Green Technologies for Consumer Choice and Food Waste Stakeholders Validation Workshop

4th – 5th November 2021

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1.0 Introduction

The workshop was modulated by Mr. Tomson Akankwasa, Senior Technical Officer, Uganda Cleaner Production Centre (UCPC). The workshop attracted a total of 30 participants from organizations including, United Nations Environment Programme, Ministry of Trade, Industry and Cooperatives, Ministry of Finance Planning and Economic Development, National Planning authority, National Environment management Authority, Ministry of Water and Environment, Ministry of Gender, Labor and Social Development, Ministry of Agriculture Animal Industry and Fisheries, Uganda Hotel Owners Association, Uganda Industrial Research Institute, Centre for Research in Energy and Energy Conservation, Nateete Market, Kitintale Market, Kansanga Market, Proteen (U) Ltd Kampala Capital City Authority etc

1.1 Official opening of the workshop

Opening remarks were made by Mr. Kassim Semanda Senior Officer in charge of Micro Small and Medium Sized Enterprises (MSMEs), Ministry of Trade Industry and Cooperatives (MTIC), on behalf of the Commissioner, Industry and Technology, MTIC. He welcomed participants to the workshop and extended apologies from the Commissioner.

While presenting opening remarks on behalf of the Commissioner, he thanked United Nations Environment Programme (UNEP) for choosing Uganda as the pilot country in Africa Region to implement this project and UCPC for executing activities under the project. He pointed out that amidst the increasing demand for goods, including food, there is significant amount of food that ends up in the landfill. He informed the participants about a global comparison which reveals that the number of people affected by hunger is highest on the African continent where 20% of the population don't get enough to eat. In some parts of Eastern and Southern Africa, the number is over 30% and globally 1 in 9 people go to bed hungry yet approximately one-third of all food produced today goes to landfill.

Mr Kassim pointed out that the vast amount of food ending up as waste is not only a humanitarian problem, but also a serious economic and environmental problem, since the world has limited natural resources and environmental benign cost-effective solutions must be found to increase food production, improve distribution networks, and promote effective food supply chain management practices. Participants were informed that in order to alleviate the increasing demand for food

production, it is necessary to significantly reduce food waste. Sustainable food production, intelligent management, and proper food distribution are the key factors that must be addressed if we expect to feed our growing population.

Mr. Kassim informed participants that in recent years, the problem of food waste has attracted considerable interest from food producers, processors, retailers, and consumers alike. In order to reduce food waste problem and secure food, it is essential to have a comprehensive understanding of the various sources of food wastes throughout the food supply chain.

Finally, Mr. Kassim informed the participants that the Government is happy that the project on Green Technologies for Reduction of Food Waste at Consumer Level is piloted in Uganda, and that it is his sincere hope that the project results/output will eventually be replicated and rolled out by food supply chain stakeholders in the economy. He then declared the workshop open.

1.2 Overview of Building Back Better Using Green and Digital Technologies to Reduce Food Waste at Consumer.

This session was presented by Dr. Patrick Mwesigye from United Nations Environmental Programme Africa office Nairobi. He welcomed participants to the workshop and pointed out that the workshop has three agendas including; Green Technologies, Consumer choice i.e made through information obtained from various products and food waste including food looses. He elaborated the interconnectedness of the agendas where he noted that in Africa, food loses (post-harvest losses even before the food moves through the food chain). He pointed out that the content of the workshop intends to demonstrate how green technologies are used to reduce food losses and food waste. He informed participants that the workshop will present the work done by UCPC and encouraged them to discuss, analyses and provide comments for further improvement. He pointed out that some of the existing green technologies which could be used to reduce food losses and food waste will also be shared during the workshop for comments. He informed participants that the project is also piloted in other four cities (Serbia, Bangkok, Colombia and Bogota) apart from Kampala, and that there will be a comparison of analysis to compare data and draw conclusions on how one city can learn from the other.

2.0 Technical presentations for day 1

2.1 Case study food waste in Markets in Kampala

This case study was presented by Mr. JP Mugerwa from Kitintale Market. He began his presentation by giving a brief background about the market and its location. In his presentation he pointed out the fact that almost 80% of food wasted in the market is cooked food i.e. at least 32(Kilograms) of cooked food on a daily basis are wasted followed by the fruits and vegetables taking about 17.5% (it's about 7kgs) and the remaining 2.5% is shared among the remaining sections in the market.

