

Integrated Waste Management in Africa

Focus on Circularity





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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 |
| GNPCPC | 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 | | ✓ | ✓ | ✓ |

OCS-F 家用型直视式电子吊秤



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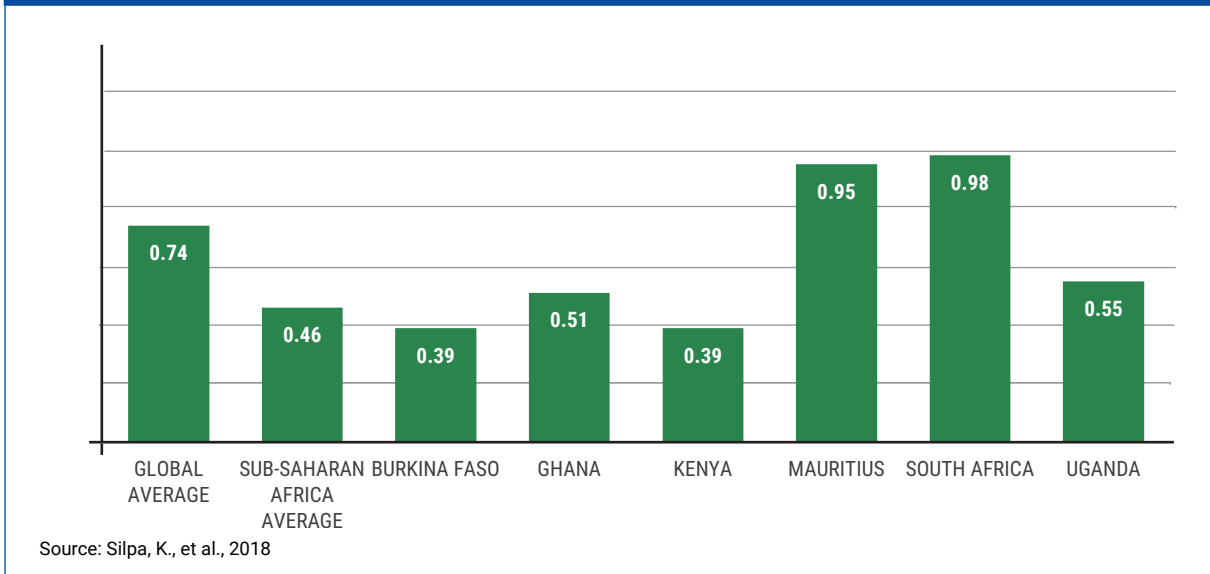
2. Sector context

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

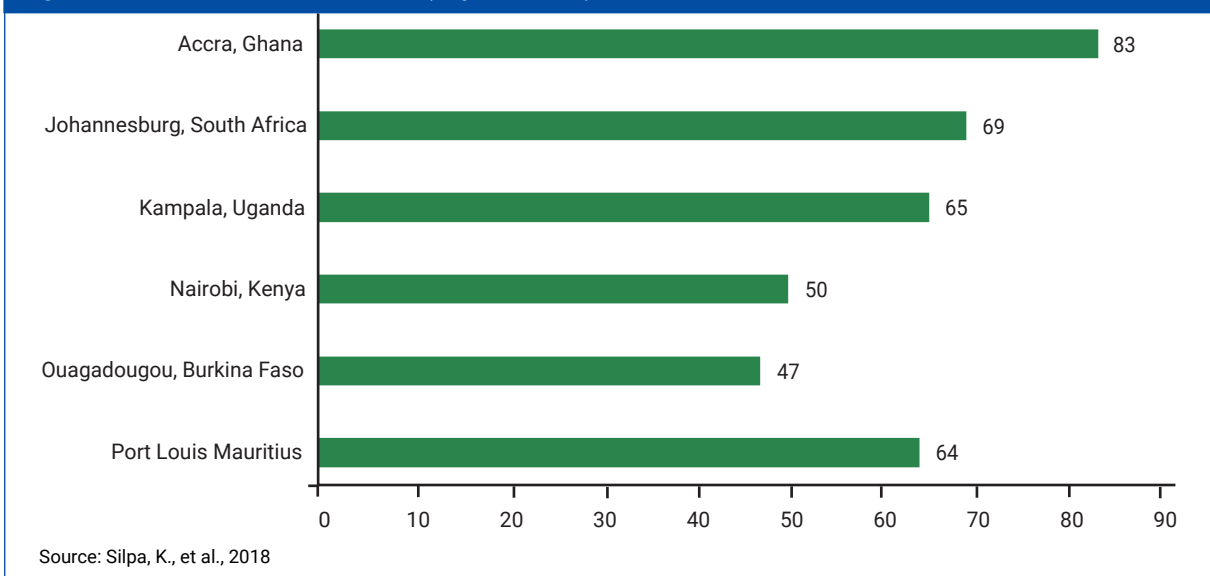


and marine litter for coastal countries (Silpa, K et al., 2018; UNEP, 2018). According to the Global e-waste Monitor 2017, e-waste is among the fastest-growing streams of waste. Global e-waste generation stood at 44.7 million metric tonnes and is forecast to increase to 52.2 million metric tonnes by 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).

