

Integrated Waste Management in Africa

Focus on Circularity





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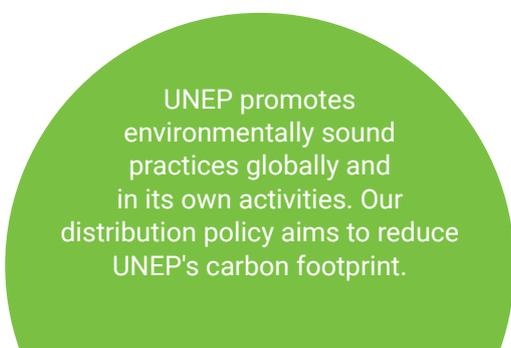
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Contents

Acknowledgements	v
Foreword	vi
Acronyms and abbreviations	vii
Executive summary.....	viii
1. Introduction	1
2. Sector context	5
3. Methodological framework.....	11
4. SWITCH Africa Green interventions	17
5. Opportunities, challenges, and lessons learnt	31
6. Conclusion and recommendations.....	35
7. References.....	37
8. ANNEX I: SWITCH Africa Green interventions	39
Annex II: List of participants SWITCH Africa Green Regional Sector Meeting on Integrated Waste Management	43



Table of figures

Figure 2.1: Waste generation per capita in 2016.....	6
Figure 2.2: Waste collection rates (capital cities).....	6
Figure 2.3: Linear economy and circular economy.....	8
Figure 3.1: Distribution of surveyed MSMEs.....	12
Figure 3.2: Results chain diagram for IWM sector.....	14
Figure 4.1: IS activities implemented in Mauritius	19
Figure 4.2: The Wend Waoga CBOs participating in NEERE cleaning activity.....	20
Figure 4.3: Improved staff capacity	21
Figure 4.4: Improved staff capacity at the subsector level (% of MSMEs).....	22
Figure 4.5: Improved business skills.....	22
Figure 4.6: New business opportunities.....	23
Figure 4.7: Percentage of MSMEs reporting increased sales.....	23
Figure 4.8: Percentage of MSMEs reporting creation of new jobs	26
Figure 4.9: Distribution of new jobs by subsector.....	26
Figure 4.10: Improved working conditions	27
Figure 4.11: Implementation of 3Rs	27
Figure 4.12: E-waste recycling in Ghana.....	28
Figure 5.1: Challenges faced by MSMEs	32
Figure 5.2: Lessons learnt.....	33

Tables

Table 1.1: Country priority sectors	2
Table 3.1: Distribution of subsectors in IWM by country (%).....	12
Table 4.1: SWITCH Africa Green supported projects in IWM sector.....	18
Table 4.2: Employment by subsector	25

Boxes

Box 4.1: Turning rice husks from an environmental nuisance to a treasure.....	24
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Acknowledgements

This report presents an analysis of the implementation and results of the SWITCH Africa Green programme in the integrated waste management (IWM) sector focusing on the participating countries: Burkina Faso, Ghana, Kenya, Mauritius, South Africa and Uganda. It covers the strategic interventions in the waste sector notably municipal solid waste management, e-waste management, waste to energy (e.g. biogas production and briquette production), as well as industrial symbiosis (IS). It analyses the results realised, cross cutting issues, challenges, lessons learnt and presents a set of recommendations. The report is informed by a SWITCH Africa Green programme survey carried out in May 2018, grantee reports, case studies, peer reviews and regional stakeholder consultations including a regional sector meeting held on 11-12 June 2019 in Accra, Ghana. The report is one of four sector reports, one for each of the priority sectors of the programme: agriculture, manufacturing, tourism and IWM.

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Foreword



The African economies though highly diversified are under constant pressure as the population increases and demand for the natural resources continues to escalate. African economies are highly dependent on natural resource sectors e.g. mining, tourism, agriculture, forestry and fishing, etc. and ensuring that these resources are sustainable is crucial for future generations.

On the other hand, there is increased growth in micro-, small and medium-sized enterprises (MSMEs). Today, these small enterprises create about 80% of the region's employment, creating the much-needed jobs for the youth as well as fuelling demand for goods and services.

Helping these MSMEs to flourish and grow in a sustainable way while protecting the environment is crucial not only for Africa but for the global environment. Not only will it ensure the sustainability of the environment but also it creates a growing middle class with disposable income, in tandem with market opportunities for new investors both from the region and globally.

According to the World Bank, the continent's vast natural resources, the young population and growing economies will sustain high levels of foreign investments that will make Africa's rise inevitable.

The SWITCH Africa Green programme is working with African countries to grow green businesses in the region. It supports African countries in their transition to inclusive green economy and in promoting sustainable consumption and production (SCP) practises and patterns.

Seventy per cent of the MSMEs implemented the Reduce, Reuse and Recycle (3Rs) interventions; some of the environmentally friendly interventions adopted include reuse and recycling, sale of waste, segregation at source, and better disposal. In Burkina Faso, 3,700 tonnes of waste were diverted from uncontrolled dumpsites, of which 2,200 tonnes went to composting and recycling activities. In Ghana, 20,000 tonnes of e-waste were recycled, benefiting directly and indirectly about 2,100 Ghanaians living in Accra, and in Mauritius, 2,677 tons of the waste was diverted annually from landfills and used locally as raw materials in the IS sub-sector.

While the programme has recorded remarkable achievements, various challenges have been identified that may undermine the implementation of SCP practices and patterns. They include the need for financial support, capacity building, need to improve the policy environment in the waste sector, marketing of green products, and behavioural change and awareness. Notably, sixty-eight per cent of the enterprises appreciate the benefits and importance of adapting SCP practices and improved business processes for the growth of their businesses.

Considerably, stakeholders recognised that there is significant unexploited potential in the waste sector. Integrated waste management is key to unlock wealth while enhancing environmental sustainability. The stakeholders recommended further support in developing a regional framework on circular economy (CE) and integrated waste management.

Dr. Juliette Biao-Koudenoukpo

Director and Regional Representative for Africa, UN Environment Programme (UNEP)

Acronyms and abbreviations

10YFP	10 Year Framework of Programmes
3Rs	Reduce, Reuse and Recycle
ABP	Africanana Products Limited
AfDB	African Development Bank
AJSDV	Youth Solidarity Association for True Development
ARSCP	Africa Round Table on Sustainable Consumption and Production
BDS	Business Development Service
CBOs	Community Based Organizations
CE	Circular Economy
CO ₂ eq	Carbon Dioxide Equivalent
COTVET	Council for Technical, Vocational Education and Training
CREEC	Centre for Research in Energy Conservation
DEVCO	EU International Cooperation and Development
EEA	European Environment Agency
EEE	Electrical and Electronic Equipment
EPA	Environment Protection Agency
EU	European Union
GAMA	Greater Accra Metropolitan Area
GDP	Gross Domestic Product
GEMOD	Ghana E-waste Model
GHG	Greenhouse Gas
GNPCP	Ghana National Cleaner Production Centre
GRAAD	Groupe de Recherche et d'Analyse Appliquées pour le Développement
IGE	Inclusive Green Economy
IS	Industrial Symbiosis
ISWA	International Solid Waste Association
ITU	International Telecommunication Union
IWM	Integrated Waste Management
JPOI	Johannesburg Plan of Implementation
KSF	Knowledge Sharing Forum
LPG	Liquefied Petroleum Gas
MEAs	Multilateral Environmental Agreements
MSMEs	Micro, Small and Medium Enterprises
MSW	Municipal Solid Waste
NESSAP	National Environmental Sanitation Strategy and Action Plan
NREG	Natural Resources and Environmental Governance Programme
PAGE	Population Approach Group Europe
PPE	Personal Protective Equipment
PSFU	Private Sector Foundation Uganda
RE&IS	Resource Efficiency and Industrial Symbiosis
SCP	Sustainable Consumption and Production
SDAP	Sustainable Development Action Plan
SDGs	Sustainable development Goals
SESIP	Strategic Environmental Sanitation Investment Plan
SIG	Sector Indicator Guidance
SSA	Sub-Saharan Africa
TRADEMFA	Transformation des Dechets Menager en Fertilisant Agricole au Nord du Burkina Faso
UCPC	Uganda Cleaner Production Centre
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
UNU	United Nations University
USD	United States Dollar
USSIA	Uganda Small Scale Industries Association
WSSD	World Summit on Sustainable Development

Executive summary

This report presents an assessment of the implementation and results of the SWITCH Africa Green programme in the IWM sector. It covers the strategic interventions, results realized, cross-cutting issues, challenges, and the lessons learnt. In 2016, Sub-Saharan Africa (SSA) accounted for 9 per cent or 174 million metric tons of the total quantity of solid waste generated globally. According to United Nations Environment Programme (UNEP), the value of municipal solid waste (MSW) generated in Africa is estimated at USD8 billion annually, but the opportunities remain largely unexploited. While SSA countries are undertaking measures to improve waste management systems, these efforts are hampered by lack of awareness and a negative attitude by the public towards waste management that contribute to poor practices such as littering; open dumping and burning of waste; poor management of the existing dumpsites; limited budget allocations for waste management, especially infrastructure investments; weak governance including compliance with and enforcement of existing policy and regulatory framework; and lack of adequate systems that support material recovery.

The SWITCH Africa Green programme is funded by the EU to support governments and the private sector in African countries (Burkina Faso, Ethiopia, Ghana, Kenya, Mauritius, South Africa, and Uganda) in the transition to an inclusive green economy (IGE). The programme is implemented by the UNEP in collaboration with the United Nations Development Program (UNDP) and United Nations Office for Project Services (UNOPS). The overall objective of the programme is to support the countries to achieve sustainable development based on SCP practices and patterns, while generating growth, creating decent jobs and reducing poverty.

The programme is being implemented in four priority sectors namely, IWM, sustainable tourism, sustainable agriculture, and manufacturing, that were identified based on the needs and priorities of national stakeholders in the countries during the inception phase of the programme. In the IWM sector, the programme supported industrial symbiosis (IS), waste to energy, waste to compost, municipal waste management services, and e-waste management.

Methodological Framework

Mixed methods of data collection have been employed in the preparation of this report. They are survey questionnaires targeting MSMEs and grantees, desk research, on-site observations, case studies, expert peer reviews, stakeholder consultations, and validation of the report. The report draws heavily upon the results-based SWITCH Africa Green programme survey that was conducted, between 14 May – 22 June 2018, as well as data collected through desk research, stakeholder consultations and case studies.

During the survey, on-site and project monitoring visits to selected MSMEs were conducted to ascertain the accuracy of the data collected and to gain a better understanding of the programme implementation at the enterprise level. One hundred and thirty-nine enterprises were surveyed across the countries (Burkina Faso, Ghana, Kenya, Mauritius, South Africa, and Uganda) in the five subsectors, namely, IS, waste to energy, municipal waste management services, waste to compost, and e-waste management. The approach adopted in the analysis and reporting is consistent with the EU's Green Economy Sector results chain, the Green Economy Sector Indicator Guidance (SIG) Framework, developed by the EU Commission's International Cooperation and Development (DEVCO).

Experiences and lessons learnt

While the programme has recorded remarkable achievements, various challenges have been identified that may undermine the implementation of SCP practices and patterns. They include the need for financial support, capacity building, need to improve the policy environment, and marketing of green products, and behavioural change and awareness. It is noteworthy that 68 per cent of the enterprises appreciate the benefits and importance of adapting SCP practices and improved business processes for the growth of their businesses.

Main findings

The analysis of the results reveals that the implementation of the SWITCH Africa Green programme activities in the IWM sector has facilitated the uptake of SCP practices and patterns by MSMEs as envisaged. Eighty-nine per cent of the surveyed enterprises reported that the capacity of personnel had been enhanced during the project implementation period, which is a good indicator of improved awareness and capacity to implement SCP practices. It is encouraging that 83 per cent of the surveyed enterprises reported improved business skills and 74 per cent recorded increased sales turnover. Some of the policy changes include personal protective equipment (PPE), waste segregation, recycling and reuse, record keeping, inventory monitoring, the proper dismantling of e-waste, energy efficiency, and resource monitoring.

Regarding the social dimension of development, positive gains in terms of employment and improved working conditions have been noted. Sixty-eight per cent of the surveyed MSMEs reported that new jobs had been created during the period of the implementation of the SWITCH Africa Green programme. Based on the survey data, 2,683 new jobs were created during the implementation of the programme, with 63 per cent of the new jobs created in the IS subsector. Seventy-three per cent of the surveyed enterprises reported improved working conditions as a result of the use of PPE and the implementation of procedures to protect workers from safety and health hazards. The PPE included safety boots, helmets, gloves, and goggles. There is scope to increase women and youth labour participation in the sector.

On the environmental front, the project recorded remarkable benefits. Seventy per cent of the MSMEs implemented 3R interventions. Some of the environmentally friendly interventions adopted include reuse and recycling, sale of waste, segregation at source, and better disposal. In Burkina Faso, 3,700 tonnes of waste were diverted from uncontrolled dumpsites, of which 2,200 tonnes went to composting and recycling activities. In Ghana, 20,000 tonnes of e-waste were recycled, benefiting directly and indirectly about 2,100 Ghanaians living in Accra, and in Mauritius, 2,677 tons of the waste was diverted annually from landfills and used locally as raw materials in the IS subsector.

