling, and stock rotation.
- Optimize inventory management systems (and increase flexibility in supplier contracts) to better match forecasting and ordering
- Enable consumers to purchase smaller or customized portions (e.g., through bulk bins or staffed seafood and meat counters).
- Adjust promotions to avoid excessive purchase of additional items (e.g., offer half off or mix-and-match deals rather than two-for-one offers).
- Redesign in-store merchandising to avoid excessive handling of products by consumers (e.g., sort by stage of maturity), and to achieve the desired appearance of abundance but with less damage and excess product (e.g., through smaller bins and bowls).
- Educate consumers about better food management (e.g., proper storage, meal planning, understanding date labels, safe food handling, and cooking tips).

	<ul style="list-style-type: none"> • Adjust pricing and promotion strategies (e.g., quantity discounts) to avoid lower prices leading to over purchasing.
Retailers informal	<ul style="list-style-type: none"> • Participate in groups or associations of informal operators to access guidance and training in best practices in food handling and storage. • Take advantage of municipal support to access clean water, storage areas, equipment that improves food safety, and training on how to reduce food contamination. • Use practices that minimize damages such as handling produce gently, stacking properly (e.g., to avoid bruising delicate produce), marking cases to track inventory, and rotating stock following a “first-in-first-out” method. • Ensure that displays allow air to be circulated and temperature conditions to be appropriate for product to remain fresh (e.g., high-ethylene producers should be kept away from ethylene-sensitive commodities). • Avoid sprinkling unclean water on products (to minimize wilting and shriveling) as such practices result in unsafe foods shunned by buyers. • Improve packaging design and materials to reduce risk of damage or spoilage, and to keep food fresher for longer while balancing other ecological considerations related to packaging.

4.2 Proposed intervention to prevent waste at Consumer level (household and food service sector)

Consumption Food loss and waste during consumption, whether from a company’s or consumer’s perspective, can result from inaccurately planning what will be consumed, portion sizes that are too large, mistakes during preparation, fears related to food safety, and improper

handling and storage, among other factors. Relevant interventions tend to be those that address the underlying drivers of inadequate implementation of practices, inadequate skills and knowledge, cultural norms and attitudes, concerns about possible risks, lack of awareness, suboptimal packaging, and marketing strategies

Households	<ul style="list-style-type: none"> • Buy only what you expect to eat: check refrigerator and cupboards before shopping, use a shopping list, and plan meals in advance. • Know the difference between “use by” (which is about food safety) and “best before” (which is about quality and still safe to eat after this date). • Freeze or preserve food before it spoils, and find out how to best store different foods so they stay fresh and safe longer. • Find creative ways to use leftover ingredients and products past their peak quality (e.g., in soups, sauces, smoothies), as well as to cook the parts you may not normally eat (e.g., stems, cores). • Organize the kitchen and refrigerator so that items do not get lost and spoil.
Restaurants	<ul style="list-style-type: none"> • Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, reward staff who deliver against targets). • Shift away from preparation methods such as batch cooking, casserole trays, and buffets to reduce

	<p>overproduction and repurpose excess food (e.g., offer customers “doggy bags,” safely incorporate unused items into other dishes, sell excess food at a discount, donate unsold food).</p> <ul style="list-style-type: none"> • Revisit inventory management and purchasing practices (as well as menus) to better fit needs based on historical trends and waste data. • Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less). • Consider whether portions served exceed what can be eaten, and rethink promotions that encourage over purchasing by customers
Hotels	<ul style="list-style-type: none"> • Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, and reward staff who deliver against targets). • Rethink the buffet (e.g., shift certain items to à la carte near end of meal times, reduce the size of dishes used in buffets). • Reduce overproduction by producing smaller quantities of items consistently left on the plate.

	<ul style="list-style-type: none"> • Repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). • Communicate to guests about food waste and encourage them to take only as much as they need.
Catering/food service	<ul style="list-style-type: none"> • Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste reduction, and reward staff who deliver against targets). • Reduce the amount overproduced (e.g., by producing smaller quantities of items that are consistently underconsumed). • Repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). • Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less). • Evaluate contractual obligations between clients and suppliers that generate waste and overproduction (e.g., contracts that stipulate that all hot dishes must be available for the full-service period)
Public and private institutions (e.g., schools, hospitals, government canteens)	<ul style="list-style-type: none"> • Engage staff on food waste reduction (e.g., explain why reduction is important, give tips on waste