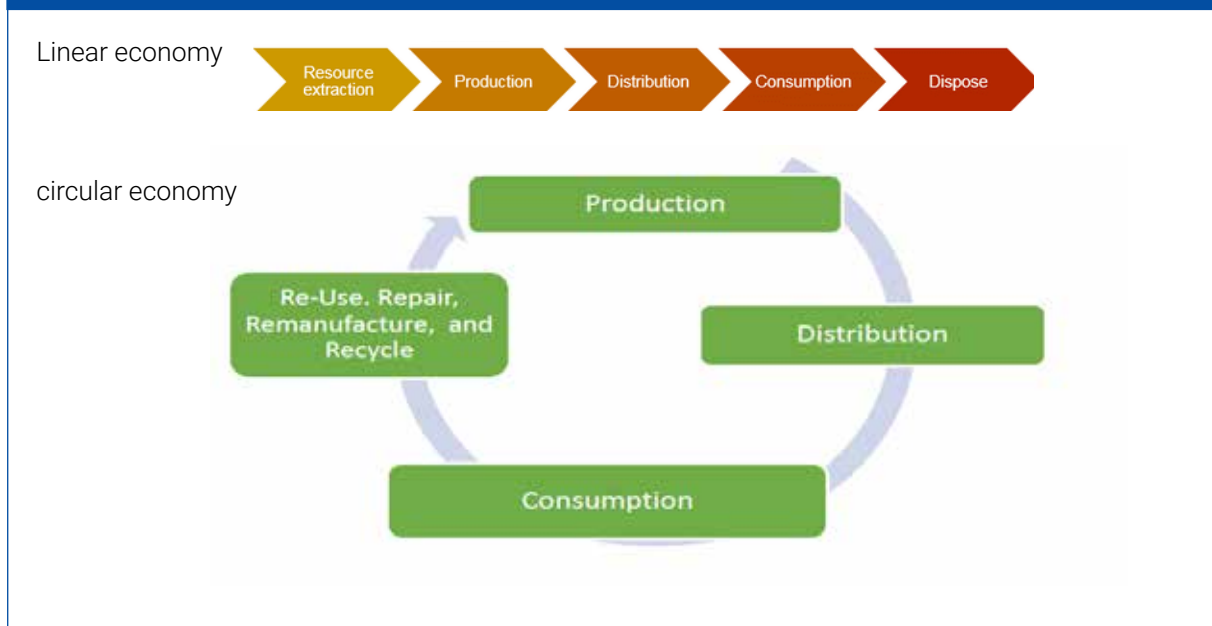
2.1 CE and Green Investments

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.







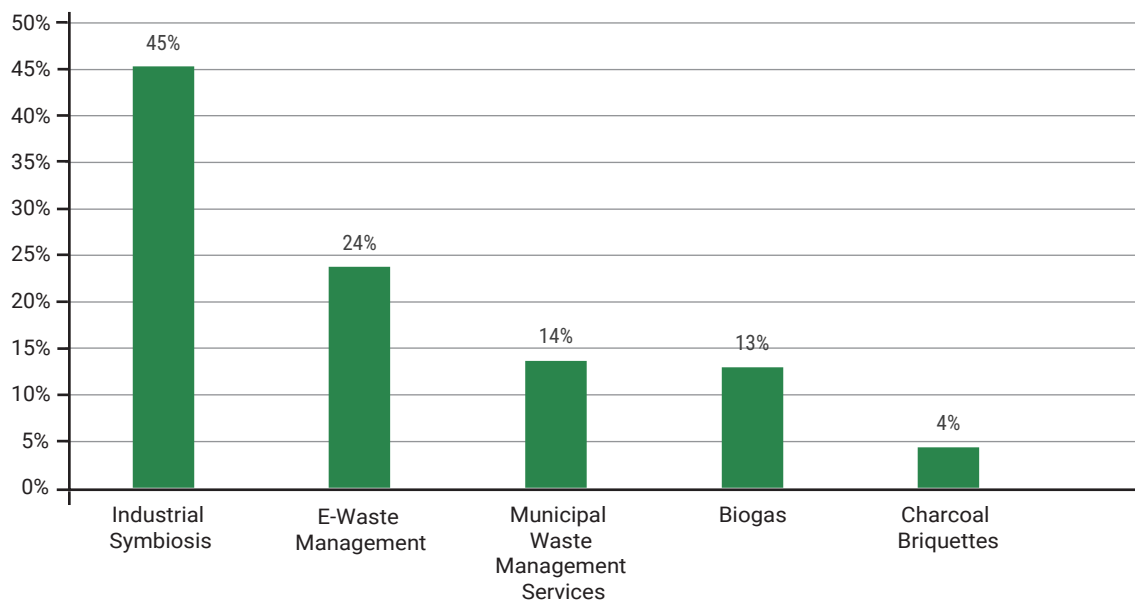
3. Methodological framework

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



Source: SWITCH Africa Green Programme Survey Data

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.