Recommendations

The results indicate that the support provided through SWITCH Africa Green has set in motion processes and facilitated improved capabilities for long-term change in terms of decoupling and improved well-being. Based on the analysis, the following set of recommendations have been identified:

- capacity development and knowledge sharing should be expanded to cover appropriate technologies and practices in alternative waste treatment and resource recovery technologies. Capacity development should be extended to government officials focusing on governance and the policy environment to support the private sector in areas such as IS and CE;
- effective partnerships and collaboration between government, civil society, private sector, academia, and development partners to exploit the potential benefits in the IWM sector and address the policy, legal and regulatory environment is promising;
- public attitude and awareness on waste management regarding open dumping, littering, waste segregation needs to be improved;
- concerted efforts are needed to address competitiveness and market access challenges for green products including the use of fiscal incentives and sustainable public procurement policies;
- institutional capacity for policy implementation should be prioritized as part of the efforts to strengthen the policy and regulatory environment;
- establish a regional platform to support a transition to a CE; and
- innovative green financing mechanisms are required to support MSMEs in the IWM sector.





1. Introduction

Sustainable waste management is among the policy priorities for Africa, and various continental, regional, and country-specific policy initiatives and strategies are being implemented (UNEP 2018). According to the first 10 Year Implementation Plan 2014-2023 of the **Agenda 2063: The Africa We Want**, by 2023 the targets for African countries include “At least 50 per cent of urban waste is recycled” and “At least 10 per cent of waste-water is recycled for agricultural and industrial use”. According to UNEP, the value of Municipal Solid Waste generated in Africa is estimated at USD8 billion annually, but the opportunities remain largely unexploited. While SSA countries are undertaking measures to improve waste management systems, these efforts are hampered by lack of awareness and a negative attitude by the public towards waste management that contribute to poor practices such as littering, open dumping and burning of waste; poor management of the existing dumpsites; limited budget allocations for waste management especially infrastructure investments; weak governance including compliance with and enforcement of existing policy and regulatory framework; and lack of adequate systems that support material recovery.

The SWITCH Africa Green programme is funded by the EU to support governments and the private sector in African countries (Burkina Faso, Ghana, Kenya, Mauritius, South Africa, and Uganda) in the transition to an IGE. The programme is implemented by the UNEP in collaboration with the UNDP and UNOPS. The overall objective of the SWITCH Africa Green programme is to support the countries to achieve sustainable development based on sustainable consumption and production patterns, while generating growth, creating decent jobs and reducing poverty.

The specific objective of the programme is to support the development of green businesses, eco-entrepreneurship, and use of SCP practices by having in place (i) MSMEs and business development service (BDS) providers that are better equipped to seize opportunities for green business development; (ii) better-informed public and private consumers; and (iii) enabling

conditions in form of clear policies, sound regulatory frameworks, incentive structures, tax, other fiscal and market-based instruments influencing key sectors. To realize this goal, SWITCH Africa Green programme has three interconnected components: policy support, green business development, and a network facility component. The policy support component aims to create an enabling environment for green business development that allows for private sector-led inclusive green growth, the green business development component aims to support MSMEs through grants to intermediary organizations to enable them to start and develop green businesses and apply or adopt SCP practices and patterns, and the networking facility aims to distil and share knowledge, lessons learned and best practices on green business and SCP, and creating broader awareness and a greater understanding of green business development in the region.

The programme is focusing on four priority sectors and a set of cross-cutting issues that were identified based on the needs and priorities of national stakeholders in the countries during the inception phase of the project. The four priority sectors are IWM, sustainable tourism, sustainable agriculture, and manufacturing. The cross-cutting issues include

the promotion of energy efficiency; labelling and standards, promotion of water-saving initiatives, eco-innovation to develop and promote environmentally sustainable industrial growth and identifying and harnessing sustainable trade opportunities. Table 1.1 summarizes the priority sectors for each country.

The first phase of the SWITCH Africa Green programme that started in March 2014 benefitted more than 3,000 MSMEs that were supported in the uptake of SCP practices across the four priority sectors and the five cross-cutting themes. The interventions on the ground have focused on capturing market opportunities for green products and services that take into account resource efficiency across the life cycle and developing green business opportunities for local entrepreneurs. The programme has also supported awareness creation, networking, and capacity building for MSMEs to apply and scale-up SCP practices.

Table 1.1: Country priority sectors

Country	IWM	Agriculture	Manufacturing	Tourism
Burkina Faso	✓		✓	✓
Ghana	✓		✓	✓
Kenya		✓	✓	✓
Mauritius		✓	✓	✓
South Africa	✓	✓	✓	
Uganda		✓	✓	✓

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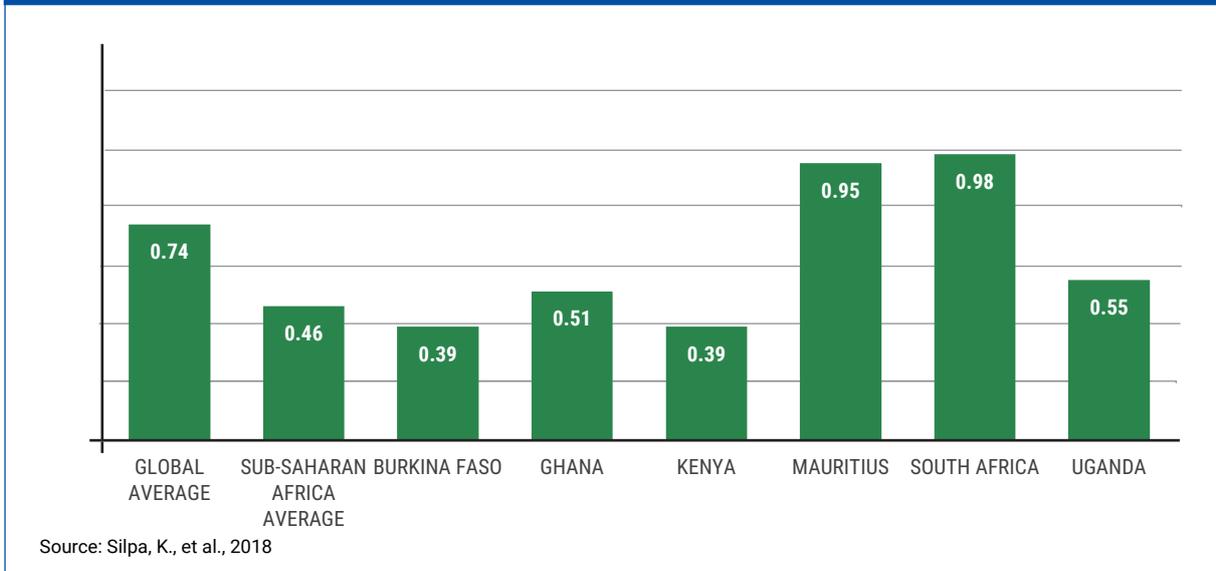
2. Sector context

The value of MSW generated in Africa is estimated at USD8 billion annually, and opportunities to develop the waste as a resource remain largely unexplored (UNEP 2018). In 2016, SSA accounted for 9 per cent of global waste generated and is projected to increase to 10 per cent by 2025 and further to 15 per cent by 2050. East Asia and the Pacific region generated the largest share of waste estimated at 23 per cent, followed by Europe and Central Asia at 20 per cent. The Middle East and North Africa accounted for 6 per cent of global waste generated. Africa's rate of waste generation per capita is estimated at 0.46 kg per person per day, which is the lowest globally, though national averages range from 0.11 to 1.57 kg per person per day. North America has the highest rate of waste generation per capita estimated at 2.2 kg per person per day. The aggregate waste generation for SSA is forecast to triple from 174 million tonnes in 2016 to 516 million annually by 2050 (Silpa, K. et al. 2018).

The main drivers of waste on the continent include rapid urbanization estimated at 3.6 per cent per annum, population growth, economic growth, and expansion in international trade. The growth in waste poses challenges related to waste management, including limited or lack of access to waste collection services, uncontrolled disposal, and open burning, which pose a threat to human health and the environment. However, challenges notwithstanding, sound waste management provides a pathway to a transition to a CE with the associated social, economic, and environmental benefits.

Available data on the rate of waste generation per capita in the pilot countries reveals that except for Kenya and Burkina Faso, the average rate of the other countries is above the sub-Saharan average. The average waste generated per capita per day in Mauritius and South Africa is above the global average (Figure 2.1). The composition of waste in SSA is such that about 43 per cent is organic, but it is evolving as consumption patterns change and new streams of waste are becoming significant. The other streams of waste include electronic waste, plastics,

Figure 2.1: Waste generation per capita in 2016

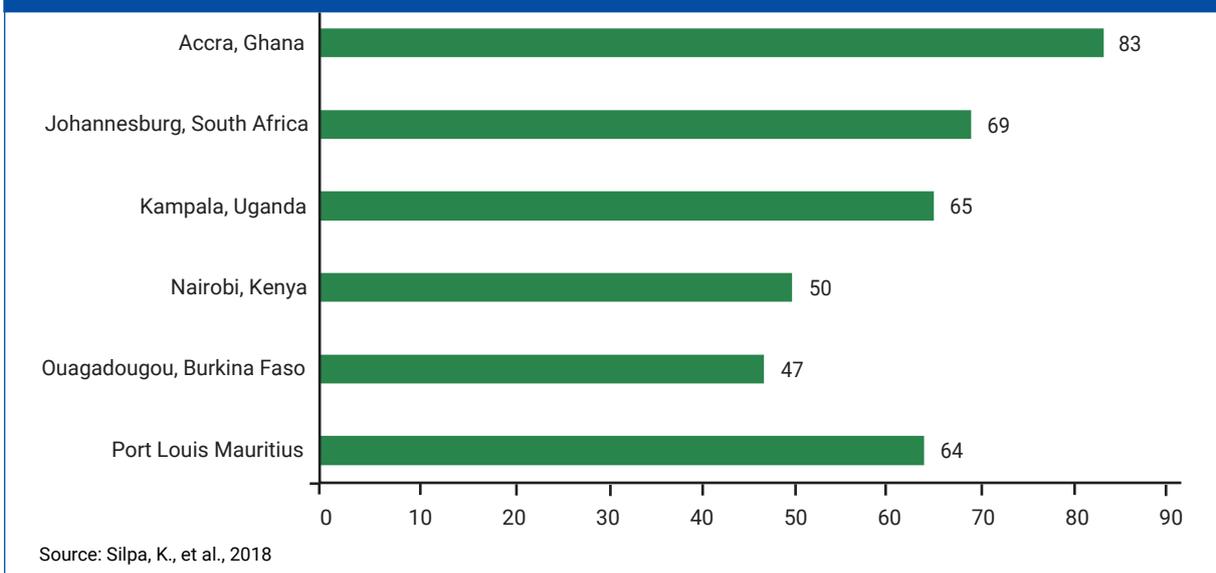


and marine litter for coastal countries (Silpa, K et al., 2018; UNEP, 2018). According to the Global e-waste Monitor 2017, e-waste is among the fastest-growing streams of waste. Global e-waste generation stood at 44.7 million metric tonnes and is forecast to increase to 52.2 million metric tonnes by 2021 (Baldé, C.P. et al., (2017)). Although there is limited information on the amount of waste that is generated and recycled in Africa, most African countries are cognizant of the challenge and strengthening the governance framework for e-waste management.

In SSA, access to waste collection services is about 44 per cent, though there are wide

variations across and within countries, with higher rates of collection in cities (Figure 2.2). Therefore, it is not uncommon to find uncollected waste in residential areas, on streets, in markets or in drainage channels. Uncontrolled dumping and open burning of waste is practised in many parts across Africa to deal with the problem of uncollected waste. In the pilot countries, waste management is a decentralized function, and the main service providers are sub-national government, private sector, informal sector players, and community-based organisations (CBOs). Waste segregation at source is also limited or non-existent due to people’s attitudes and lack of infrastructure.

Figure 2.2: Waste collection rates (capital cities)



All the countries have laws, regulations, and policies governing waste management. In Kenya, Environment Management and Coordination Act Cap 387 and Waste Management Regulations-2006 provide the framework for managing waste. Kenya developed a National Waste Management Strategy in 2015. By April 2019, the following laws and regulations were undergoing development or approval: Sustainable Waste Management Bill 2018; e-waste management regulations; asbestos handling and disposal guidelines; and regulations on used oil, waste tires, and plastic wastes. According to the draft national Waste Management Policy (Republic of Kenya (April 2019)) the existing legal environment does not have adequate provisions that support the circular model to waste management. While waste management is a devolved function, most counties lack adequate policy, institution, and infrastructure for sound waste management. According to Haregu, T.N et al. (2016), failure to articulate clear implementation mechanisms undermine policy implementation in Kenya.

Similarly, weak implementation of South Africa's National Waste Management Strategy is attributed to failure to develop practical action plans (UNEP 2018). Burkina Faso has an insufficient regulatory framework for some streams of waste such as e-waste and plastics and needs to develop an integrated solid waste management strategy . According to the Population Approach Group Europe (PAGE 2017), in Mauritius, the solid waste management strategy is being revised towards integrated waste management to increase material recovery and energy from waste. The key issues for Mauritius, according to the Waste Management Strategy 2011-2015, include inefficiencies in waste collection, enforcement, waste reduction, reuse and recycling, institutional capacity, and need for education and awareness.