Plate 1: Some of the generated food waste

The causes of food waste in the market as presented by Mr. Mugerwa include; poor storage of the produce by vendors, poor planning in-terms of market forecast for the future, un foreseen changes in weather for example high temperatures accelerates the rate at which fruits and vegetables ripen.

He also stated that the market was implementing some options for reducing food waste which include; food vendors keeping the food left overs and giving them to people rearing animals as animal feeds, and refrigerating meat and chicken products as a form of preserving them.

Mr. Mugerwa concluded by pointing out recommendations for government which include; improving road networks and the quality of roads to connect markets to producers and sensitizing the community on how to reduce food waste in markets .which can be done by both government and NGO's.

2.2 Presentation of Food waste Household Survey Findings in Kampala

This technical session was presented by Mr. Edson Twinomujuni, Senior Technical Officer, UCPC. He informed participants that the survey was aimed at; diagnosing the food waste problem in Kampala by working with local authorities to develop urban food waste baselines, accompanied by a survey to understand the causes and drivers of household food waste, including COVID 19-specific impacts; and that it looked at Wholesalers/Retailers, Food service and Consumers. He then briefed participants about the methodology used during the survey at both household and market levels. This included; Direct weighing and measurement of food waste at household level (100 households sampled for a week) and quantification of food waste in 5 five food markets in Kampala (Kalerwe, Kitintale, Natete, Luzira and Kansanga) by establishing the number of waste trucks collected and the tonnage of waste carried by each truck per day from each of the sampled markets.

Plate 2: Some of the generated waste in markets

Participants were informed that the survey revealed the following findings; food waste is a problem i.e food waste generation in Kampala increased from 407,890 tons in 2011 to 785,214tons in 2017 thus making the waste sector, the second biggest contributor of greenhouse gas emissions in Kampala (28% of city-wide emissions come from landfills, waste incineration and solid management) after energy generation. Daily food waste in Kampala ranges from 0.241 to 0.500 kg per person.

Participants were informed that some of the causes of food waste included; preference of eating staple food, load shading affecting storage, unplanned shopping especially for perishable items, delays in transit and distribution, absence of storage technologies and failure to estimate the wright quantity of food for each household.

Plate 3: Delays during transit of food due to mechanical fault of the car likely to cause food to go bad thus food waste

He concluded with sharing lessons learnt during the survey process which included;

- Addressing food waste requires lifecycle interventions instead of a singular action.
- Given the role of women in the informal sector and in food consumption, such interventions should take into full consideration and systematically integrate gender.
- Data is key, especially data to illustrate the economic, environment and social
- Financiers also need to improve finance for new technological innovations and business models.
- An enabling environment is needed, with more attention to the informal sector that works on food service and waste collection.

2.3 Case study Food waste and Innovations in Hotels in Kampala

This cases study was presented by Mr. Alol Paul Kileta, one of the staff at Arcadia Suits Hotel, located on Plot 54A Kira Road, Kampala. The hotel used to generate about 400kg/week of food waste and this used to be disposed off at a cost of UGX 1.18M/week. After adoption of green

technologies, the hotel reduced on its quantity of food waste generated and thus reduced costs of disposing off this waste by UGX. 590,000/week. Some of the implemented green technologies by the hotel included;

- Waste segregation in the kitchen.
- The hotel always buys food from licensed food sellers and traders since they follow certain standards which ensure supply of quality food with longer shelf life.
- The hotel implemented housekeeping measures including; weighing, first in fast out, not putting items on the floor, use of refrigeration of food and waste, use of ala carte menu, e.t.c.

Plate 4: Mr. Alol Making a case study presentation on implemented green technologies to reduce food waste in Arcadia Hotel Kampala

2.4 Green technologies for Circularity and Food waste management

This session was presented by PROTEEN (U) Ltd which processes organic waste into animal feed. The presenter noted 3 challenges/opportunities which the organization exploits. These include; Fertilizer; i.e depleted soils due to heavy rains, limited availability of fertilizers due to high costs and fake fertilizers on the market; Feed i.e most of available feed is mixed with up to 50% sand,

most available feeds are contaminated and thus lead to loss of livestock, unreliable supply of feed and fluctuating prices due to uncertainty in supply of raw materials used in processing feed; Waste i.e about 3,100 tonnes of organic waste is generated in Kampala per day and most of it is disposed in Kiteezi, about 40 -50% of generated waste is collected, most of which is uncollected thus remains in cities and causes pests and flooding; and Jobs i.e about 83% of youth do not have formal employment and Agriculture is becoming less profitable due to limited jobs.