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% |



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

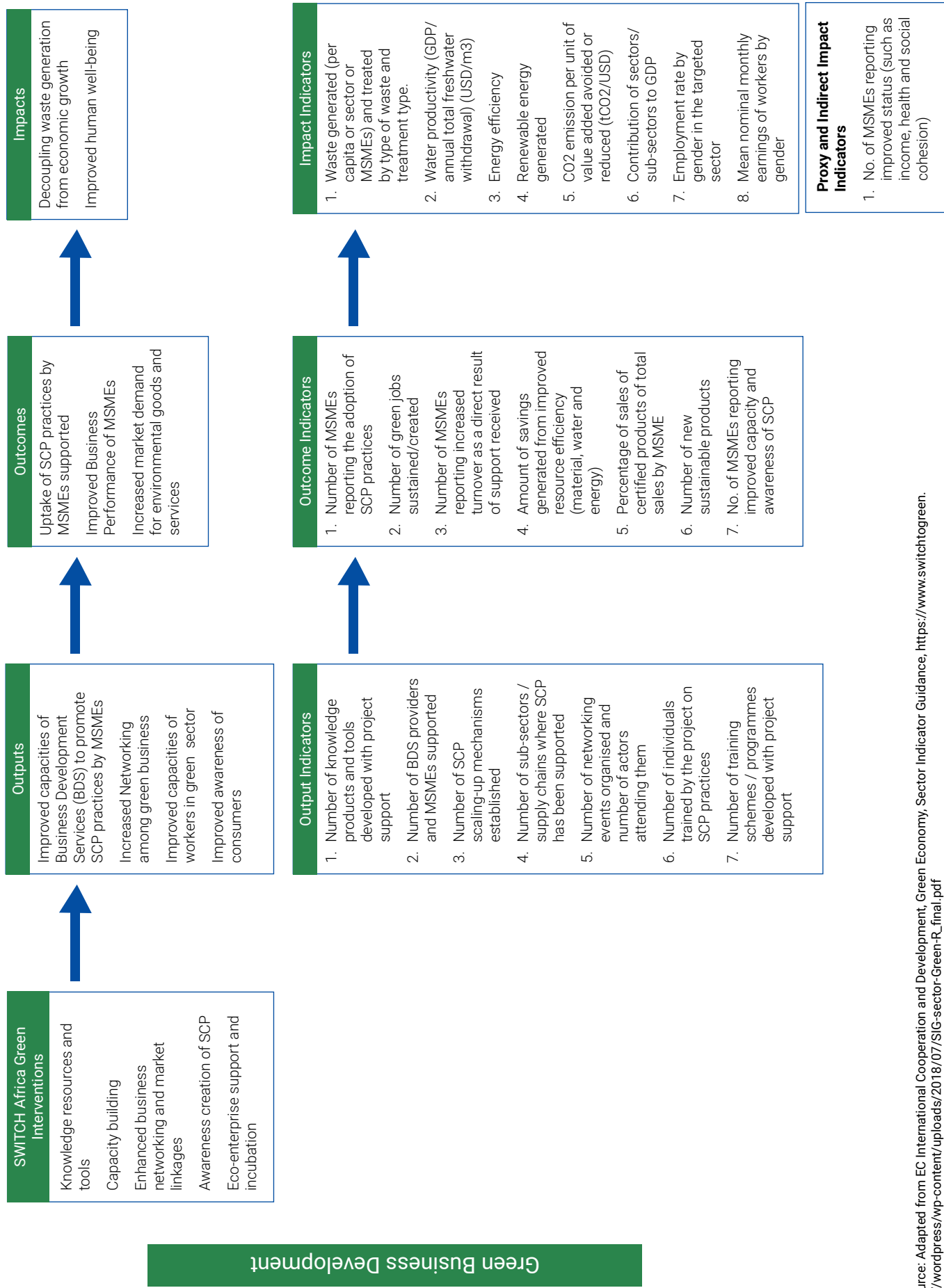
The results indicators in Figure 3.2 are presented at three levels, namely, outputs, outcomes, and impact. The impact refers to the goal that the programme aims to achieve, namely, decouple growth from waste generation and adverse environmental effects, and contribute to improved human wellbeing. The 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 EC International Cooperation and Development, Green Economy, Sector Indicator Guidance, https://www.switchofgreen.eu/wordpress/wp-content/uploads/2018/07/SIG-sector-Green-R_final.pdf