Ghana's overall policy landscape is anchored on the Environmental Sanitation Policy, National Environmental Sanitation Strategy and Action Plan (NESSAP) and Strategic Environmental Sanitation Investment Plan (SESIP). Ghana has also embraced public-private partnerships in waste management (UNEP, 2018). The policy environment could be enhanced by increased

public education, a more attractive regulatory environment for the private sector, and clear policy implementation targets that can be monitored annually (Agyepong, I.A., 2018).

A review of Uganda's laws, policies, and business environment related to SCP reveal that broad policies exist and incorporate measures that support MSMEs' development. However, the greatest challenge is in the implementation and therefore institutional capacity building should be an important component of the policy environment (SWITCH Africa Green, 2017). Implementation deficiency in waste management policy in Uganda is attributed to a lack of resources and political interference (Okumu-Okot, J. and Nyenje, R. 2011).

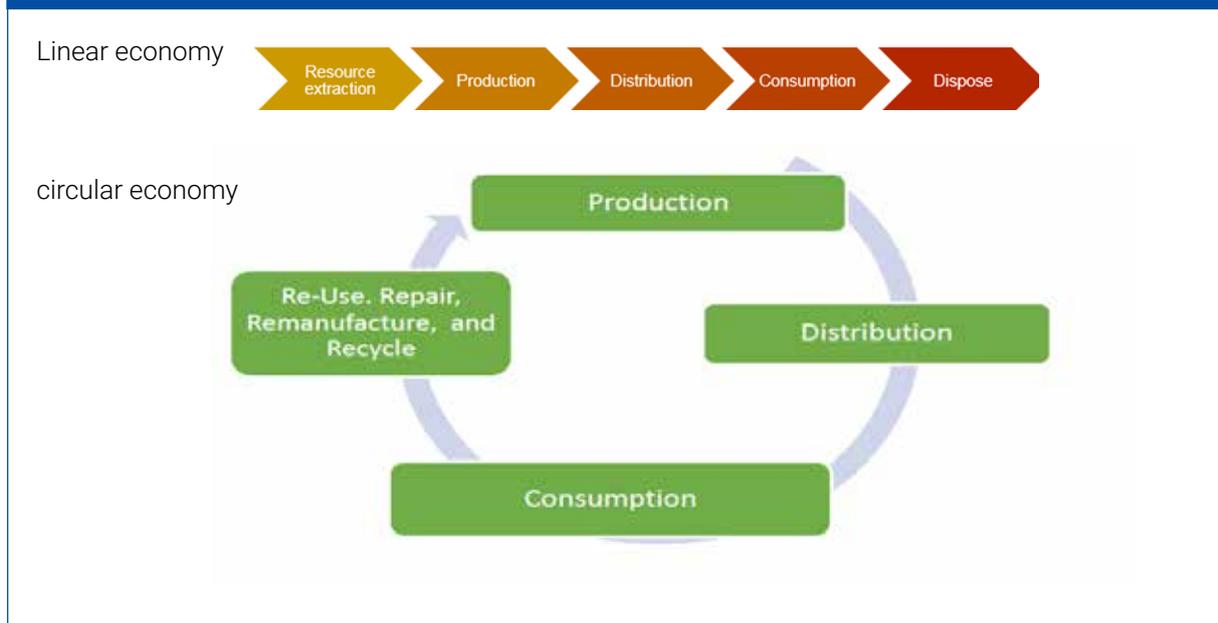
2.1 CE and Green Investments

The concept of the CE is gaining currency globally because of the expected economic, social and environmental benefits. CE represents an economic model that moves from the current linear model that is characterised by extraction, production, distribution, consumption and waste disposal to a model where products and materials are recycled, repaired, refurbished or reused such that a by-product or waste in one process is an input in another economic process (Figure 2.3).

According to the European Environment Agency (EEA) (2016), CE is an alternative to the linear take-make-consume-dispose economic model that is not sustainable. In Figure 2.3, the loop indicates that products and materials at the end of their lifespan are turned into resources for others through reuse, repair, recovery, re-manufacture, and recycle.

The key characteristics of a CE include less material input and natural resource use, increased share of renewable energy and recyclable resources, the value of products, components and materials are retained as long as possible, and emissions and material losses are minimized. The CE, therefore, calls for efficient and sustainable management of resources throughout their life cycle and is not just limited to the aspect of waste management.

Figure 2.3: Linear economy and circular economy



Waste is a resource in the context of a CE. There are various CE activities such as recycling and reuse that are being practiced in waste management in Africa and therefore, upscaling up of such activities has the potential to increase employment and business opportunities. The SWITCH Africa Green programme is supporting the transition to CE in the waste management sector by supporting MSMEs to harness opportunities including waste to energy and compost, e-waste recycling, and IS.

A review of the literature, including country strategy and policy documents, reveals that the six SWITCH Africa Green countries face various challenges in the transition to sustainable waste

management. These include: lack of awareness and negative attitude by the public towards waste management that contribute to poor practices such as littering, open dumping and burning of waste; poor management of the existing dumpsites and unavailability of land for landfills; waste generation is growing faster and putting pressure on available infrastructure; low coverage of waste collection services; lack of sound waste management systems to support segregation, recycling, reduce and reuse; limited budget allocations for waste management especially infrastructure investments; weak governance including compliance with and enforcement of existing legal framework; and lack of comprehensive and reliable data on waste.







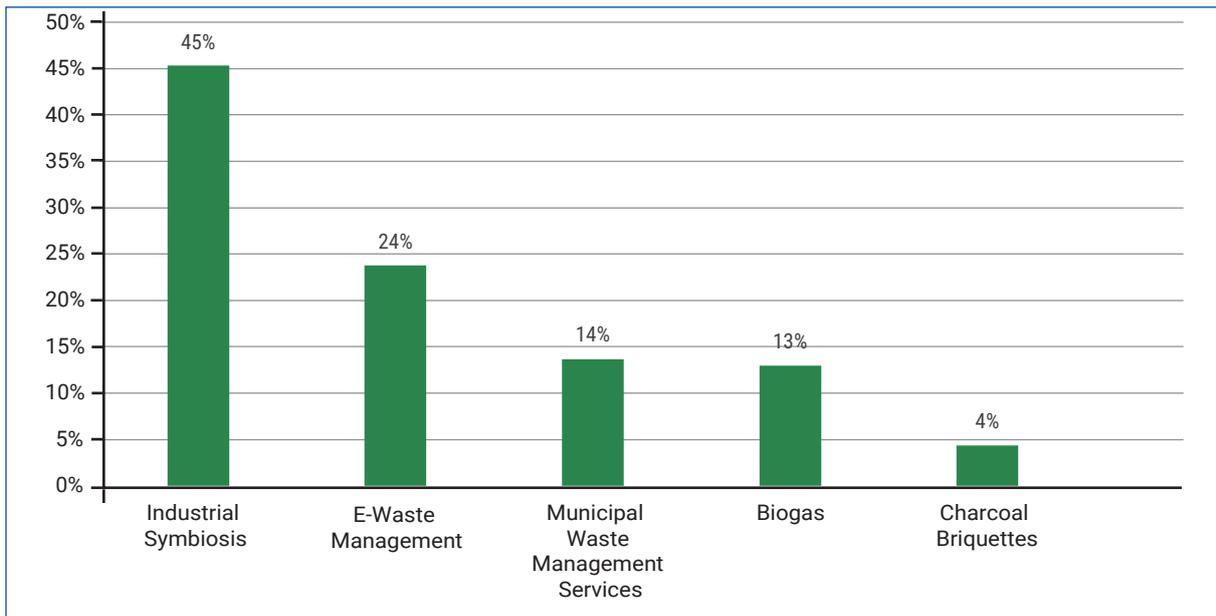
3. Methodological framework

The data used in preparing this report were collected through mixed methods including survey questionnaires targeting MSMEs and grantees, a desk review of documents, on-site visits, case studies, expert peer reviews, and stakeholder consultations and validation of the report as part of the quality review process. The key stakeholders included national and local government representatives, regional economic communities (RECs), development partners, UN agencies, private sector, financial institutions, research institutions, academia, and non-state actors (Annex II).

A results-based SWITCH Africa Green programme survey was conducted between May 14 - June 22, 2018, to collect relevant data from the project beneficiaries and grantees through questionnaires targeting at least ten per cent of the project beneficiaries and all the 34 grantees. Before administering the questionnaires, six national workshops were held, one in each country, to brief and discuss with grantees and MSMEs the questionnaires. Some smaller MSMEs were clustered into groups to keep data manageable. The enterprise questionnaire was designed to obtain data on a wide range of issues including data before and after SWITCH Africa Green interventions, and qualitative and quantitative data on achievements, challenges, and lessons learned. The grantee questionnaires covered issues such as grantee interventions, challenges, and lessons learnt. The main objective of the survey was to establish the impact of SWITCH Africa Green programme interventions on the beneficiary MSMEs and the uptake of SCP practices.

The programme supported IS, waste to energy, waste to compost, municipal waste management services, and e-waste management. Under waste to energy, projects were supporting the production of charcoal briquettes and biogas. The survey covered 139 MSMEs in the sector distributed as presented in Figure 3.1.

Figure 3.1: Distribution of surveyed MSMEs



The types of enterprises are quite diverse and include associations, CBOs, self-help groups, cooperatives, sole proprietorship, and limited companies. Sole proprietorship and limited companies account for 39 and 38 per cent of the responding enterprises, respectively. The distribution of the surveyed MSMEs by subsectors and countries is provided in Table 3.1. For instance, e-waste management and charcoal briquettes were implemented only in Ghana and Uganda, respectively.

During the survey period, there were on-site field visits to selected MSMEs to verify the data collected and to help gain first-hand information on the programme. Case study data collection

methodology was also used to provide in-depth information on the activities and achievements at the enterprise level. The documentary review was undertaken at the global, regional, country, and programme level. Data on programme actions, outputs, outcomes, and impacts are obtained from programme documents and the information collected through the SWITCH Africa Green survey. As part of the quality assurance process, the draft report was subjected to expert peer review and stakeholder validation at a workshop held in Accra, Ghana on 11-12 June 2019.

The approach used in the analysis of the interventions and results is consistent with the EU's green economy sector results chain,

Table 3.1: Distribution of subsectors in IWM by country (%)

Priority sector						
Country	Biogas	Charcoal Briquettes	E-Waste Management	Industrial Symbiosis	Municipal Waste Management Services	Total
Burkina Faso				37%	79%	27%
Ghana	78%		100%	22%	21%	47%
Kenya				8%		4%
Mauritius				6%		3%
South Africa				3%		1%
Uganda	22%	100%		24%		18%



SIG framework 1 developed by DEVCO. The SIG framework reflects the underlying logic or causal chain on how the project objectives are to be realised running through activities and interventions, outputs, outcomes, and the impact. The framework, therefore, helps to explain how the results have been achieved.

Conceptually, the SIG framework reflects the underlying theory of change underpinning the actions undertaken under SWITCH Africa Green. The drivers of change being sustainable consumption and production practices. The activities implemented under SWITCH Africa Green are expected to create an enabling environment and empower key stakeholders to adopt and implement SCP practices, which in turn contribute to sustainable development. Figure 3.2 below summarizes the framework as adapted for the IWM sector.

Under the business development component, the actions mainly target MSMEs, consumers, households, and workers in the specific sectors and subsectors. The programme interventions or actions undertaken under the SWITCH Africa Green business development component broadly fall under five broad categories, namely: development and deployment of knowledge/information resources such as training materials and toolkits; capacity building including mentorship; incubation of green enterprises; raising awareness and enhancing collaboration between different actors in the value chain and the policy arena.