	<p>reduction, and reward staff who deliver against targets).</p> <ul style="list-style-type: none"> • Reduce the amount overproduced (e.g., by producing smaller quantities of items that are consistently under consumed), and repurpose excess food (e.g., by safely incorporating unused items into other dishes, or by donating it). • Introduce techniques to minimize people taking overly large portions (e.g., trayless dining, flexible portion sizes, pay-by-weight pricing system, smaller plates). • Revisit inventory management and procurement practices (as well as menus) to better fit needs based on historical trends and waste data. • Use scales in the kitchen to weigh food and track items most commonly wasted (and estimate the financial cost of food disposed, thus creating a financial signal to waste less).
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5 STRATEGIC FRAMEWORK OF ACTION TO REDUCE FOOD WASTE

Addressing food waste represents a significant opportunity to put in place measures to protect our environment, prevent economic losses, and help relieve food insecurity. The volume of work already underway to address food waste provides a platform to learn, leverage and build on as we work toward halving of Uganda’s food waste by 2030. This strategy adopts a circular economy approach that takes into account the food waste hierarchy and seeks to capture food waste as a resource so it is not sent to landfill. The waste hierarchy prioritises waste management practices in favouring food waste avoidance over resource reuse, recycling, reprocessing, and energy recovery, followed by waste disposal. The hierarchy recognises the

inherent value of food waste in providing guidance on the most resource efficient and environmentally sound approaches to dealing with waste.

5.1 The overall objective of the food waste prevention strategy

To reduce food waste generation by 50% by end of 2030 with the aim of increasing households' food security, creating jobs, creating jobs contributing to improved livelihood of Ugandans.

The specific objectives

(i) To raise awareness and build capacity in order to facilitate transition in culture, norms, behavior and attitudes towards avoiding and reducing food waste.

Changing our attitudes and behaviours that reduce food waste should be encouraged. A key component of driving behavioural change is educating the community on the economic, social and environmental costs of producing food and the benefits that can be achieved from reducing food waste. Individuals' choices impact on the amount of waste generated and how it is managed. Food that is not consumed, either in the home or when eating out, results in personal financial loss and contributes to greenhouse gas emissions once it enters landfill. The following action can be undertaken to drive behaviour change.

- community education programs such as *Love Food, Hate Waste*
- data collection on household food waste and conducting trials on possible management strategies
- adopting nationally consistent approaches to raising consumer awareness and education about household food waste. These approaches could include the adoption of a national campaign that addresses issues such as food handling to optimize storage life, food planning to only purchase food that is likely to be eaten, explaining the differences between 'use-by' and 'best before' dates, and uses for left-over food
- increased adoption of home composting and worm farms
- creating a culture of taking left-over food home when eating out

(ii) To promote research and development to foster innovation and adoption of technologies, processes to avoid and reduce food waste.

Research and development and use of technologies can improve our existing processes is an important part of avoiding and reducing food waste. Improvements can support cost reductions and increased productivity in the various parts of the food system, as well as delivering positive environmental outcomes. These benefits can be realised through businesses committing to

continuous improvement within their operations. Routinely reviewing and updating business processes to minimise waste, encourage innovation, adopt technologies that improve process efficiencies, and normalise industry standards and certification systems in support of food waste reductions can benefit existing systems. Actions in these areas could be undertaken by government or individual businesses or industries, or form part of a voluntary commitment to reduce food waste.

- Conduct research and development for technology advances in food products and packaging, including food coatings, food product development, preservatives developed for consumer acceptability and safety, and packaging that meets consumer and environmental goals for reduced packaging while preserving food longer;
- Conduct research and development in technologies for food recycling for example research in extract nutrition components from food waste for industrial process, animal feed production or energy recovery from food waste.
- Encourage the informal retailers to form and join associations to enhance their interface with policy makers, financial institutions, researchers, innovators and technology developer
- Development of a central web-based portal, or through more formal processes such as issue-focused food waste forums that bring together all stakeholders in the food system to discuss solutions to improve food waste reduction.

(iii) To enhance/amend the Policy framework to support food waste avoidance, reduction and repurposing.

Uganda's food and waste systems are underpinned by various national, state and territory legislative frameworks. Improving our understanding of where existing legislation is inhibiting the adoption of practices, or where it is required to facilitate improved outcomes for food waste, will be important. These changes could include amending or developing new legislation to provide more flexibility or incentives to redirect food waste to charities or convert it for other purposes, avoiding its disposal in landfill. It could also include legislative measures such as mandating food waste recycling where this is considered appropriate. All MDAs can work together to identify and support changes to achieve national consistency. The following strategic action are recommended to development supportive policies and regulation for food waste reduction in Uganda.

- Establishing a National Food Waste Baseline and methodology to measure progress against our goal
- Establishing a voluntary commitment program to reduce food waste that requires signatories to voluntarily commit to a set of measurable actions that are known to achieve reductions in food waste will help achieve our target.
- legislative measures such as mandating food waste recycling where this is considered appropriate.