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

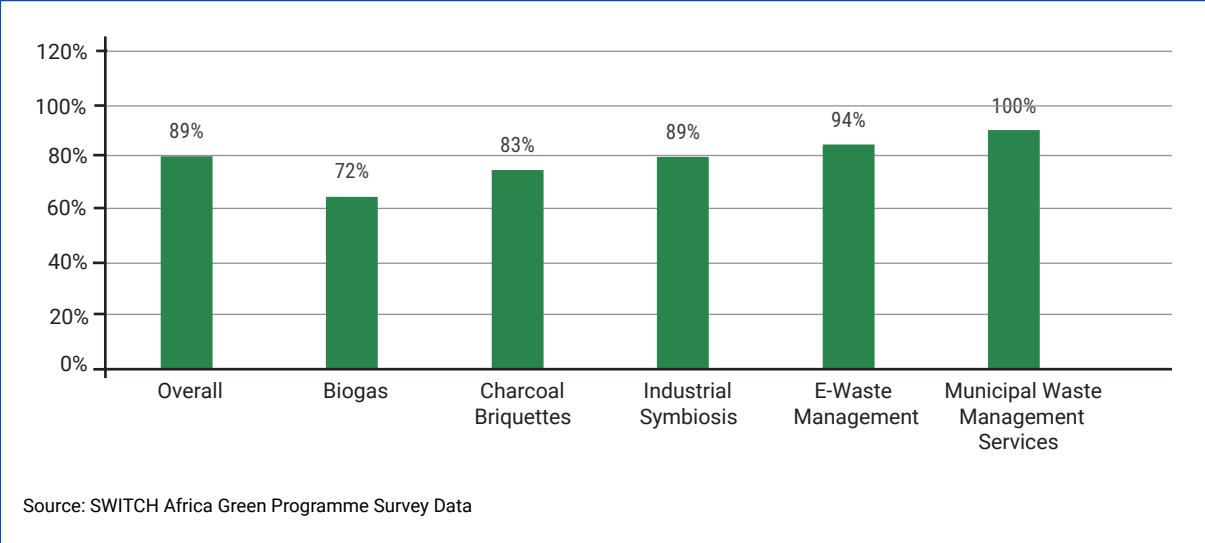
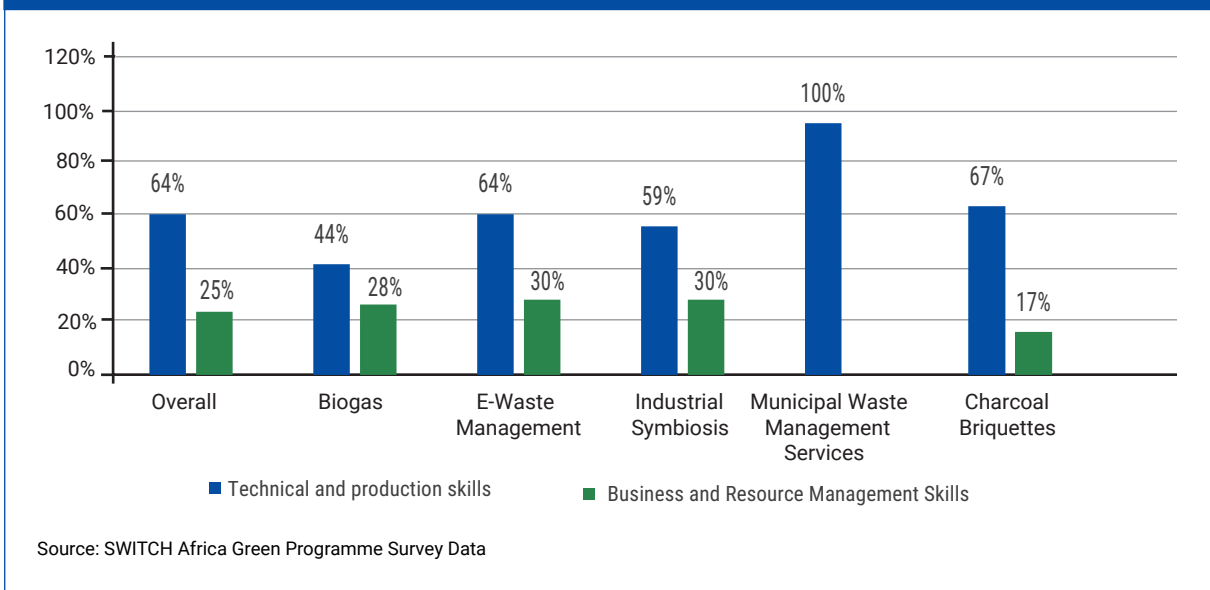


Figure 4.4: Improved staff capacity at the subsector level (% of MSMEs)



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 reported 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

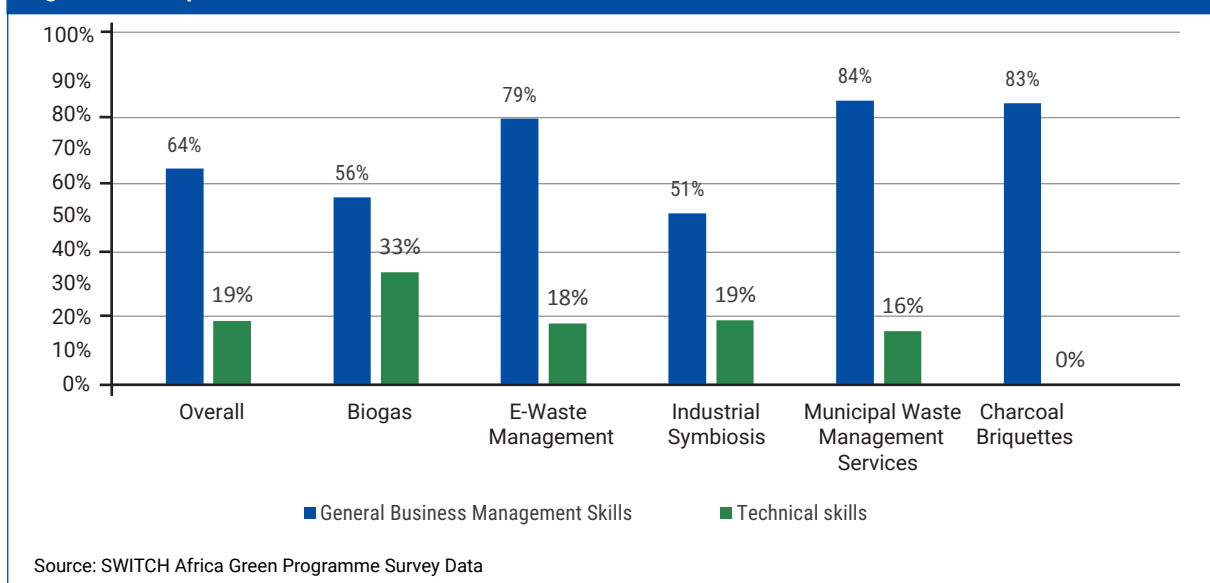
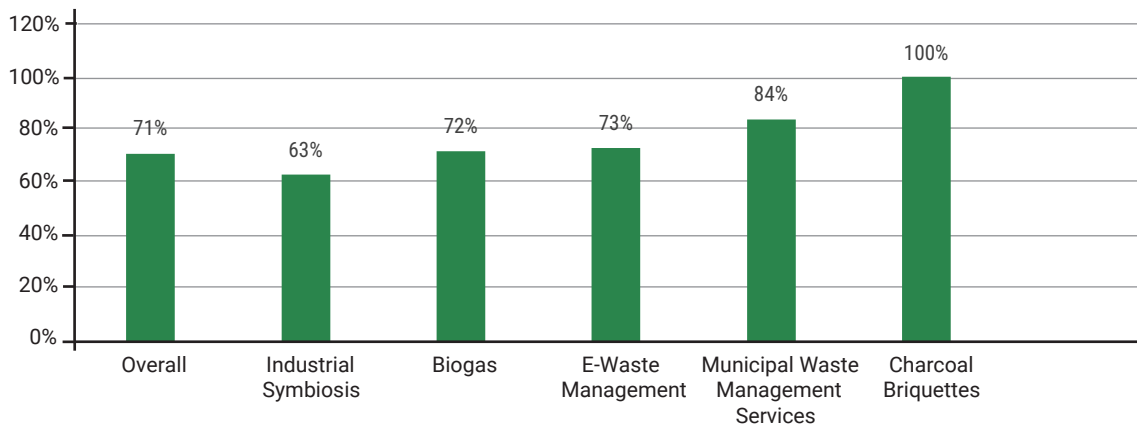