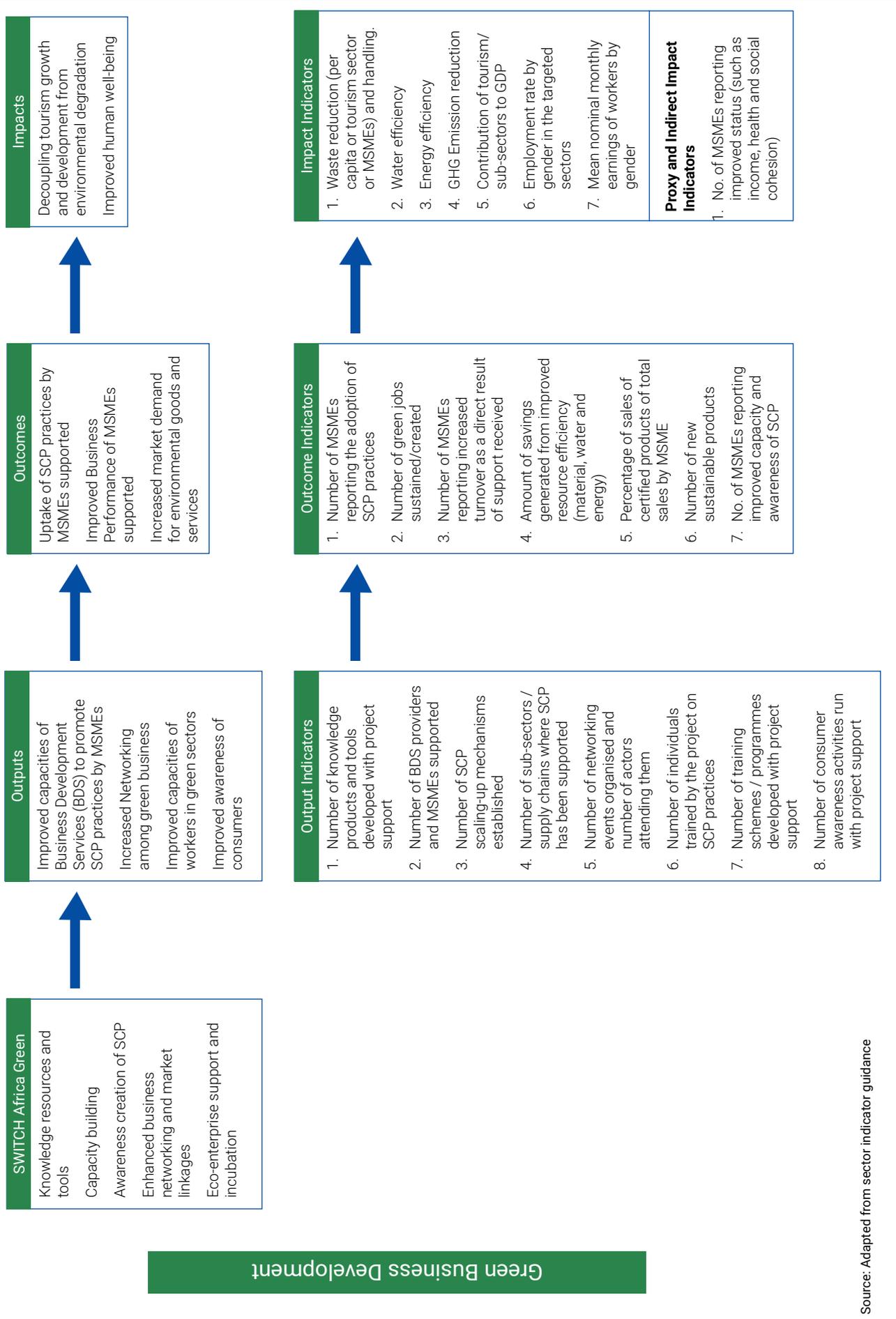
The results indicators in Figure 3.2 are presented at three levels, namely, outputs, outcomes, and impact. The impact refers to the goal that the programme aims to achieve, namely, decouple growth from waste generation and adverse environmental effects, and contribute to improved human wellbeing. The outcomes measure the effectiveness of SWITCH Africa Green interventions in inducing a change in the application of sustainable consumption and production practices. These are captured through policy, institutional capacity changes, and performance induced by the programme

outputs. The outputs provide information about the implementation of SWITCH Africa Green interventions in the specific sector towards influencing the adoption and implementation of SCP practices. While impact indicators measure broad medium- to long-term change due to various interventions, in the SIG context presented here, impact reflects an attempt to measure the contribution attributable to the project or programme.

The analysis and reporting faced several challenges. These include data unavailability and limitations, heterogeneity of enterprises and the business environment across the six countries, and development of the appropriate results indicators. The survey questionnaire included several questions that sought to establish the status of variables before (in 2014) and after (in 2017) SWITCH Africa Green interventions. The variables include annual production, unit and total cost of production, raw material use, energy and water use, and waste generated. However, many firms did not provide consistent solid data to facilitate the quantitative assessment of the change and development of quantitative indicators based on survey data. Data on similar variables were also presented in numerous units of measurement, perhaps reflecting the heterogeneity of the firms, thus rendering the data aggregation rather difficult and tedious. Additionally, due to data limitations, especially lack of data on control groups and household characteristics before and after SWITCH Africa Green interventions, a rigorous impact evaluation cannot be conducted (Khandker, S.R., Koolwal, G.B. and Samad H.A. (2010)). These challenges related to data have been overcome through the mixed methods of data collection. Qualitative indicators that reflect the beneficiary's perception or sense of well-being have also been used in the report. The SWITCH Africa Green programme survey collected data on employment in the surveyed MSMEs. However, the reported data on youth employment does not distinguish gender. Without additional data, it is assumed that the overall gender composition in the integrated waste management sector holds for youth employed in the surveyed enterprises.

1 https://www.switchtogreen.eu//wordpress/wp-content/uploads/2018/07/SIG-sector-Green-R_final.pdf

Figure 3.2: Results chain diagram for IWM sector



Source: Adapted from sector indicator guidance







4. SWITCH Africa Green interventions

4.1 Interventions

During the first phase of the SWITCH Africa Green programme that started in March 2014 and ended in February 2020, grants were awarded to 34 successful grantee applicants to support MSMEs in the uptake of SCP practices in the priority sectors. Overall, more than 3000 MSMEs benefited from the programme.

The programme was implemented through a call for proposals. Grantee applications were evaluated based on a selection and award criteria that included the financial and operational capacity of the applicant, the quality of the proposal regarding consistency with programme objectives, the feasibility of proposed actions and cost-effectiveness. The grantees are the intermediaries and select the beneficiary MSMEs. Consequently, the distribution of successful grantees and beneficiary MSMEs varies across countries and sectors.

The funding directed towards various projects in the IWM sector is USD2,837,412 and benefited 964 MSMEs (Table 4.1). The support went towards enhancing the capacity of MSMEs including skills development and business incubation, development of knowledge and information resources and tools, awareness creation, and fostering partnerships and market linkages. The support went to the following subsectors: IS, e-waste management, waste to energy, municipal waste management services, and waste to compost. The projects are summarized in Table 4.1.

Table 4.1: SWITCH Africa Green supported projects in IWM sector

Country	Project Title	No. of beneficiary MSMEs	Budget (USD)
Ghana	Ghana e-waste model (GEMOD) project	100	250,000.00
	Promoting biogas technologies in Ghana	100	250,000.00
Ghana	One-stop business and policy centre for the establishment of eco-innovative MSMEs	123	237,412.86
Uganda	Upscaling generation, commercialization and utilization of biomass waste-based green energy sources in Uganda	34	200,000.00
Burkina Faso	Promoting cleaner and sustainable cities in Burkina Faso- NEERE Project: communes of Dedougou and Koudougou	12	200,000.00
	Transforming household waste into agricultural fertilizer (P/TRADEMFA)	38	200,000.00
Multi-Country	Enhancing resource productivity and environmental performance of MSMEs in 6 African countries through the concept of IS (ARSCP)	557	1,500,000.00
	Promoting eco-entrepreneurship in Africa -SEED		1,500,000.00
Total		964	2,837,412.96⁵

4.1.1 Industrial Symbiosis

The IS projects were implemented in all six countries involving 557 enterprises. The implementation of the projects started with the mapping of potential MSMEs to determine potential waste or resource exchange synergies to facilitate the implementation of IS. Figure 4.1 shows industrial relationships as implemented in Mauritius. Through the project, 4,387 tons of waste have been diverted from the landfill annually, and this has resulted in reducing the greenhouse gas emission by 92 tons of CO₂eq and an annual saving of MUR10,985,800

IS refers to the industrial relationship where two or more traditionally separate enterprises engage in mutual and beneficial partnerships. This includes the use of waste or by-products from one firm as input to another firm (Chertow, M., Ashton, W. and Kuppalli, R. (2004). IS may also be seen as an industrial relationship where two or more enterprises engage in mutual and beneficial partnerships to build a collective competitive

advantage through resource exchanges including the physical exchange of materials, energy, water, and by-products.

4.1.2 E-waste management

Over the last few decades, electrical and electronic equipment (EEE) has become an indispensable part of global life. The demand for newer, sophisticated, and more efficient 4,387 tons of waste has been diverted from the landfill annually and this has resulted in reducing the greenhouse gas emission by 92 tons of CO₂eq and an annual saving of MUR10,985,800

“The capacity building has helped us know that waste is actually a resource, production capacity has increased, quality of jobs improved, and the value of service rendered has appreciated.”

Mystery Technologies, Accra Ghana

⁵ This total excludes SEED which is multi-sector cutting across the 4 priority sectors

4.1.4 Waste to energy

The SWITCH Africa Green programme supported MSMEs in renewable energy businesses in charcoal briquetting and biogas. Biogas is a clean and renewable form of energy that can be generated from available organic waste which comprises more than 40 per cent of waste generated in SSA.

The projects were implemented in Ghana and Uganda. The project on promoting biogas technologies was implemented in the Greater Accra Metropolitan Area (GAMA) in Ghana. Another biogas project was implemented in Uganda under Afribanana Products Limited (ABP) in partnership with the Centre for Research in Energy and Energy Conservation (CREEC). The charcoal briquettes project was implemented in Uganda, by ABP benefiting 16 MSMEs.

4.1.5 Municipal waste management services

The SWITCH Africa Green programme implemented two projects in waste management services: The NEERE project, implemented by Groupe de Recherche et d'Analyse Appliquées pour le Développement (GRAAD) Burkina in Communes of Dédougou and Koudougou

in Burkina Faso, and SEED, implemented by Adelphi Research in Ghana. NEERE is derived from a local language meaning pretty or clean. The NEERE project mainly involved MSMEs and CBOs working in waste collection and transportation (Figure 4.2). The key activities that were implemented include capacity building, awareness campaigns, business support, and networking and collaboration, especially with municipal authorities and CBOs. Under the capacity building, 38 training events were delivered.

4.2 Results of SWITCH Africa Green

This section examines the implementation of SWITCH Africa Green programme activities in the IWM sector to establish whether the interventions have triggered the changes in the development conditions or behavior of the beneficiaries in the up-take of SCP practices. The analysis is consistent with the EU's SIG framework that reflects the underlying theory of change underpinning the actions undertaken under SWITCH Africa Green. The specific interventions and the associated results are provided in Annex I.

Figure 4.2: The Wend Waoga CBOs participating in NEERE cleaning activity



At the broad sector level, several strategic interventions were implemented. These include:

- development and deployment of knowledge and information resources such as training manuals and toolkits in various technical and business development and management subjects, including green business, waste management, business administration, resource efficiency and clean production (RECP), in IS monitoring and evaluation, and SEED toolkits;
- capacity building events and MSMEs' support and incubation activities through business development service providers (BDS) and grantees;
- awareness creation, sensitization and facilitating networking and learning; and
- support for improvement in the policy environment in the six countries.

The results are discussed along three dimensions of sustainable development, namely: economic, social, and environmental. The selected economic indicators include the capacity of MSMEs, new business opportunities, and turnover. On the social dimension, the key indicators include job creation and safety at work. The environmental indicators include implementation of 3Rs, estimates on greenhouse gas emissions, and waste generated.

4.2.1 Economic results – improved staff capacity

The SWITCH Africa Green programme delivered various capacity building activities aimed at enhancing the capacity of MSMEs to implement SCP practices. Based on the SWITCH Africa Green survey, 89 per cent of enterprises reported that the capacity of personnel had been enhanced during the project implementation period. At the subsector, the percentage of the surveyed firms that reported improved capacity ranges from 72 per cent in biogas to 100 per cent in municipal waste management services (Figure 4.3).

An analysis of the enhanced staff capacity at the subsector level and type of skills reveals that overall 64 per cent of the surveyed MSMEs reported improved technical skills and 25 per cent business and resource management skills. More than 90 per cent of the MSMEs in the e-waste management, IS, and municipal waste management services subsectors reported improved staff capacity. All the MSMEs in the municipal waste management services reported improved staff capacity (Figure 4.4).

Figure 4.3: Improved staff capacity

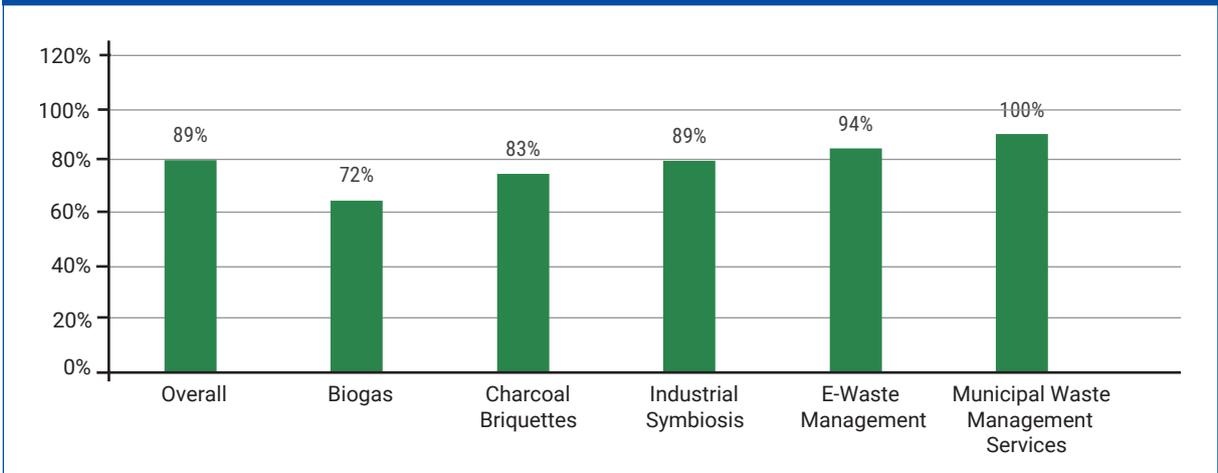
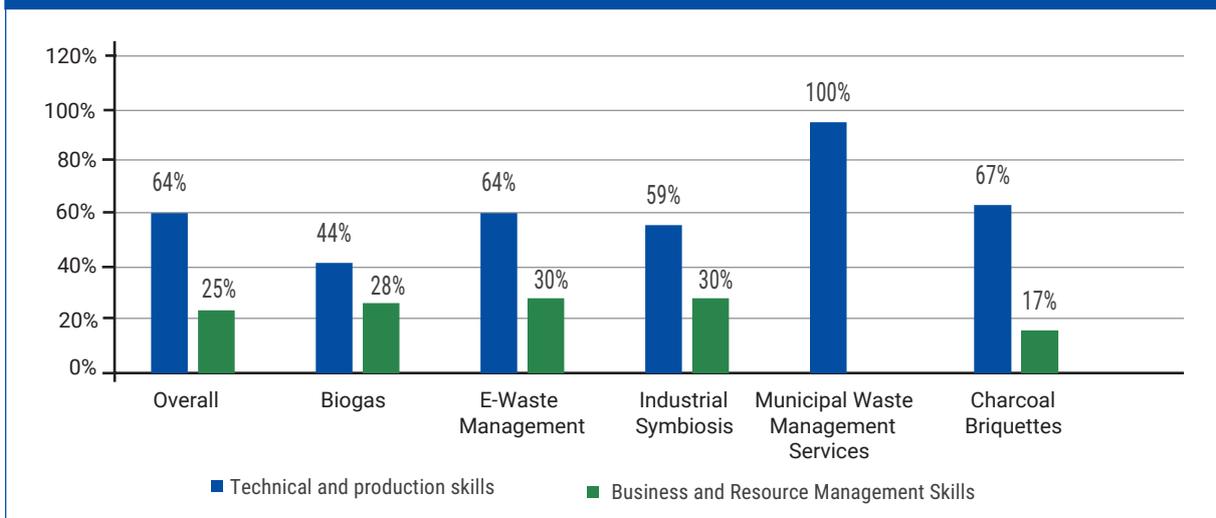


