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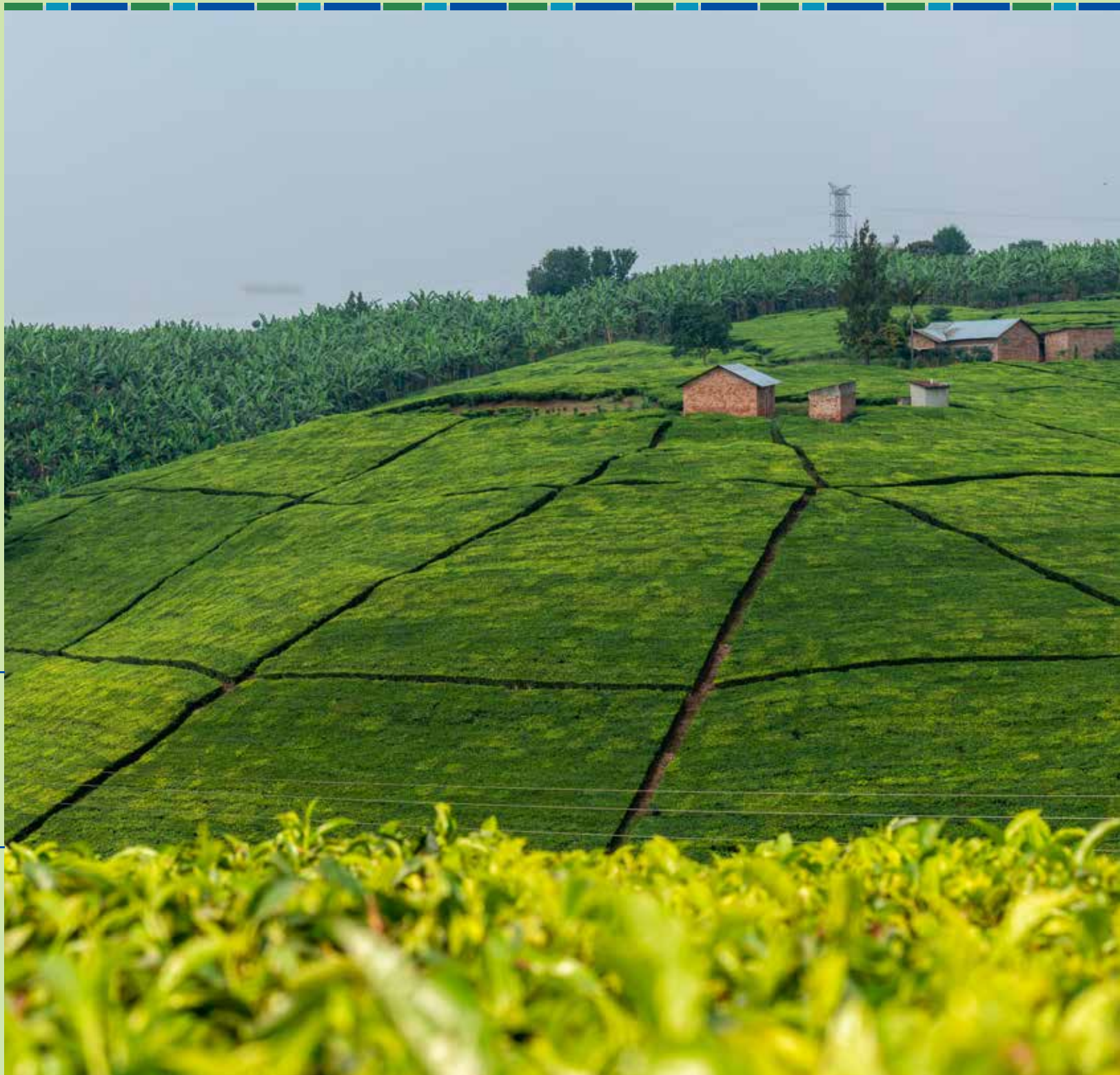
Sustainable Agriculture in Africa

Focus on Organic Agriculture



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December 2020

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Acknowledgements

This report presents an analysis of the implementation and results of the SWITCH Africa Green programme in the agriculture sector focusing on the participating countries Burkina Faso, Ghana, Kenya, Mauritius, South Africa and Uganda. It covers the strategic interventions on sustainable agriculture such as: organic farming; weed and pest control and management; organic disease control and management; pre- and post-harvest management; composting; use of waste for mulching, and/or fuel; permaculture; certification; standards; market requirements; rangeland management; and animal nutrition and health. It analyses the results realised, cross cutting issues, challenges, lessons learned 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 27-28 November 2019 in Nairobi, Kenya. The report is one of 4 sector reports, one for each of the priority sectors of the programme: agriculture, manufacturing, tourism and integrated waste management (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 enterprises (MSMEs). Today, these small enterprises create about 80 per cent of the region's employment creating the much-needed jobs for the youth as well as fuelling demand for goods and services.

Helping these small enterprises 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.