Figure 4.6: New business opportunities



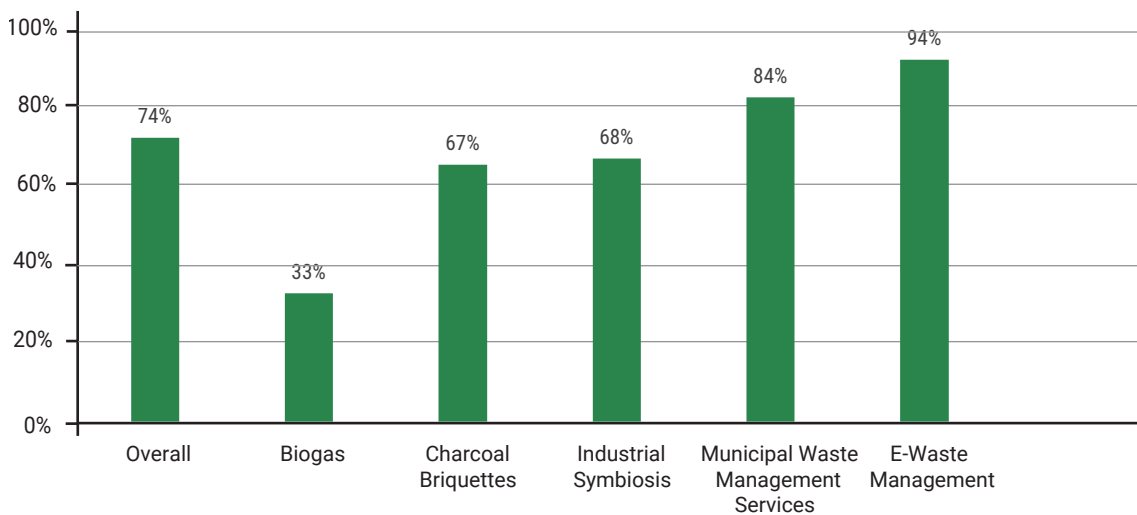
Source: SWITCH Africa Green Programme Survey Data

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



Source: SWITCH Africa Green Programme Survey Data

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.

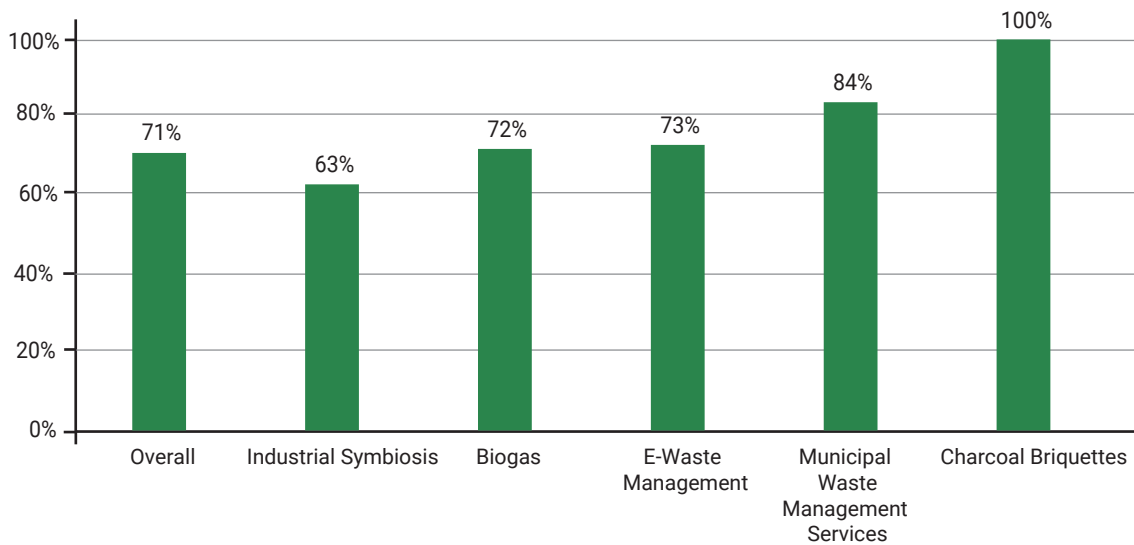
Sixty-eight per cent of the MSMEs reported that new jobs had been created during the period of the implementation of the SWITCH Africa Green programme. At the subsector level, the percentage of firms reporting that new jobs were created during the implementation of the programme ranges from 63 per cent 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% |