Figure 4.4: Improved staff capacity at the subsector level (% of MSMEs)



4.2.2 Business skills

The SWITCH Africa Green programme organized and delivered business training skills useful for implementing SCP practices including record-keeping, business planning and management. Eighty-three per cent of the surveyed enterprises reported improved business skills, of which 64 per cent report improved general business management skills and 19 per cent improved technical skills. At the subsector level, the percentage of the enterprises that were surveyed and reported improved business skills ranges from 70 per cent in IS to 100 per cent in municipal waste management services (Figure 4.5)

4.2.3 Emerged business opportunities

The implementation of the SWITCH Africa Green interventions generated new business opportunities. The opportunities were noted in producing new products from waste, sale and exchange of waste; business expansion arising from improved market linkages; and application of new technologies. Overall, 71 per cent of the enterprises reported that new opportunities had emerged. At the subsector level, the percentage of MSMEs reporting new business opportunities ranges from 63 per cent in IS to 100 per cent in the charcoal briquettes subsector (Figure 4.6).

Figure 4.5: Improved business skills

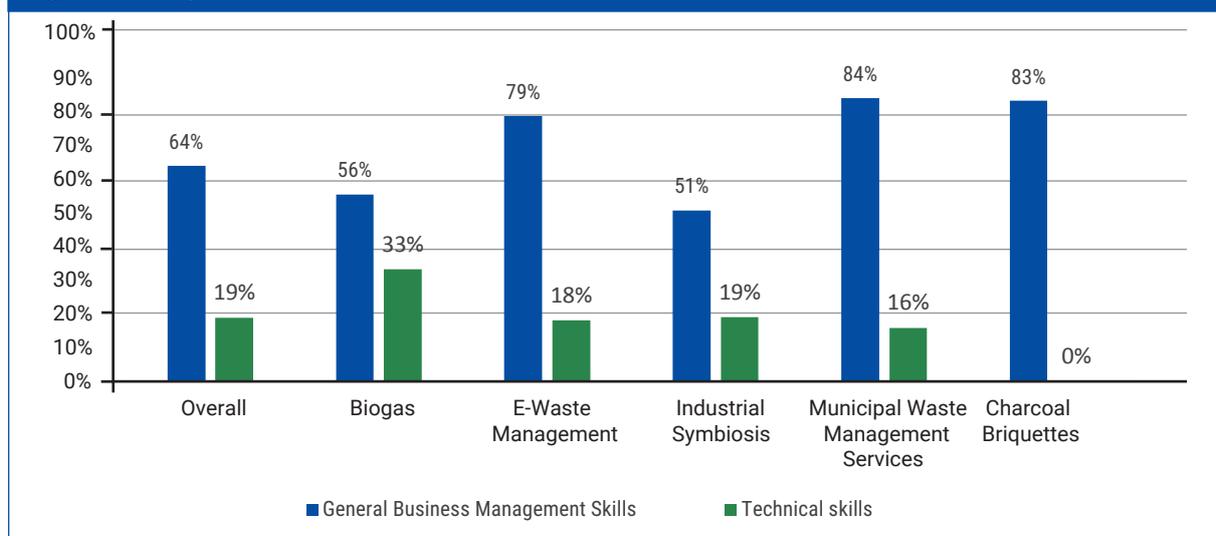
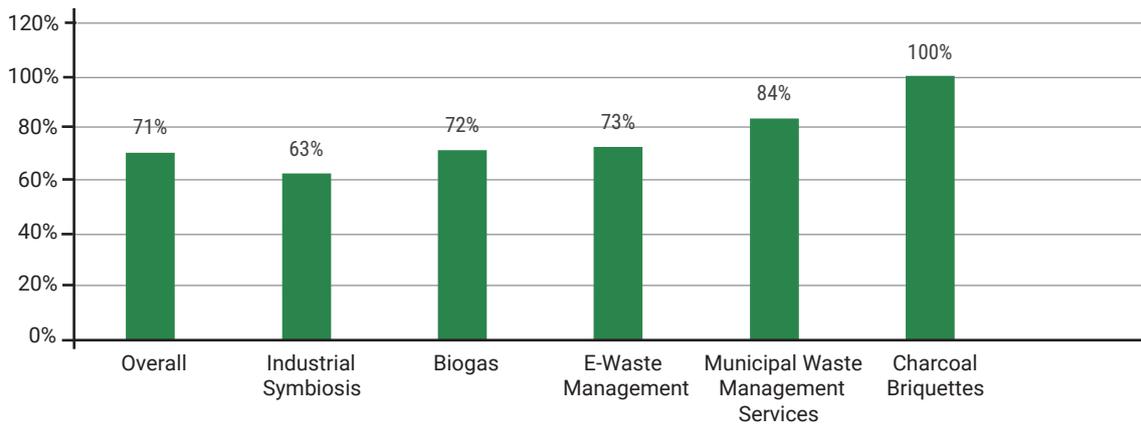




Figure 4.6: New business opportunities

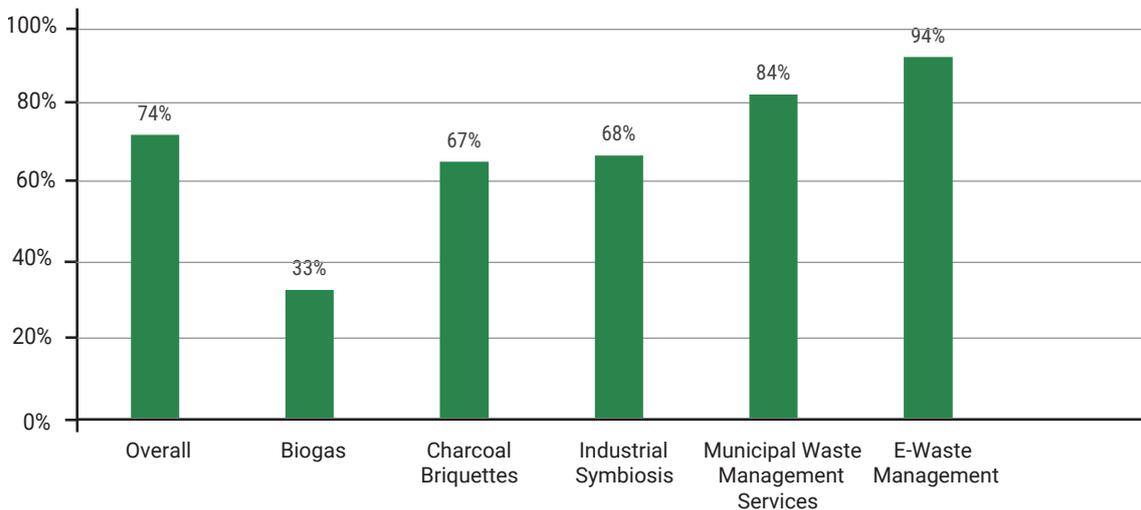


4.2.4 Change in sales

At the sector level, the sector's contribution to overall GDP is an aggregate indicator of the dynamism of the sector. Based on the SWITCH Africa Green survey data, we use sales as a proxy for the contribution of the MSMEs covered under the programme as a proxy for sector growth. According to the survey data, 74 per cent of the MSMEs reported increased sales during

the period of implementation of the SWITCH Africa Green programme. The improvement is largely attributed to improvement in production processes, improved marketing strategies, and better business processes. (Figure 4.5). At the subsector level, the percentage of firms reported increased sales ranges from 33 per cent in the biogas subsector to 94 per cent e-waste management.

Figure 4.7: Percentage of MSMEs reporting increased sales



Box 4.1: Turning rice husks from an environmental nuisance to a treasure

Upland Rice Millers (U)

Upland Rice Millers (U) Ltd was a beneficiary of the SWITCH Africa Green Industrial Symbiosis project in Uganda. The company had serious challenges in the management of its major by-product, rice husks. The Company implemented industrial symbiosis by procuring a new burner and drying unit that uses husks to dry paddy rice, purchased a new burner that also uses husks to replace the old burner which uses diesel, and synergies were created with other enterprises that started to use rice husks including Sugar and Allied Industries Ltd. Abacus Parenteral Drugs Limited and Tembo Steel.

Through synergies created with other companies, the company sold rice husks and generated additional annual revenue of up to USD 30,252 from rice husks waste.

The company used to use 2.240 litres of diesel per month, with the use of rice husks, the company realizes annual savings of USD 22,588 due to a shift from the use of diesel and potential savings in carbon dioxide emissions. The company has also generated an average added revenue of about USD 65,000 annually from the sale of rice bran.



“The large amounts of rice husks generated by our company has been converted to a resource by other companies by using these rice husks as fuel in the industrial boilers. This has led to an increase in income for our enterprise as we now save costs on fuel from using USD 16 per MW with diesel as compared to only USD 4 with the rice husks. The rice husks that were once an environmental nuisance to the community have been turned to treasure.”



4.2.5. Social results

4.2.5.1 Employment

The subsector analysis of employment data at the time of the survey is summarized in table 4.2. The data reveals that 17,103 employees were working in the surveyed enterprises. The percentage of youth engaged in the sector ranged from 25 per cent in municipal waste management to 44 per cent in e-waste management. The gender dimension of youth employment was not reported, but the data reveals that the sector is male-dominated, and there are relatively fewer youths engaged in the sector. The percentage of youth employment ranges from 25 per cent in municipal waste management to 44 per cent in e-waste management. However, on the gender dimension, more female workers are engaged in municipal waste management services. The percentage of employees who are female ranges from 10 per cent in e-waste

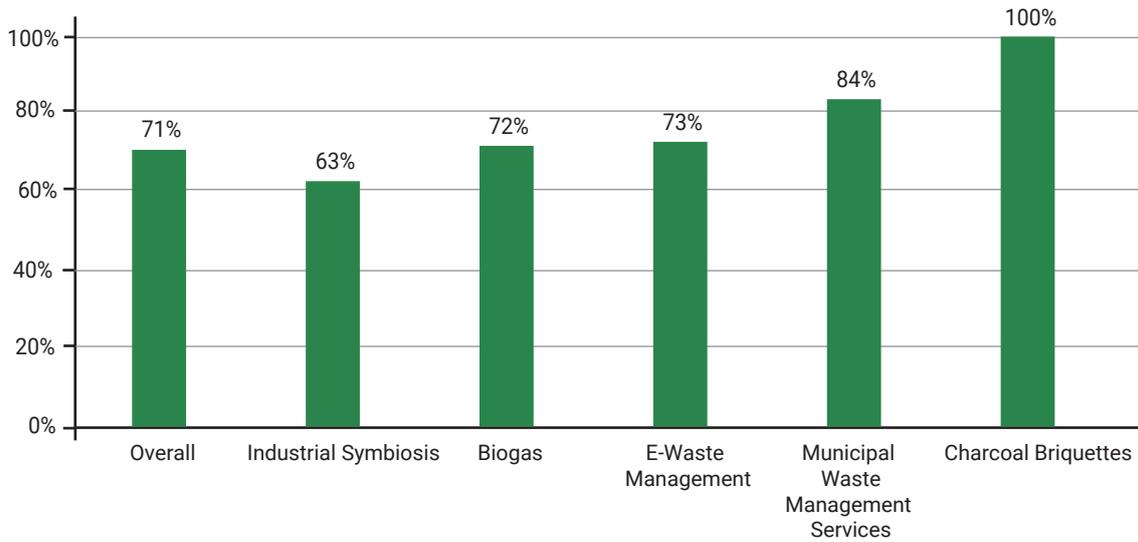
management to 78 per cent in municipal waste management (Table 4.2). The high proportion of female employees in waste management services is partly explained by the fact the project in Burkina Faso largely involved women groups, particularly in the municipality of Tangaye and Seguenega. In the municipality of Thambippillai, the project supported the establishment of a women's association for the preservation of the environment. Broadly, women and youth labor participation in the sector remains low. Most of the employment is concentrated in IS.