The results reveal that the project is having a positive effect on decoupling agricultural growth from environmental degradation and contributes to improved human welfare. The strategic interventions in capacity building and awareness creation have had a positive impact on staff capacity, business skills, and enterprise performance. Sixty-two per cent of the beneficiaries reported that they had acquired new skills in areas such as organic farming; weed and pest control and management; organic disease control and management; pre-harvest, harvesting, and post-harvest management; permaculture; certification; standards; market requirements; rangeland management; and animal nutrition and health. Sixty-one per cent recorded increased sales turnover as a direct result of the SWITCH Africa Green programme. Additionally, implementation of SCP principles in the agriculture sector generated new business opportunities. Slightly more than half of the surveyed enterprises reported new opportunities arising through business expansion and new products. The new products and opportunities include production of organic fertilizer, diversification into horticulture and livestock, agro-tourism, inter-cropping, and introduction of new breeds.

Some of the challenges that need to be addressed to ensure green business is a success in the region include access to finance for small businesses, improving the local infrastructure (roads, water, energy, etc.), ecolabelling and certification of organic products, unfavourable weather due to over reliance on rain-fed agriculture and improved measures for pests and disease control. Over 55 per cent of the enterprises noted that adoption of SCP practices leads to improved product quality and improved business process.

Dr. Juliette Biao-Koudenoukpo
Director and Regional Representative for Africa, UN Environment Programme (UNEP)

Acronyms and abbreviations

AGRA	Alliance for a Green Revolution in Africa
APAP	Agricultural Action Plan
ASTGS	Agricultural Sector Transformation and Growth Strategy
BCEAO	Central Bank of West African States
CAADP	Comprehensive Africa Agriculture Development Programme
3Rs	Reduce, reuse, recycle
10YFP	10 Year Framework of Programmes
DEVCO	International Cooperation and Development
EU	European Union
FAO	Food and Agriculture Organization
FFV	Fresh Fruits and Vegetables
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GHG	Greenhouse Gas
IFPRI	International Food Policy Research Institute
IGE	Inclusive Green Economy
IMF	International Monetary Fund
IWM	Integrated Waste Management
kg/hectare	kilogram per hectare
MauriGAP	Mauritius Good Agricultural Practices
METASIP	Medium Term Agricultural Sector Investment Plan
MSMEs	Micro, Small and Medium Enterprises
NDP	National Development Plan
OECD	Organization for Economic Cooperation and Development
SCADD	Strategy for Accelerated Growth and Sustainable Development
SCP	Sustainable Consumption and Production
SDGs	Sustainable development Goals
SIG	Sector Indicator Guidance
SSA	Sub-Saharan Africa
TRADEMFA	Transforming Household Waste into Agricultural Fertilizer
UGX	Uganda Shillings
UNDP	United Nations Development Program
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services
USD	United States Dollar
XOF	CFA Franc BCEAO
WDI	World Development Indicators

Executive summary

This report presents an analysis and review of the implementation and results of phase I of the SWITCH Africa Green programme in the sustainable agriculture sector. It covers the strategic interventions, results achieved, cross-cutting issues, challenges, the lessons learned, and a set of recommendations. The economies of most of the Sub-Saharan Africa (SSA) countries rest primarily on agriculture. The sector accounted for about 55 per cent of total employment and 15 per cent of GDP in 2018. While measures have been put in place to transform agriculture, SSA still lags the rest of the world in agricultural productivity and cereal yields. Among the key challenges include overdependence on rain-fed agriculture in the face of climate change and variability, high food insecurity, high cost of agricultural inputs, and land degradation.

The SWITCH Africa Green programme is EU funded to support governments and the private sector in African countries (Burkina Faso, Ghana, Kenya, Mauritius, South Africa, and Uganda) in the transition to an inclusive green economy (IGE). The programme is implemented by the United Nations Environment Program (UNEP) in collaboration with the United Nations Development Program (UNDP) and United Nations Office for Project Services (UNOPS). The overall objective of the SWITCH Africa Green 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 respective six countries during the inception phase of the programme. The SWITCH Africa interventions in sustainable agriculture include production and use of organic fertilizer, green business, conservation, eco-entrepreneurship, and agro-tourism.

Methodological framework

Mixed methods of data collection have been employed in the preparation of this report. They include survey questionnaires targeting MSMEs and grantees, documentary reviews, on-site observations, case studies, expert peer review, 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, case studies, desk review and stakeholder consultations. The survey team also conducted on-site visits to selected MSMEs to ascertain the accuracy of the data collected and to gain a better understanding of the programme implementation at the enterprise level.

The results and analysis presented in this report are 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

About 37 per cent of the MSMEs indicated that they needed financial support to implement SCP interventions. Other challenges include the need for capacity building and awareness, including regarding eco-labelling and certification of agriculture products, behavioural change, marketing challenges, unfavorable weather conditions due to over-reliance on rain-fed agriculture, need for government support, and diseases. Importantly, 55 per cent of the surveyed enterprises noted that from their own experience with the SWITCH Africa Green programme, SCP adoption, quality improvement, improved business process, and networking contribute positively to enterprise performance.