At PROTEEN (U) Ltd, waste is fed to Larvae, which processes it into; Profeed, a high quality protein that improves animal health; ProOil, which is used as feed additive and in processing of cosmetics and ProTilizer, used for plant health as an organic fertilizer. The organization has processed about 480 tons of organic waste since 2020 and employs about 25 youth.

2.5 Green technologies for Energy Recovery from inedible food waste

This case study presentation was made by Ms. Eileen P. Lara from Centre for Research in Energy and Energy Conservation (CREEC) whose mission is to enhance access to modern types of energy through research, training and consultancy in East-Africa. The presenter pointed out the focal areas of the company which include rural electrification, energy for productive use, household energy and energy entrepreneurship. The company has implemented a number of projects in regards to the focal areas such as the Solar Kiosk Lulagwe under rural electrification, Pico Hydro in the Rwenzori mountains under energy for productive use, creating awareness about energy efficiency and the use of clean cook stoves among women and children in rural households under household energy and technical trainings under energy entrepreneurship. Food waste can be a source of energy for example rice husks and straws can be used to make briquettes and it can also be used in the bio digester for producing biogas. She also explained the process from which food waste is turned into bio methane, which is a clean source of energy. Thereby by demonstrating that food waste is not that useless after all since it can be used for generation of biomethane.

3.0 Discussions and Reactions

There were various reactions from different participants at the end of each technical presentation. Some of these included the following;

Dr. Patric Mwesigye, emphasized the role of cultural norms and consumer choices in food waste and food losses. At this point he noted the need for massive awareness in order to minimize food waste.

Mr Francis Aziz from Ministry of Gender, Labour and Social development, emphasized the importance of mind/ behavior change in food waste and food loss prevention/minimization.

One of the participants emphasized the need to clearly define the food waste regulations and storage facilities in the market in the report.

One of the participants suggested that the challenge of waste handlers mixing up already segregated waste should be addressed by setting up and enforcing penalties since the waste, which is already segregated, makes it easy to recycle.

Some participants proposed that the government should promote technologies that process food for preservation to avoid food waste.

Participants emphasized the need to create a system for sharing food so that it doesn't become waste.

One of the participants emphasized the need to incorporate the technical indigenous means of food preservation that were used by local people in the report since they are also important for reducing food waste.

Mr. Nathan Munuzi advised the members present and UCPC to visit Gudie Leisure Farm located to look at their business model since its good for food waste reduction.

Participants emphasized that in order to reduce food waste a value chain approach has to be used since technologies alone can't solve the problem given that food waste begins right away from the farm where food is produced.

4.0 Technical presentations for day 2

4.1 Case study for Kampala Uganda Green and Digital technologies to reduce food waste at Consumer level, Policy analysis, stakeholder mapping and food waste prevention strategies

During day 2 of the workshop, only one technical presentation was made and was about Green and Digital Technologies, Policy analysis and possible strategies. It was delivered by Edson Twinomujuni.

He started the technical presentation with a definition of Green technologies as products/goods or services whose application and use can conserve the natural resources and environment, and can curb negative impacts of human activities. Mr. Edson then described the various existing Green and Digital technologies for reducing food waste in Uganda which some of which included;

- Use of mobile phone applications (Jumia foods and Glovo) by hotels to allow customers to pre-order their meals.
- Use of QR code based applications by Hotels to allow customers make orders directly to chefs.
- K-Smart Market, a farm to plate mobile application developed by KCCA under urban farming.
- Aseptic packaging in food and beverage industry for long/extended shelf life.
- Use of air tight grain bags for protection against physical damage.
- Use of improved varieties of food crops
- Micro-cold chain transportation
- Waste to energy technologies such as Luchacos cooperative, which uses organic waste to produce biomass briquettes – an energy source for cooking.

The technical presentation also consisted of; challenges that limit uptake of these technologies, efforts and strategies that Uganda has undertaken to address the challenge of food waste and the several recommendations to various key stakeholders to reduce food waste in Uganda.

5.0 Group sessions

After the technical presentation, participants were distributed among three groups to discuss the sector food waste prevention strategies. These groups reviewed the various recommendations as presented by Edson for comments and inputs. Group 1 discussed Food waste Prevention Strategies in Food Services sector, Group 2 discussed Food waste Prevention Strategies in Food Retail sector and Group 3 discussed Food Prevention Strategies in Households.