Source: SWITCH Africa Green Programme Survey Data

Figure 4.8: Percentage of MSMEs reporting creation of new jobs



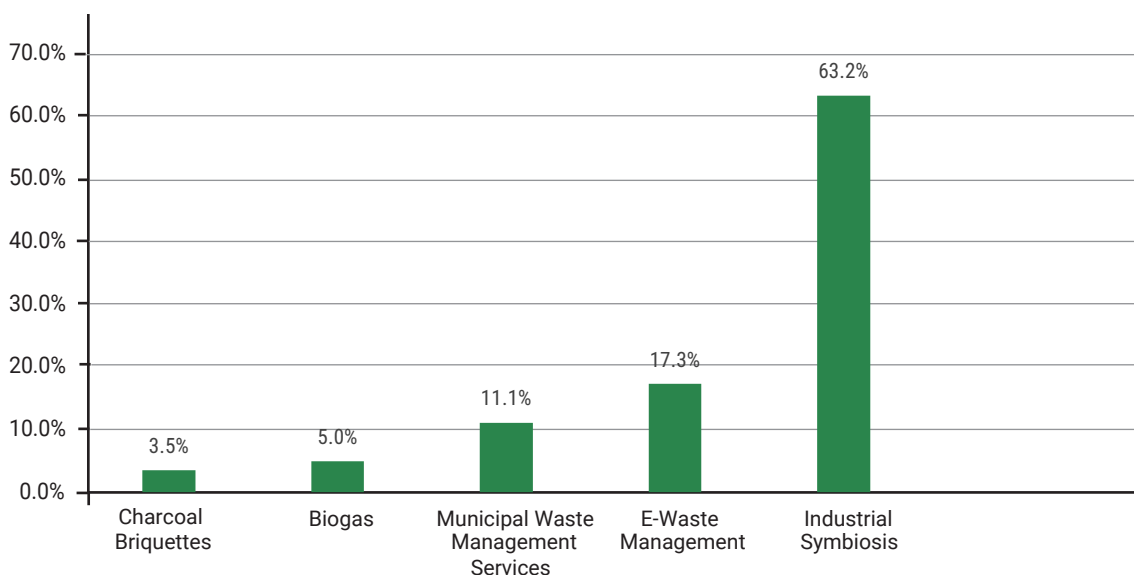
Source: SWITCH Africa Green Programme Survey Data

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

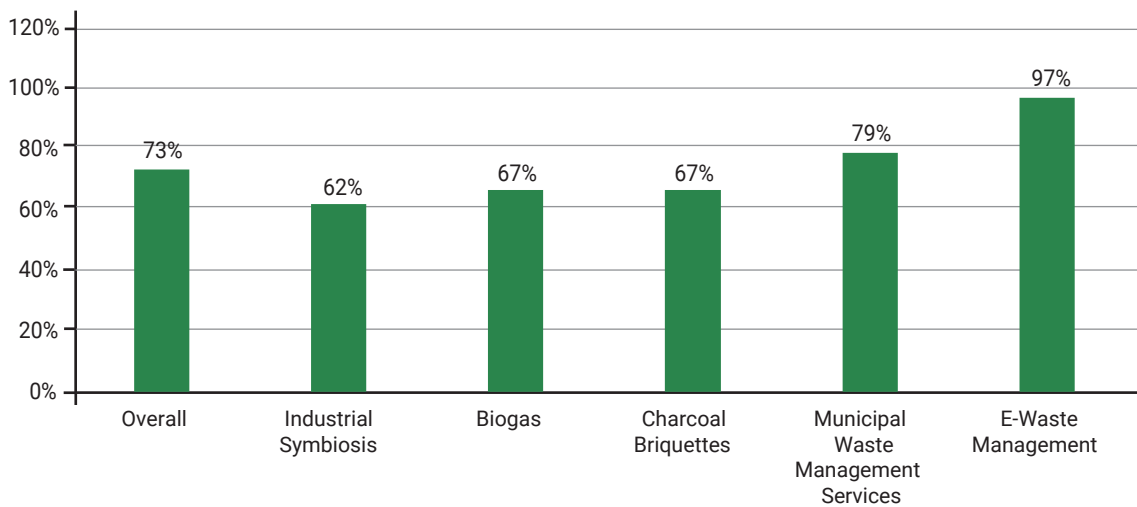
Figure 4.9: Distribution of new jobs by subsector



Source: SWITCH Africa Green Programme Survey Data



Figure 4.10: Improved working conditions



Source: SWITCH Africa Green Programme Survey Data

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).

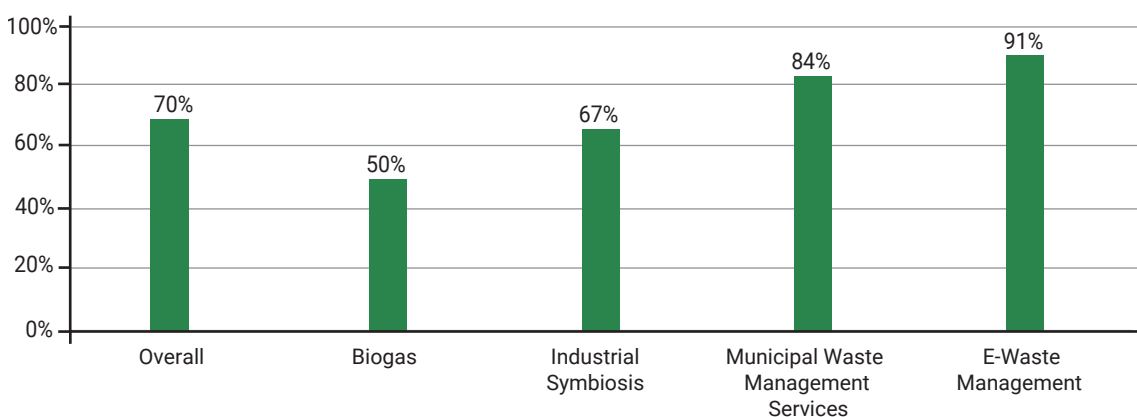
4.2.6 Environmental results

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

Figure 4.11: Implementation of 3Rs



Source: SWITCH Africa Green Programme Survey Data

and made important contributions to the cleaning 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