(iv) Enhance access to finance and development of business and markets to support the repurposing of food waste

Improvements can support cost reductions and increased productivity in the various parts of the food system, as well as delivering positive environmental outcomes. These benefits can be realised through businesses committing to continuous improvement within their operations. Routinely reviewing and updating business processes to minimise waste, encourage innovation, adopt technologies that improve process efficiencies, and normalise industry standards and certification systems in support of food waste reductions can benefit existing systems. The following actions can undertake to achieve this objective

- Create funds (and associated project preparation facilities) dedicated to reducing food waste.
- Introduce financial product lines in commercial and development banks focused on food waste reduction technologies and programs.
- Introduce “pay-as-you-go” programs to make technologies marketed to large scale commercial operations affordable for smallholder operations (e.g., for solar powered refrigeration units).
- fostering industry leadership in setting voluntary industry standards, sustainable fishing and cold chain efficiencies
- developing web-based wholesale marketplaces for surplus food and ingredients
- investigating packaging options to help reduce food waste.
- running award schemes to promote the reduction of food waste and rewarding businesses who are making positive and sustainable changes

- marketing aesthetically imperfect produce, discounting product that is near expiry date, and optimizing forecasting and planning to avoid over-ordering

6 THE IMPLEMENTATION FRAMEWORK

Specific objective 1: To raise awareness and build capacity in order to facilitate transition in culture, norms and attitudes towards avoiding and reducing food waste					
Strategic interventions	Strategic Actions	2022-2024	2024-2026	2026-2030	Responsible institution
Design and run awareness raising programmes to dissemination of information about the on-food waste reduction interventions	Document and disseminate in the low cost indigenous and tradition methods of preserving and storing food				MoTIC, MoAAIF, MoES, MoWE, NEMA, MoGLSD
	Raise awareness of food waste hierarchy's principles; (including reduction food waste, sharing with food ensure communities, converting food waste to animal feeds, composting of food waste into fertilizers)				
	Develop and disseminate education materials on alternative uses for food waste where collection is unavailable or unviable				MoTIC, MoAAIF,

					MoES, MWE, NEMA
	Leverage the latest findings of behavioural science, engage grassroots campaigns, social media, religious communities, and others to make “wasting food” unacceptable				MoTIC, MoAAIF, MoES, MWE
	Develop and run award schemes to promote the reduction of food waste and rewarding businesses who are making positive and sustainable changes				MoTIC, MoAAIF, MoES, MWE, NEMA
Support population in gaining relevant skills that avoid food waste (e.g., incorporate in education curriculum lessons in food preparation and planning	Technical support programs informal retailers to evaluate their food waste reduction efforts and publish their findings, and provide tools and assistance for these purposes				
	Include programs related to the effects, prevention, and management of food waste, as well as how to prevent it, in the curricula for math, science, social studies, language,				MoES, UNCH

	arts, family/food/consumer sciences, financial literacy, economics, vocational classes, and others;				
	Develop materials to inform members about the impacts of food waste and to characterize the business case, in terms of costs and benefits, of food waste reduction practices				MTIC, MAAIF, NEMA
	Provide incentives (e.g., credits, certificates, awards, internships) for student-led innovations in food waste reduction (e.g., through university hackathons, design jams, business-pitching competitions)				MTIC, MAAIF, NEMA
	Promoting tools for the consumers and householder to prevent waste in their own homes				MTIC, MAAIF, NEMA, UCPC

Specific objective 2: To promote research and development to foster innovation and adoption of technologies, processes to avoid and reduce food waste.

Strategic intervention	Strategic Actions	2022-2024	2024-2026	2026-2030	Responsible institution
Supporting technology adoption enhance operational efficiencies through improved assessment and monitoring equipment, and approaches to mechanisation.	Invest in development, adoption and use of technologies that allow access to real time and quality data to assist in informing decisions during planning.				MoICT, NITA, MTIC, MWE, MAAIF
	Promote wide use cold chain in food transportation and distribution through investment mechanized chilling and distribution processes				MoICT, NITA, MTIC, MWE, MAAIF
	Provide incentives for formal food retailers to invest and use data analytics technologies to track consumer purchasing behavior				MoICT, MFPED NITA, MTIC, MWE, MAAIF

Establish research program for food waste prevention, recycling and recovery	Conduct research and development with particular focus on local, indigenous and traditional technologies food preservation techniques and technologies for purposes upscale their wide application.				UIRI, MTIC, MoWE, MAAIF
	Conduct research and development for technology advances in food products and packaging, including food coatings, food product development, preservatives developed for consumer acceptability and safety, and packaging that meets consumer and environmental goals for reduced packaging while preserving food longer;				UIRI, MTIC, MoWE, MAAIF
	Conduct research and development in technologies for food recycling for example research in extract nutrition components from food waste for industrial process, animal feed production or energy recovery from food waste.				UIRI, MTIC, MoWE, MAAIF