Plate 5: Participants engaged in discussion in different groups

After the discussions, each group presented what food waste prevention strategies it had agreed on.

Group 1 agreed on the following food waste prevention strategies in the food service sector. Restaurants should; analyze control portion savings, sensitize on importance of food waste reduction, exercise demand forecasting to avoid excess cooking and kitchen staff should understand the financial implication of food wastage. Hotels should; repurpose certain excess food, communicate strategically to guests about food waste, engage staff on food reduction policies, reward staff who deliver against targets on food waste management, allow two different types of plates of serving stations and reduce over production by producing smaller quantities of items consistently left on the plate. Catering/food services should; adopt cold storage rooms, adopt mobile application technologies and evaluate contractual obligations between clients and suppliers.

Group 2 agreed on the following strategies for prevention of food waste in the food retail sector. Some of these included; expand cold storage systems during wholesale and logistics to protect products vulnerable to heat damage, 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, participate in groups or associations of informal operators to access guidance and training in best practices in food handling and storage, 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 and Use practices that minimize damages such as handling produce gently, stacking properly, marking cases to track inventory, and rotating stock following a "first-in-first-out" method.

Group 3 agreed on the following food waste prevention strategies at the household level. Budgeting of household levels, use of appropriate storage containers (for cooked food), promote modern and indigenous methods of preserving food, Mind set change of family members (self-service, serve what you can complete, observe meal times), good housekeeping, promote back yard farming and provision of affordable power sources to refrigeration and other associated appliances.

6.0 Way forward and closing remarks

Mr. Silver Ssebagala was invited to provide the way forward. He started by thanking all participants for having actively participated in the workshop. He informed them that all of their input has been captured and will be incorporated in the final reports. He informed the participants that they will be continuously engaged during the development of final reports. He finally thanked the task team leader, Mr. Edson for having led the team in developing the draft documents which were discussed during the workshop and invited Dr. Patrick Mwesigye to give closing remarks.

Dr. Patrick Mwesigye started his closing remarks by first thanking once again; all participants for having attended the two days' workshop and UCPC team for having participated in the pilot

project. He hoped that the workshop raised awareness on the issue of food waste and food loss, showcased some of the available green technologies (including indigenous technologies) and significance of consumer choice in prevention/reduction of food waste and food losses. At this moment, he called for all participants to join in the campaign of minimizing food waste and losses by becoming change agents. He called for politicians to include the issue on food waste and losses so that massive awareness is done. He finally called upon the Government through Ministry of Finance Planning and Economic Development to support programs intended to prevent/minimize on food waste and food losses. He once again thanked Uganda Cleaner Production Centre for having successfully implemented the programme and declared the workshop closed.

7.0 Annex

7.1 Annex 1: Workshop program

No	Item	Time	Responsible Entity
Day 1			
1	Opening Remarks	8:30-9:00	MTIC
2	Overview of Building Back Better Using Green and Digital Technologies to Reduce Food Waste at Consumer.	9:00-9:30	UNEP
3	Case study food waste in Markets in Kampala	9:30-10:00	Kitintale
Health Break			
4	Case study Food waste and Innovations in Hotels in Kampala	10:30-11:00	Hotel African
5	Green technologies for Circularity and Food waste management	11:00-11:30	Proteen (U) Ltd
6	Green technologies for Energy Recovery from inedible food waste	11:30-12:00	CREEC
Lunch Break			
7	Presentation of Food waste Household Survey Findings in Kampala	2:00-3:00pm	UCPC
8	Discussion and Reactions	3:00-4:00pm	ALL
Day Two			
9	Registration and Introduction	8:30-9:00	
10	Presentation of Case Study for Kampala Uganda Green and Digital Technologies to Reduce Food Waste at Consumer Level, Policy analysis, stakeholder mapping and food waste prevention strategies	9:00-10:30	UCPC
Health Break			
11	Group sessions to discuss the Sector Food waste prevention strategies I. Group 1: Food waste Prevention Strategies in Food Services sector II. Group 2: Food waste Prevention Strategies in Food Retail sector III. Group 3: Food Prevention Strategies in Households	11:00-12:00	ALL
12	Way Forward	12:00-12:45	UCPC
13	Closing Remarks	12:45-1:00	MWE
Lunch and Departure			

7.2 Annex 2: List of participants