SWAP TRASH FOR CASH



RECYCLABLE MATERIALS ONLY

WWW.PACKACHING.CO.ZA

PACKA-CHING
MAKE SOME KILOBRANDS



SHOPRIT







5. Opportunities, challenges, and lessons learnt

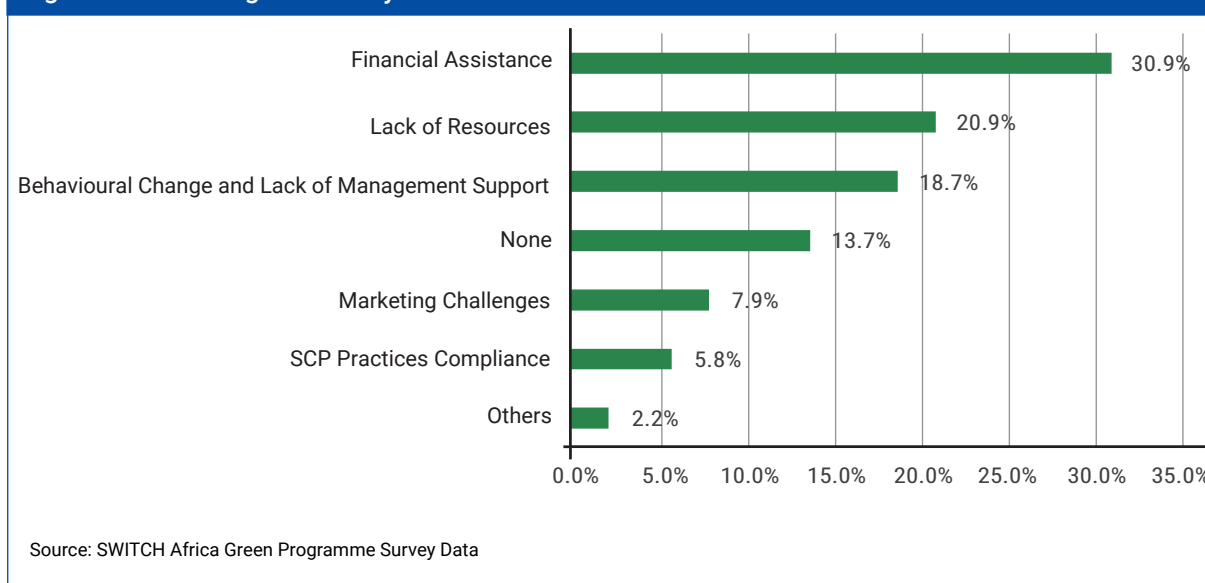
The SWITCH Africa Green supported projects have facilitated the realization of multiple benefits for beneficiary enterprises including generation of monetary gain, job creation and contribution to reduced pollution. Through the survey, the enterprises identified various challenges that need to be addressed 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.

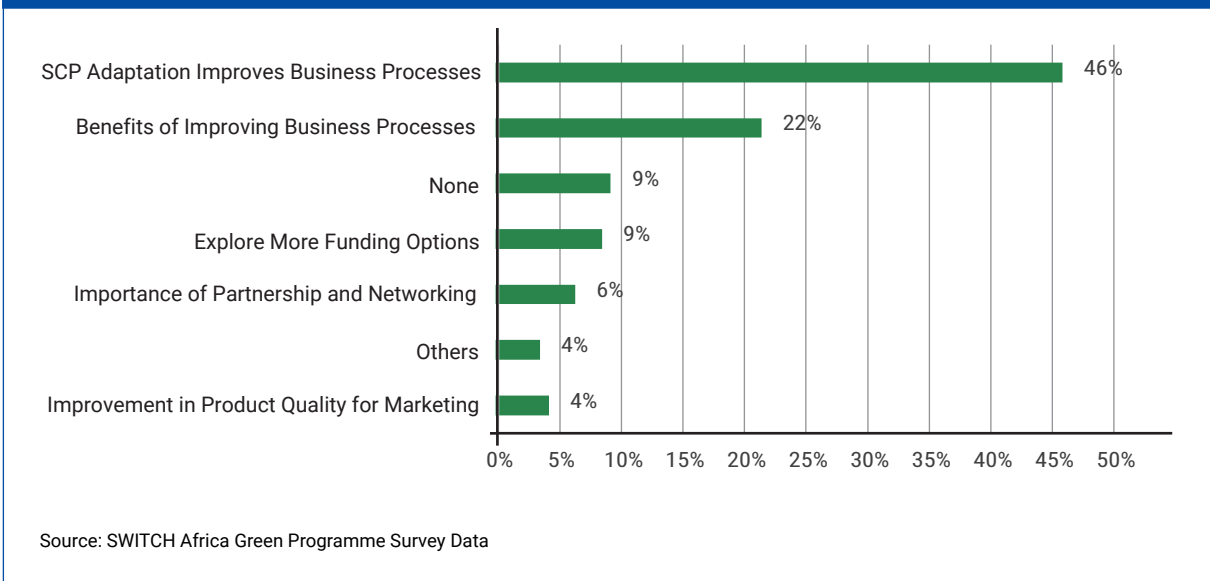
5. Business skills

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



Figure 5.2: Lessons learnt



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. 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.