Encouraging collaboration to identify solutions through sharing of knowledge developed within businesses or by industries through an integrated network of producers, suppliers, manufacturers and distribution system	Development of a central web-based portal, or through more formal processes such as issue-focused food waste forums that bring together all stakeholders in the food system to discuss solutions to improve food waste reduction.				UIRI, MTIC, MoWE, MAAIF
	Encourage the informal retailers to form and join associations to enhance their interface with policy makers, financial institutions, researchers, innovators and technology developer				UIRI, MTIC, Local Government Authorities, MAAIF
	Establish links to collaboration with international researchers and developer to facilitated technology transfer of mature food waste prevention technologies				UIRI, MTIC, MoWE, MAAIF

Specific objective 3: Policies are supportive of food waste avoidance, reduction and repurposing					
Strategic intervention	Strategic Actions	2022-2024	2024-2026	2026-2030	Responsible institution
Overcome the data deficit by investing in data collection and storage infrastructure to eliminate challenges associated with absence of or unreliable data on food waste	Develop a national food waste accounting and reporting standard				UBOS, UNBS, MAAIF
	Undertake research to fill data gaps and standardize reporting of food loss and waste data in order to better compare results, create benchmarks, and provide clearer direction for stakeholders.				UBOS, UNBS, MAAIF, NITA

	Make measurement and reporting of food waste by food service entities and retailers' companies' mandatory				UBOSS, UNBS, MAAIF, NITA
Develop policies that help small businesses improve their operations (e.g., by incentivizing and providing support for food handling practices that reduce contamination).	Develop guidelines and standards to provide direction on the types of products that can be developed from food waste, and the specifications to which those products must comply				UNBS, MTIC
	Introduce tax incentives for donating unsold but still safe food to food rescue organizations				MFPED
	Develop sector specific standard for cold food chain and certification for businesses engaged with the cold food chain to encourage consistency in equipment and handling, and temperature control				MTIC, MAAIF, UNBS
	Develop a tailored rating system to show how well businesses take action on reducing waste could also be developed.				

	Provide tax incentives for importers and developers of food handling and storage technologies				MPED
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Specific objective 5: Enhance access to finance

Strategic intervention	Strategic Actions	2022-2024	2024-2026	2026-2030	Responsible institution
Develop appropriate financing mechanisms dedicated to promoting investment in enterprises, technologies, and programs designed to reduce food loss and waste. These financing mechanisms should provide special consideration for the informal sector.	Create funds and associated project preparation facilities dedicated to reducing waste.				MFPED, MAAIF, Local Government Authorities
	Introduce financial product lines in commercial and development banks focused on food waste reduction technologies and programs.				MFPED, MAAIF, Local Government Authorities
	Provide technical support and special financial assistance to food businesses; overcoming the barriers and accessing technologies				MFPED, MAAIF, Local Government Authorities
	Introduce “pay-as-you-go” programs to make technologies marketed to largescale commercial operations affordable for				MFPED, MAAIF, Local

	smallholder operations (e.g., for solar powered refrigeration units)				Government Authorities
Capacity building program to aimed at enhancing collaboration between financial institution and informal food retailers	Support informs food retailers and small-scale restaurants to associations to enhance their capacity to collaborate and work with financial institutions				Local Government Authorities, MoLG, MoWE, MTIC
	Build the capacity of informal sector in business and financial accounting				Local Government Authorities, MoLG, MoWE, MTIC
	Build the capacity of financial institution to work with micro scale and informal business in food sector				Local Government Authorities, MoLG, MoWE, MTIC
Development of business and markets to support the repurposing of food waste					Local Government

	Develop a 'matchmaking' service to pair novel technologies with potential funders and users across the food supply chain;				Authorities, MoLG, MoWE, MTIC
	Fund and support start up in value-adding food waste through composting with other organic materials, producing bioenergy, and developing innovative solutions to convert food waste to animal food				
	Invest in urban farming to minimize food waste originating from transited and storage				Local Government Authorities, MoLG, MoWE, MTIC
	Support household in urban areas to adopt backyard farming in order to create market for products from food waste like composite or animal feed				Local Government Authorities, MoLG, MoWE, MTIC

	Allocate funds to support engaged in development of indigenous and tradition technics and technologies for preserving foods				Local Government Authorities, MoLG, MoWE, MTIC
	Fund the informal food retailer association to develop web-based wholesale marketplaces for surplus food and ingredients or fresh food approach their end of shelf life.				Local Government Authorities, MoLG, MoWE, MTIC
	Investing in infrastructure for on-site processing of food waste and recycling				Local Government Authorities, MoLG, MoWE, MTIC