Sixty-eight per cent of the MSMEs reported that new jobs had been created during the period of the implementation of the SWITCH Africa Green programme. At the subsector level, the percentage of firms reporting that new jobs were created during the implementation of the programme ranges from 63 per cent in IS to 100 per cent in charcoal briquettes (Figure 4.8).

Table 4.2: Employment by sub-sector

Subsectors within IWM	FEMALE Employees	MALE Employees	YOUTH Employees
Biogas	43	179	167
E-Waste Management	121	1151	1011
Industrial Symbiosis	3020	5393	5302
Charcoal Briquettes	21	28	33
Municipal Waste Management Services	371	105	158
Total	3576	6856	6671
Percentage Gender and Youth Composition (% Sector total)			
Biogas	19%	81%	43%
E-Waste Management	10%	90%	44%
Industrial Symbiosis	36%	64%	39%
Charcoal Briquettes	43%	57%	40%
Municipal Waste Management Services	78%	22%	25%
Percentage Gender and Youth Composition (% total Female, % total Male, % total youth)			
Biogas	1%	3%	3%
E-Waste Management	3%	17%	15%
Industrial Symbiosis	84%	79%	79%
Charcoal Briquettes	1%	0%	0%
Municipal Waste Management Services	10%	2%	2%

Figure 4.8: Percentage of MSMEs reporting creation of new jobs



Source: SWITCH Africa Green Programme Survey Data

There were 2,683 new jobs created within the sector during the implementation of the programme. Sixty-three per cent or 1,696 new jobs were created in the IS subsector and 17.3 per cent in the e-waste management subsector (Figure 4.9).

4.2.5.2 Working conditions

The projects facilitated a shift to better working conditions in the surveyed MSMEs. Most of the surveyed enterprises implemented measures to

Figure 4.9: Distribution of new jobs by subsector

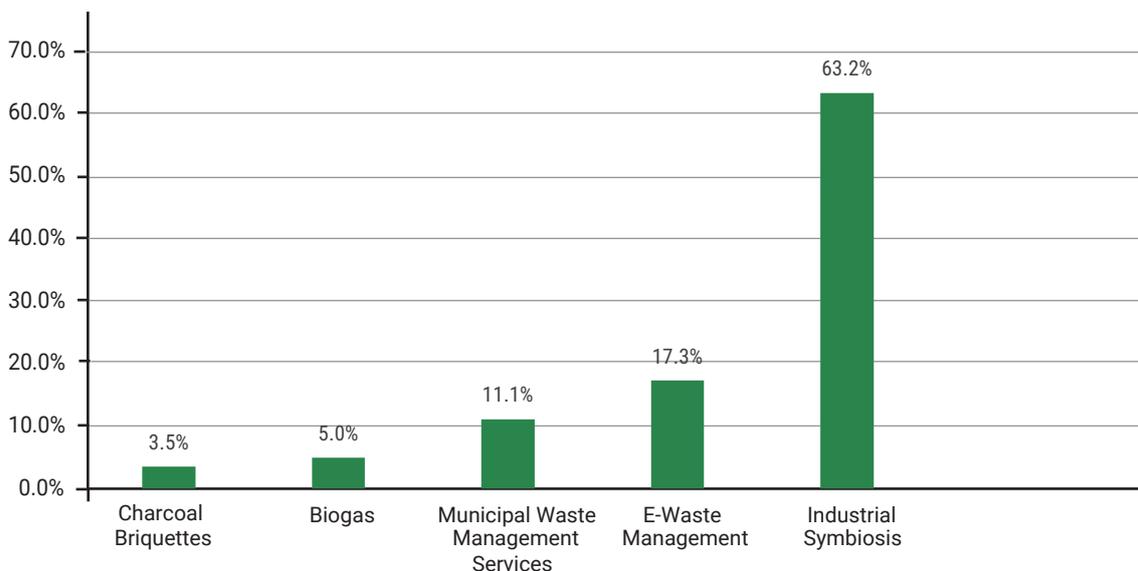
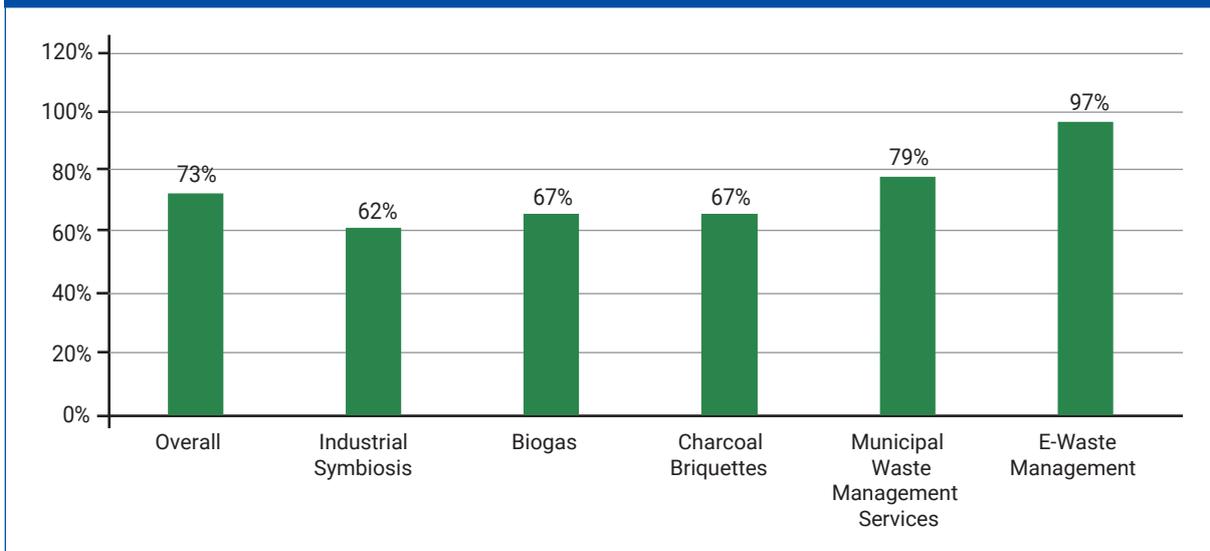




Figure 4.10: Improved working conditions



enhance safety at the workplace by use of PPE and procedures to protect workers from safety and health hazards. The PPE included safety boots, helmets, gloves, and goggles. Overall, 73 per cent of the surveyed enterprises reported having improved working conditions. The percentage of the enterprises reporting improved working conditions ranges from 62 per cent in IS to 97 per cent in e-waste management (Figure 4.10).

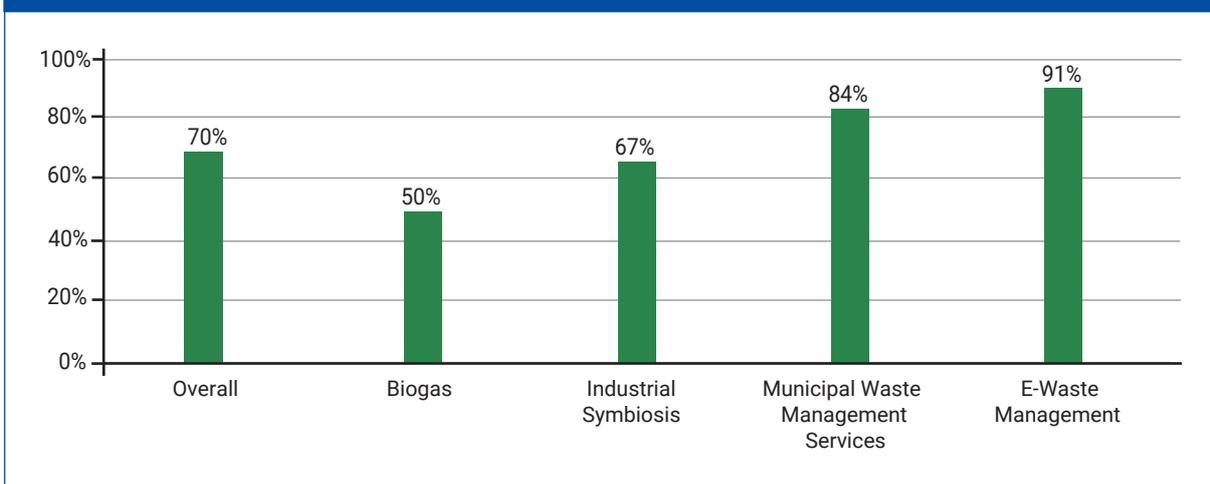
4.2.6 Environmental results

The decoupling of waste generation from economic growth is at the heart of the SCP interventions. There are various strategies

directed towards addressing this challenge, including 3R interventions, and other sustainable waste management approaches. The survey data reveals that the responding enterprises implemented various interventions including 3Rs, sale of waste, segregation at source, and better disposal. The data further reveals that 70 per cent of the MSMEs implemented 3R interventions, ranging from 50 per cent in the biogas subsector to 91 per cent in the e-waste management subsector (Figure 4.11).

At the project level, various environmental benefits of the SWITCH Africa Green programme are reported. The NEERE project in Burkina Faso was implemented in Koudougou and Dédougou and made important contributions to the cleaning

Figure 4.11: Implementation of 3Rs



of the environment in the two communes by removing 45 uncontrolled dumpsites and moving 3,000 tonnes of waste to designated landfills. This accounts for 32 per cent of the uncontrolled dumpsites. Part of the waste was also diverted to composting. The SWITCH Africa Green supported project TRADEMFA that was implemented in the three provinces of Burkina Faso (Yatenga, Loru, and Zondoma) also helped divert 3,700 tonnes of waste from dumpsites, of which 2,200 tonnes went to composting and recycling activities.

The e-waste management GEMOD project in Ghana contributed to the recycling of 20,000 tonnes of e-waste with the emerging economic activity benefiting directly and indirectly about 2,100 Ghanaians living in Accra. Before this initiative, burning e-waste to extract metals and illegal dumping was the norm and resulted in serious environmental pollution and clogging of drainage systems. The project also spearheaded the establishment of 25 main collection centres for e-waste aggregation and transport and

formation of three scrap dealers' associations (Figure 4.12).

Notably, through this initiative, the Government of Ghana commenced the building of an e-waste recycling plant at Agbogbloshie launched by President Akufo-Addo in October 2018. During the launch of the recycling plant, the president also announced that the government had passed the Hazardous and Electronic Waste Control and Management Act, Act 917 (2016), to provide the enabling policy environment for e-waste in Ghana.

The IS project in Mauritius also reported significant environmental benefits. The implementation of the project resulted in a diversion of 4,387 tons of waste from the landfill annually, equivalent to reducing the greenhouse gas emission by 92 tons of CO₂eq. Sixty-one per cent, or 2,677 tons of the waste diverted from landfills was used locally as raw materials thus displacing some of the virgin raw materials.

"We are hoping to train 100 youth in extracting and recycling useful components from a wide range of e-waste,"

said Gilbert Odjidja of Atlantis Recycle International Systems

Figure 4.12: E-waste recycling in Ghana



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5. Opportunities, challenges, and lessons learnt

The SWITCH Africa Green supported projects have facilitated the realization of multiple benefits for beneficiary enterprises including generation of monetary gain, job creation and contribution to reduced pollution. Through the survey, the enterprises identified various challenges that need to be addressed to increase the uptake of SCP practices. Also, during the regional sector meeting on IWM held on 11-12 June 2019, stakeholders discussed and validated the report, thereby providing additional information on the challenges, lessons, and opportunities in green manufacturing. The key challenges include the need for financial support, broad resource constraints, behavioral changes, marketing, a supportive policy environment, and the burden of compliance with SCP practices (Figure 5.1). These challenges are discussed below.

1. Financial challenges

Thirty-one per cent of the MSMEs indicated that they faced challenges in raising finances to implement the recommended interventions. Most of the MSMEs require financial support to enhance and upscale their operations. Some of the key areas identified include adequate working capital; funds for business expansion; acquisition of improved equipment and capital for material recovery and recycling; working space and storage facilities; and SEED capital to implement innovative ideas. Some of the MSMEs also expressed concerns about difficulties in accessing funding from financial institutions due to the high cost of borrowing.

4 List of participants is provided in Annex II

Figure 5.1: Challenges faced by MSMEs



2. Lack of resources

The second major challenge noted is the lack of resources. However, a closer examination of the issues raised indicates a diverse range of challenges. The recurrent issues include lack of electricity and or unstable power supply, transport logistics in transporting the waste, working material and machinery, inadequate tools, and limited equipment for production.

3. Sustainable trade and markets

The other challenges that were identified related to market access. The key marketing challenges related to lack or limited market for new products from waste, especially e-waste. It was also noted that the cost of biogas digesters is high, thus limiting demand, and the competitiveness of some products such as wastepaper, compost, and egg-trays is a challenge.