7. References

- African Development Bank (2012), Africa Development Report: African Development Report-Towards Green Growth Africa.
- African Regional Roadmap on Sustainable Consumption and Production (SCP) for the 10YFP Implementation (2018-2023). (2018). [pdf]. Retrieved from http://arscp.org/wp-content/uploads/2018/09/Final-Review-of-the-African-Regional-Roadmap-on-10YFP_SCP1.pdf
- Anggraeni, K. and Schroeder, P. (2017). SWITCH-Asia Programme Impacts: Taking Stock and Looking Ahead. In Sustainable Asia: Supporting the Transition to Sustainable Consumption and Production in Asian Developing Countries (pp. 77-102).
- Arden-Clarke, C. and Farah, A.Z. (2010). ABC of SC: Clarifying Concepts on Sustainable Consumption and Production.
- Baldé, C.P., Forti V., Gray, V., Kuehr, R. and Stegmann, P. The Global E-waste Monitor – 2017, United Nations University (UNU), International Telecommunication Union (ITU) & International Solid Waste Association (ISWA), Bonn/Geneva/Vienna
- Chertow, M., Ashton, W. and Kuppalli, R. (2004), The Industrial Symbiosis Research Symposium at Yale: Advancing the Study of Industry and Environment, Yale F&ES Publication Series Report Number 3, Nov. 2004, Yale Centre for Industrial Ecology
- European Environment Agency (2016), Circular Economy in Europe: Developing the Knowledge Base. European Environment Agency, Report No 2/2016
- Environment Protection Agency, United Nations Environment Programme and Natural Resources and Environmental Governance Programme (2010). National programme on SCP for Ghana: Sustainable Development Action Plan (SDAP)
- Haregu, T.N. et al. (2016) Integration of Solid Waste Management Policies in Kenya: Analysis of coherence, gaps and overlaps, Working Paper No. 8. Nairobi: African Population and Health Research Centre
- https://muele.mak.ac.ug/pluginfile.php/243181/mod_resource/content/1/Solid%20waste%20mgmt%20Uganda.pdf
- Kaza, S., Yao, L., Bhada-Tata, P., and Van Woerden, F. (2018). What a waste 2.0: a global snapshot of solid waste management to 2050. World Bank Publications.
- Khandker S.R., Koolwal G.B. and Samad H.A. (2010). Handbook on impact evaluation: quantitative methods and practices. Washington, DC: World Bank, 2010 <https://openknowledge.worldbank.org/bitstream/handle/10986/2693/520990PUB0EPI1101Official0Use0Only1.pdf?sequence=1&isAllowed=y>
- Levine, D. 2018. Municipal Solid Waste Management: A Roadmap for Reform for Policy Makers (English). Washington, D.C.: World Bank Group. <http://documents.worldbank.org/curated/en/813181537537614202/Municipal-Solid-Waste-Management-A-Roadmap-for-Reform-for-Policy-Makers>

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- Okumu-Okot, J. and Nyenje, R. (2011), Municipal solid waste management under decentralization in Uganda. *Habitat International* 35 (2011) 537-543
- Population Approach Group Europe (2017), *Industrial Waste Assessment in the Republic of Mauritius: Opportunities for Industrial Symbiosis*.
- Republic of Kenya (April 2019), *National Sustainable Waste Management Policy (Revised Draft)* Ministry of Environment and Forestry
- Republic of Kenya (2017), *Green Economy Strategy and Implementation Plan-Kenya 2016 – 2030*
- SWITCH Africa Green (2018). *Country Implementation Report and Plan: Review of laws, policies, and business environment*. Republic of Kenya: Ministry of Environment and Forestry
- SWITCH Africa Green (undated). *Country Implementation Report and Plan: Review of laws, policies, and business environment*. Republic of South Africa: Department of Environmental Affairs
- SWITCH Africa Green (2017). *Country Implementation Report and Plan: Review of laws, policies, and business environment*. Government of Uganda: Ministry of Water and Environment.
- SWITCH Africa Green (2016). *The country Implementation Report and Plan*. Republic of Mauritius: Ministry of Social Security, National Solidarity, and Environment and Sustainable Development.
- United Nations Economic Commission for Africa (2009). *Africa Review Report on Sustainable Consumption and Production*. Retrieved from <https://www.uneca.org/publications/africa-review-report-sustainable-consumption-and-production>
- United Nations Economic Commission for Africa (2018). *Africa Sustainable Development Report 2018*.
- United Nations Environment Programme (2018). *Africa Waste Management Outlook*. Nairobi: United Nations Environment Programme,
- United Nations Environment Programme (2014). *Green Economy Assessment Study – Burkina Faso*
- Van Beers, D. and Rowe, A. (2017). *Terminal Evaluation of UNEP Project: SWITCH to Sustainable Policies and Innovation for Resource Efficiency in Asia-Regional Policy Support Component*.
- Wilson, D.C., Rodic, L., Modak, P., Soos, R., Carpintero, A., Velis, K. and Simonett, O. (2015). *Global waste management outlook*.



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 (NCPCC) |
| 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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SWITCH Africa Green

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