4. Behavioral change and awareness creation

The behavioural challenges that were noted relate to failure and or resistance by staff and management to embrace SCP practices. Compliance with SCP practices places an extra burden on MSMEs in such areas such as record keeping and acquiring PPEs. For instance, the issue of behavioural change as an impediment to sustainable waste management was noted during the implementation of the NEERE project in Burkina Faso. Difficulties were encountered related to dumpsite fitting largely as a result

of the NIMBY (not in my backyard) effect or *negative effects of awareness*. Residents of the Koudougou region were hesitant to accept the development of a landfill in their neighbourhood, despite the multiple approaches of the mayor. Another space was chosen, but again, it was met with the same resistance. Similarly, there is a need to raise awareness of the public on illegal dumping and littering and promote waste segregation.

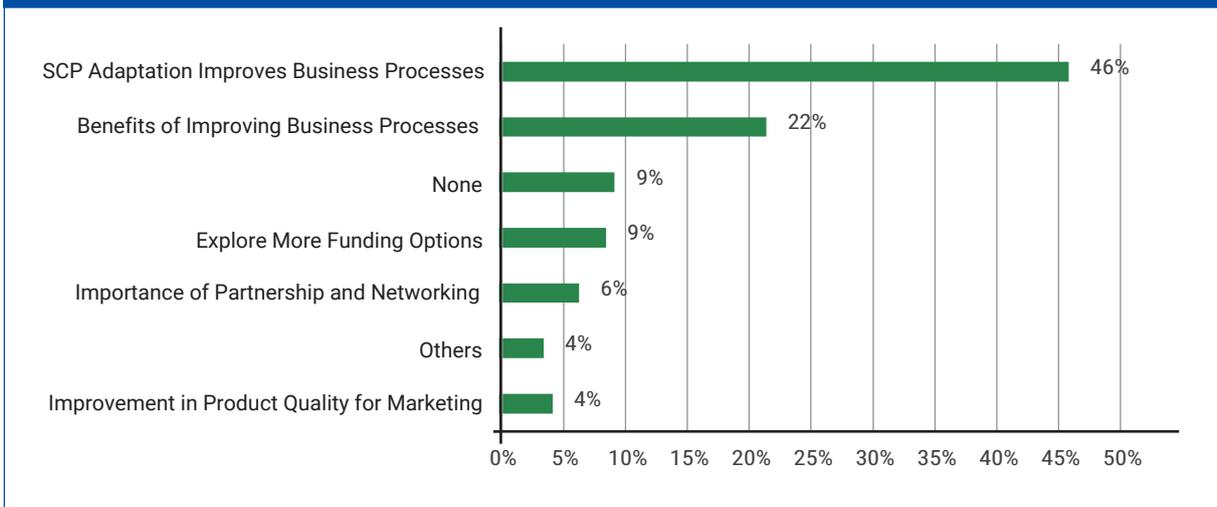
5. Business skills

During the implementation of the programme, it was noted that the majority of the MSMEs did not have basic business skills such as costing and pricing of the products, financial bookkeeping, record keeping, standards and certification, and marketing. This gap had to be incorporated into the programme. The improvement in business skills is clearly illustrated in the case of IS in Uganda where out of the 60 MSMEs which were assessed, 47 enterprises had no records on waste generated. However, out of the 47 MSMEs which were provided technical support, 31 enterprises initiated the process of record management for the generated wastes.

In addition to the above experiences, the one important lesson is that MSMEs appreciate the benefits and importance of adopting SCP practices and improved business processes, as shown in Figure 5.2. Forty-six per cent of MSMEs acknowledge the importance of adopting SCP practices for the improvement of their business.



Figure 5.2: Lessons learnt



Particularly, monitoring resource use, data collection, business planning, and exploring synergies in resource use leads to better decision making and improvement in business. Through the implementation of SWITCH Africa Green, many MSMEs now understand 'waste is a resource,' and not as a problem, and there is a need to develop a genuine entrepreneurial spirit to expand businesses and increase earnings. Application of IS, though a new concept, helps enterprises to grow while at the same time addressing environmental challenges.

Nine per cent of the MSMEs reported the need to explore more funding options to be able to purchase better equipment and tools to improve operations. It is noted that financial institutions are reluctant to lend to MSMEs working in the sector, and most of them lack the collateral for bank loans. The cost of borrowing is also considered to be high.





6. Conclusion and recommendations

The analysis of the SWITCH Africa Green programme results in the IWM sector reveals that the objectives of the programme were largely met. The implementation of the projects has contributed to monetary gains, job creation and contributed to reduced pollution. The results also indicate that the support provided through SWITCH Africa Green has set in motion processes and the required capabilities for long-term change in terms of decoupling and improved well-being. This is noted in improved awareness and capacity of staff and businesses in practices such as energy efficiency, water efficiency, waste minimization in production processes, better health and safety in the workplace, and record-keeping. The findings in this report provide a basis for the following set of recommendations.

A. Capacity building

The SWITCH Africa Green programme delivered training on various aspects of SCP practices and patterns. These have contributed to improved awareness and capacity to implement SCP practices at the MSMEs level. To ensure long-term and sustainable change and adoption of SCP practices, MSMEs require partners on the ground to continuously work with them to improve their practices and make them sustainable. Capacity building and knowledge sharing should be expanded to cover appropriate technologies and practices in alternative waste treatment and material recovery technologies.

Besides, there is a need to extend such training to government officials focusing on governance and the policy environment to support private sector development in the sector. Concepts such as IS and CE are relatively new, yet they offer opportunities for enterprise development while providing environmental benefits.

B. Partnerships and collaboration

The SWITCH Africa Green programme experience from Ghana and Burkina Faso suggests that partnerships between the government, private sector, civil society, academia and development partners could provide positive benefits in waste management services, policy, legal and regulatory environment.

C. Public education and awareness

Public attitude and awareness on waste management regarding open dumping, littering and waste segregation needs to be improved. As the Burkina Faso case suggests, active involvement and support of community-based organisations in waste management could have positive benefits.

D. Markets and trade

MSMEs have expressed challenges in terms of market access and competitiveness of green products. There is a need to build an appreciation for green products by consumers (both public and private consumers). Support for developing sustainable public procurement policies and raising greater awareness of sustainable products. Develop and support initiatives that link MSMEs to markets for their products, improve the quality of recyclable products, including providing appropriate fiscal incentives.

E. Institutional capacity for policy implementation

A review of the policy and legal environment reveals that there are policy implementation deficiencies characterized by gaps between legal and institutional mandates and what is in practice; that is, the functional difference between a de jure institutional framework and de facto practices. This aspect is reflected in policies and regulations that are not implemented or enforced and or institutions that are not able to deliver on their functional mandate. There is, therefore, a need for institutional capacity building for agencies involved in waste management. There is scope to support women and youth labour participation in the sector.

Also, IS has been identified as an important tool to support a transition to a CE. There is a need to support African countries to develop an appropriate policy framework to support the transition.

F. Financial support

MSMEs face challenges in accessing finance due to a lack of collateral and high cost of borrowing. Consequently, green financing mechanisms are needed for small enterprises, including support for MSMEs to help them develop sustainable business models and bankable proposals for implementing identified green options in their enterprises.

G. A regional platform on CE

A transition to a CE offers opportunities to address climate change, variability, and environmental degradation. A regional platform to facilitate policy dialogue among stakeholders and information sharing on good practices and experiences on the transition to CE should be established to support efforts towards a transition building on existing development activities.

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8. ANNEX I: SWITCH Africa Green interventions

Industrial symbiosis interventions and results

SWITCH Africa Green Strategic Interventions	Outputs	Outcomes
Mapping of MSMEs for IS Implementation	<ul style="list-style-type: none"> 698 MSMEs mapped (140 in Burkina Faso, 120 in Ghana, 132 in Kenya, 100 in Mauritius, 95 in South Africa and 111 in Uganda) The target of 100 MSMEs mapped in each country 137 IS opportunities identified (33 in Burkina Faso, 27 in Ghana, 11 in Kenya, 18 in Mauritius, 32 in South Africa, and 16 in Uganda). Detailed IS assessments carried in 60 selected enterprises 	<ul style="list-style-type: none"> 1,696 new jobs created 73% of the MSMEs reported increased sales (business processes, marketing strategies, product quality, and production processes). 90% of MSMEs reported improved skills (production, resource management, business management, and technical skills) 63% of the MSMEs reported improved health and safety at work (40% use of PPE, 2% reduced accident, and 21% 45 industrial symbiotic synergies have been implemented in Uganda. Adoption of various SCP practices such as record-keeping for the generated waste, improved housekeeping/management for the waste generated, designing of point source measures to eliminate waste at source and recycling in MSMEs where IS synergies were implemented. 31 out of 47 MSMEs which had previously no records on waste had embraced record management for waste generated.
Capacity building	<ul style="list-style-type: none"> Total 585 MSMEs trained (101 in Burkina Faso, 100 in Ghana), 110 in Kenya, 40 in Mauritius, 100 in South Africa, and 124 in Uganda). 18 staff trained on IS (3 each from Burkina Faso, Kenya, Mauritius & South Africa; 4 from Ghana National Cleaner Production Centre (GNCP) and 2 from Uganda Cleaner Production Centre (UCPC). Development of IS Workbook and used it for training the ToT. Technical support offered to 46 enterprises to foster implementation of industrial symbiotic synergies. Technical evaluations conducted in 32 MSMEs 	
Knowledge and information resources	<ul style="list-style-type: none"> 3 Knowledge sharing forum (KSF). Business administration toolkit Green business toolkit Resource efficiency toolkit, M & E toolkit 	
Fostering Market Linkages.	<ul style="list-style-type: none"> Creation of an IS page within the Roundtable's website. Involvement of formalization associations 	

E-Waste Interventions and Results

SWITCH Africa Green Strategic Interventions	Outputs	Outcomes
Awareness creation	<ul style="list-style-type: none"> Profiling of 122 MSMEs in the e-waste subsector. 	<ul style="list-style-type: none"> 463 new jobs created 62.5% of the MSMEs reported improvements in business processes, 21.9% of the MSMEs reported improvements in production processes, 3.13% of the MSMEs reported an increase in sales and profits and 12.50% of the MSMEs reported improvements in resource management 94% of the MSMEs in the sector reported an increase in the sales (due to improved business processes, marketing strategies, and production process) 94% of the MSMEs reported improved skills (production, resource management, business management, and technical skills) 100% of the MSMEs reported improved health and safety at work (81% use of PPE and 19% reduced health hazards)
Capacity building	<ul style="list-style-type: none"> Trained 240 technicians (repairers and refurbishers), collectors on dismantling and sorting e-waste for the local and export market. 	
Business support	<ul style="list-style-type: none"> 6 MSMEs applied for an environmental permit. 3 environmental permits issued. 25 MSMEs at various stages of the permit application. Registration of over 200 institutions, corporations, local scavengers for e-waste collection 	
Networking	<ul style="list-style-type: none"> Formalization of Scrap Dealers Associations establishment of Eco-BPC office 	

Waste to Compost: Interventions and Results

SWITCH Africa Green Strategic Intervention	Outputs	Outcomes
Awareness creation	<ul style="list-style-type: none"> 1,980 households and shops were sensitized 150,000 people were sensitized 19 municipalities were sensitized on the recovery of household waste 3 fora (2 provisional and one regional) 1,667 gadgets were used in the creation of awareness through audiovisual media 	<ul style="list-style-type: none"> 3,700 tons of waste were collected, 1,500 through waste management promotion activities and 2,200 through composting and recycling activities in the 19 communes. Improved awareness of sustainable waste management practices Improved capacity of enterprises in waste management services
Capacity building	<ul style="list-style-type: none"> More than 1,000 people participated directly in the communal workshops 20 internships were offered Two five-day training sessions helped in building the capacity of 129 actors in composting 38 micro-entrepreneurs were retrained on the sorting of non-biodegradable waste 2 training sessions on the recovery of household waste 3 MSME's trained in business management 3 public conferences were organized for financial institutions, authorities, and populations 55 micro-entrepreneurs have benefitted from technical support on composting 	
Business Networking	<ul style="list-style-type: none"> 92 exporters and processors were identified 62 exporters and processors networked 	



Promoting biogas technologies: interventions and results

Intervention	Outputs	Outcomes
Knowledge/information resources	Training manuals <ul style="list-style-type: none"> • Business administration toolkit • Green business toolkit • Resource efficiency toolkit 	<ul style="list-style-type: none"> • 133 new jobs created • 89 per cent of MSMEs reported improved staff capacity • 50 per cent of the firms reported a reduction in costs of production which is attributed to efficient resource use, capacity building, and local sourcing of materials • 83 per cent of the MSMEs reported emergent new business arising from business expansion, new technology, and new products • 78% of the MSMEs reported uptake of the production interventions. Improvement in the efficiency of resource use and business process played significant roles according to 50% of the MSMEs.
Capacity building	<ul style="list-style-type: none"> • Trained 101 artisans/engineers in construction of bio-digesters • Registered 34 individuals and 19 companies in the construction of biogas plant • Public-private partnerships between MMDAs and private sector Formation of Biogas Association of Ghana as umbrella advocacy and not for a profit-making organization 	
Enhanced business networking and market linkages		
Eco-enterprise incubation	<ul style="list-style-type: none"> • The project led to the construction of 2 demonstration digesters at IES of Environment Protection Agency (EPA), GNCPC office and 1 septic tank to a bio-digester. • Construction of 10 bio-digesters in seven senior high schools in the GAMA 	

Charcoal briquettes: interventions and results

SWITCH Africa Green Interventions	Outputs	Outcomes
Capacity building	<ul style="list-style-type: none"> • 4 hands-on charcoal briquette making training sessions • 23 stakeholders were trained on charcoal briquette char crushers • 2 training sessions were conducted on charcoal briquette carboniser fabrication. A total of 32 participants attended the fabrication training. • 22 participants were trained on using fabricating charcoal briquette pressing machine • 33 MSMEs and community 22 participants were trained on using fabricating charcoal briquette pressing machine 	<ul style="list-style-type: none"> • 93 new jobs created • 25 % of trainees have fabricated carboniser equipment • 5 of the 6 MSMEs reported increased staff capacity • 5 of the 6 MSMEs reported improved business skills in general business management and marketing • 5 of the 6 MSMEs reported reduced costs of production attributed to efficient resource use and capacity building • All the MSMEs reported emergent new business arising from business expansion, new technology, and new products
Awareness creation	<ul style="list-style-type: none"> • 179 participants were trained in various aspects of charcoal briquettes, including sensitization workshops and project inception • Conducted awareness creation meeting at Shema, Western Uganda hosted by ecofriendly briquette producers • Conducted 4 awareness community meetings in central and western Uganda • Two radio adverts at Kiruhura District on Radio 5 • Three radio adverts in Mbarara at Radio Endigyito • Conducted 4 awareness community meetings in central and western Uganda. 	

Municipal waste management services: interventions and results

Intervention	Output	Outcomes
Knowledge/information resources	<ul style="list-style-type: none"> Two toolkits (business administration and resource efficiency M&E) 	<ul style="list-style-type: none"> Creation of 297 new jobs Turnover increase of 150% was recorded for MSME's 45 dumpsites were removed, and 3700 tons of waste was transferred to the landfills 85% of the MSMEs reported improved health and safety at work (54% use of PPE, 8% increase in employee and 23% reduced health hazards) 100% of the MSMEs reported improved skills (38% production, resource and 62% technical skills) 100% of the MSMEs reported the creation of new job opportunities in the subsector 85% of the MSMEs reported increased sales (38% business processes, a 15% increase in sales, 31% introduction of new products) 23% of the MSMEs reported improvements in business processes, 46% of the MSMEs reported improvements in production processes and 31% of the MSMEs reported an increase in sales and profits
Capacity building	<ul style="list-style-type: none"> Training of 10 primary school teachers by the NEERE project team on waste sorting from 9th to 15th March 2018 38 training sessions were conducted on various topics such as good practices in waste management, marketing, communication for development and management 	
Awareness creation and Sensitization	<ul style="list-style-type: none"> 5 awareness events on chemical waste 3,200 household and 430 producers were reached on matters of sanitation, collection, and recovery of household waste and the reduction of chemicals 3000 pupils and 70 teachers of 10 primary schools were sensitized on sanitation matters 	
Networking and Collaboration with other partners	<ul style="list-style-type: none"> Presentation on NEERE at National Green Economy Academy Conference 	
Business Support Services	<ul style="list-style-type: none"> Unit of waste collection set up in the commune of Ouarkoye 12 MSMEs trained on toolkits 	

Annex II: List of participants				
SWITCH Africa Green Regional Sector Meeting on Integrated Waste Management				
11 - 12 June 2019,				
Accra, Ghana				
No.	NAME	COUNTRY	DESIGNATION	ORGANIZATION
1	Jens Norgard	Belgium	SWITCH to Green Facility	European Commission
2	Dr. Shepherd Muchuru	Botswana	Programme Officer, Environment and Climate Change	Southern African Development Community (SADC) Secretariat
3	Zenabou Segda	Burkina Faso	President	Women Environmental Programme Burkina
4	Innocent Souguilimpo Tankoano	Burkina Faso	Project officer	Fondation 2IE
5	Karim Lomboza Konde	Burkina Faso	Mayor	Municipality of Dédougou
6	Becquet Polycarpe Bationo	Burkina Faso	Director of Promotion of Entrepreneurship and Green Investments	Ministry of the Environment, Green Economy and Climate Change
7	Pamoussa Ouedraogo	Burkina Faso	General Director, Green Economy	Directorate of Green Economy and Climate change (DGEVCC)
8	Albert Compaore	Burkina Faso	National Coordinator	SWITCH Africa Green Programme
9	Hamidou Oouily	Burkina Faso	Member	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
10	Sévérin Tora	Burkina Faso	Program Director	Christian Relief and Development Organization (CREDO)
11	Simone Zoundi	Burkina Faso	General Manager	SODEPAL
12	Sayouba Guiro	Burkina Faso	President	Bayiri Malguéré Zamana Association (ABMZ)
13	Sibiri Judicael Noel Zongo	Burkina Faso	Director	Sahelia Solar
14	Georgette Benao	Burkina Faso	Chair lady	Wend Waoga association
15	Illassa Ouedraogo	Burkina Faso	Member	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
16	Odile Ouedraogo	Burkina Faso	Member	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
17	Guo Tingzheng	China	Director	Department of Energy Conservation and Resources Utilisation, Ministry of Industry and Information Technology
18	Misgana Elias Kallore	Ethiopia	National Coordinator, SWITCH Africa Green programme	UNEP Liaison office in Addis Ababa, Ethiopia
19	Shiferaw Negash Bira	Ethiopia	Director General for Environment and Social Impact Assessment	Environment, Forest and Climate Change Commission

No.	Name	Country	Designation	Organisation
20	Girma Gemechu Kenne	Ethiopia	Director, Solid and Hazardous Waste Compliance	Environment, Forest and Climate Change Commission
21	Susana Martins	Ghana	International Aid/Cooperation/ Communications Officer	EU Delegation in Ghana
22	Kingsley Bekoe Ansah	Ghana	National Coordinator, SWITCH Africa Green programme	United Nations Development Programme (UNDP) Ghana
23	Precious Chineyenwa Okoro Onu	Ghana	NGO-Waste Management	Novsiac Expression
24	Wilhelmina Quaye	Ghana	Director	CSIR-STEPRI, Ghana
25	Rosemond Boohene	Ghana	Lecturer	University of Cape Coast
26	Hiroto Kondo	Ghana	Assistant Resident Representative	JICA Ghana Office
27	Prince Bio	Ghana	Local Technical Coordinator	JICA Ghana Office
28	Daniel Digber	Ghana	Senior Programme Officer	Ghana National Cleaner Production Center
29	Letitia Nyaaba	Ghana	Principal Programme Officer	Environmental Protection Agency
30	Lambert Faabeluon	Ghana	Ag. Director	National Cleaner Production Centre (NCPC)
31	Selina Amoah	Ghana	Green Economy Coordinator	Environmental Protection Agency
32	Seth Mawu Agbeve	Ghana	Deputy Director, Renewable Energy	Ministry of Energy;
33	Pwamang John	Ghana	Executive Director	Environmental Protection Agency
34	Ing.Solomon Nuetey Noi-Adzeman	Ghana	Director	WMD Accra Metropolitan Assembly
35	Al-Zakaria Foroco Saeed	Ghana	Regulator	MID Environmental Protection Agency
36	Joy Hesse Ankomah	Ghana	Senior Programme officer	BE Environmental protection Agency
37	Maximillian Acquah	Ghana	Assistant Programme Officer	Ghana National Cleaner Production Center
38	Rose Bentsil-Quaye	Ghana	Senior Planning Officer	Ministry of Planning
39	Patrick Wilber Tsigbey	Ghana	Environmental Health Officer	Ashaiman Municipal Assembly
40	Dr. Yahaya Yakubu	Ghana	General Manager (Operations/ Research)	Zoomlion Ghana Limited

No.	Name	Country	Designation	Organisation
41	George Annan	Ghana	Chief Executive Officer	Fiberwealth Limited
42	John Afari Idan	Ghana	Chief Executive Officer	Biogas Technologies Africa Limited
43	John Dziworu	Ghana	Corporate Affairs Manager	Shinefield Ghana Limited
44	Joshua Amenorfe	Ghana	Executive Secretary	Biogas Association of Ghana
45	Kennedy Buabeng-Ampofo	Ghana	Executive Director/CEO	Bakplus Ghana Limited
46	Kwabena Jeffrey Yeboah	Ghana	Entrepreneur/Student	University of Ghana
47	Liberty Nana Ama Adobea	Ghana	Chief Executive Officer	Liberty Waste Limited
48	Matilda Payne	Ghana	Founder	MH COUTURE
49	Michael Olusegun Olusanya	Ghana	Founder	Greenway International Foundation
50	Ama Ofori-Antwi	Ghana	Executive Secretary	Environmental Service Providers Association
51	Richard Boateng	Ghana	Chief Executive Officer	Lifestyle Creations
52	Vivian Ahiayibor	Ghana	Managing Director	City Waste
53	Young Joo Lee	Ghana	Managing Director	L & G Plastics
54	Raymond Okrofu Ategbi	Ghana	Board Member	Safisana Enterprise
55	Charles Boateng	Ghana	Deputy Head of Public Sector	Zenith bank
56	Carolyn Cheron Kilel	Kenya	Programme Management Assistant	United Nations Environment Programme (UNEP)
57	Dickson Khainga	Kenya	Consultant	United Nations Environment Programme (UNEP)
58	Eric Guantai	Kenya	Founder and CEO	Recykla International
59	Hezekiah Bunde Okeyo	Kenya	Director of Industries	Ministry of Industrialization, Trade and Enterprise Development
60	Irene Kamunge	Kenya	Director Legal Services	National Environment Management Authority (NEMA)
61	Isaiah Maina	Kenya	Environmental Education and Awareness officer	Ministry of Environment and Forestry
62	Jacob Mithamo	Kenya	Director	Palm Prints

No.	Name	Country	Designation	Organisation
63	Kamala Ernest	Kenya	Programme Management Officer	United Nations Environment Programme (UNEP)
64	Lily Murei	Kenya	National Coordinator SWITCH Africa Green programme	United Nations Development Programme (UNDP) Kenya
65	Mercy Gatobu	Kenya	Project Support Associate	United Nations Office for Project Services (UNOPS)
66	Norah Mugita	Kenya	Legal Associate	United Nations Environment Programme (UNEP)
67	Patrick Mwesigye	Kenya	Regional Sub-Programme Coordinator Resource Efficiency and SCP	United Nations Environment Programme (UNEP)
68	Peter Ohon	Kenya	Technical Officer	African Roundtable on Sustainable Consumption and Production (ARSCP)
69	Rhoda Wachira	Kenya	Programme Management Officer	United Nations Environment Programme (UNEP)
70	Robert Wabunoha	Kenya	Regional Sub-Programme Coordinator Environmental Governance	United Nations Environment Programme (UNEP)
71	Steve Nyamori	Kenya	Deputy Director	Kenya National Cleaner Production Center (KNPCPC)
72	Timothy Kiogora	Kenya	Director	Environment, Energy and Natural resources, Nakuru County
73	Dhanita Ramdharee	Mauritius	Assistant Permanent Secretary, Solid Waste Management Division	Ministry of Environment, Solid Waste Management and Climate Change
74	Jaykrishna Lobin	Mauritius	Chief Health Inspector	District Council of Moka, Ministry of Local Government
75	Ruben Pillay Munien	Mauritius	Chief Health Inspector,	Grand Port District Council
76	Deoduth Somna	Mauritius	Director	Soge Intl Company Ltd.
77	Shreedanand Cullychurn	Mauritius	Director	Pallet World
78	Marie Lourdes Raphael Robertson	Mauritius	Project Manager	Commission for Environment, Rodrigues Regional Assembly
79	Percy C. Onianwa	Nigeria	Executive Director	Basel Convention Coordinating Centre for training & Technology and Hazardous waste management University of Ibadan Ibadan, Oyo State
80	Bernard Yao Koffi	Nigeria	Head Division Environment and Climate Change	Economic Community of West African States (ECOWAS).
81	Oluwabukola Adeyemo	Nigeria	Head Legal & Advisory Services	Lagos Waste Management Authority (LAWMA)
82	Steven Niyonzima	Rwanda	National Coordinator	Rwanda Resource Efficient and Cleaner Production Centre

No.	Name	Country	Designation	Organisation
83	Elizabeth Mamonyama Ntoyi	South Africa	Assistant Director	Department of Environment, Forestry and Fisheries
84	Tshepo Mazibuko	South Africa	Managing Director	K1 recycling
85	Robert Hamwey	Switzerland	Economic Affairs Officer	United Nations Conference on Trade and Development (UNCTAD)
86	Silver Ssebagala	Uganda	Director	Uganda Cleaner Production Center
87	Prosie Hope Kikaabi Nakawuki	Uganda	NTCC	Uganda Investment Authority
88	Teddy Twine Nsubuga	Uganda	National Coordinator SWITCH Africa Green Programme	United Nations Development Programme (UNDP) Uganda
89	Richard Mugambwa Mukasa	Uganda	Project Manager	National Environment Management Authority (NEMA)
90	Kime Godfrey Kabbyanga Baluku	Uganda	Mayor	Kasese District Local Government
91	Christopher Kato	Uganda	Biogas expert	Uganda National Alliance on Clean Cooking (UNACC)
92	Phillip Idro	Uganda	Chief Executive Officer	Upland Rice Ltd
93	Prof. Sarah Feresu	Zimbabwe	Lecturer	Institute of Environmental Studies, University of Harare



Sustainable Tourism



Sustainable Agriculture



Green Manufacturing

United Nations Environment Programme (UNEP)

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