Main findings

The analysis of the interventions and results of the SWITCH Africa Green programme activities reveals that a transition to sustainable agriculture has social, economic and environmental benefits. The results reveal that the project is having a positive effect on decoupling agricultural growth from environmental degradation and contributes to improved human welfare. The strategic interventions in capacity building and awareness creation have had a positive impact on staff capacity, business skills, and enterprise performance. Sixty-two per cent of the surveyed enterprises reported that they had acquired new skills in areas such as organic farming; weed and pest control and management; organic disease control and management; pre-harvest, harvesting, and post-harvest management; permaculture; certification; standards; market requirements; rangeland management; and animal nutrition and health. Sixty-one per cent of the surveyed MSMEs recorded increased sales turnover as a direct result of the SWITCH Africa Green programme. Additionally, the implementation of SCP principles in the agriculture sector generated new business opportunities. Slightly more than half of the surveyed enterprises reported new opportunities arising through business expansion and new products. The new products and opportunities include organic fertilizer, diversification into horticulture and livestock, agro-tourism, inter-cropping, and introduction of new breeds.

On the social dimension of development, positive gains have been reported in terms of job creation, economic activity, and social cohesion as reported by the surveyed enterprises. Forty-eight per cent of the enterprises reported that new jobs had been created during the period of the implementation of the SWITCH Africa Green programme. A total of 9,983 new jobs were created, of which some are seasonal and dependent on family labour.

The environmental benefits are anchored on improved resource efficiency and conservation including energy-use efficiency, water-use efficiency, and waste reduction practices. Fifty-five per cent of the enterprises implemented water-efficiency interventions such as reuse, rainwater harvesting, water conservation, and installation of water-saving devices. Thirty-nine per cent of the surveyed enterprises depend on rain-fed agriculture, thus underscoring the need for water-use efficiency and conservation. Fifty-seven per cent of the enterprises implemented waste reduction measures including composting, use of waste for mulching, and use of waste as fuel.

Conclusion and recommendations

The present findings demonstrate that embracing sustainable production practices in the agricultural sector has economic, social, and environmental benefits. Based on the analysis and review of the implementation of the programme, the following set of recommendations is presented:

- financing of the transition to sustainable agriculture should be given priority including green financing mechanisms, fiscal incentives, and public investment in infrastructure and protection of the environment;
- capacity building and knowledge sharing on relevant SCP principles including labelling certification, and eco-solutions is required;
- there is a need to align the policy and regulatory environment to support sustainability in agriculture, including fiscal incentives, green procurement policies and tax incentives;
- strengthen institutional capacity in the public sector for effective policy coordination and implementation;
- innovative solutions need to be developed that enable the consideration of the impact of climate change in sustainable agriculture – including permaculture, conservation, urban agriculture and use of traditional knowledge and systems of coping; and
- other important policy dimensions include rural infrastructure, agricultural research, extension services, and innovation systems.

1. Introduction

The economies of most of the SSA countries rest primarily on agriculture. According to the World Development Indicators (WDI), the sector accounted for about 55 per cent of total employment and 15 per cent of GDP in 2018. Between 2000-2018, the sector grew by 4.6 per cent, much higher than the 3.2 and 2.6 per cent growth that was recorded in Asia and Latin America during the same period. However, agricultural productivity and yields remain relatively low in SSA. Agricultural value added per worker in SSA stood at an average of USD1,371 in 2016, compared to USD 3,568.4 in East Asia and Pacific, USD6,679.9 in Latin America and the Caribbean, and USD1,497.8 in South Asia. Similarly, yields are comparatively low, cereal yield (kilograms per hectare) in 2016 is estimated at 1,400 kg/hectare, compared to 3,132 kg/hectare in South Asia, and 4,178 kg/hectare in Latin America and Caribbean. Additionally, food insecurity is highest in SSA, estimated at 29.3 per cent of the population compared to the world average of 9.2 per cent. These trends are partly driven by climate variability, rapid urbanization, land degradation, weak access to agricultural inputs and governance (AGRA 2016, AGRA 2018).

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 inclusive green economy.. The overall objective of the SWITCH Africa Green programme is to support countries in Africa to achieve sustainable development based on sustainable consumption and production patterns, while generating growth, creating decent jobs and reducing poverty.

The specific objective is to support the development of green businesses and eco-entrepreneurship and use of SCP practices by having in place (i) MSMEs and business service providers that are better equipped to seize opportunities for green business development, (ii) better-informed public and private consumers, and (iii) enabling conditions in the form of clear policies, sound regulatory frameworks, incentive structures, tax, other fiscal and market-based instruments influencing key sectors.

To realize this goal, the SWITCH Africa Green programme has three inter-connected 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; the networking facility aims to distil and share knowledge, lessons learnt and best practices in green business and SCP, 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 participating 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, eco-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. Accordingly, the national priority sectors and cross-cutting issues were determined based on specific country context, including the potential for advancing green business development and SCP practices. 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 consider resource efficiency across the life cycle and developing green business opportunities for local entrepreneurs in the priority sectors. The programme has also focused on 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		✓	✓	✓

2. Sector context

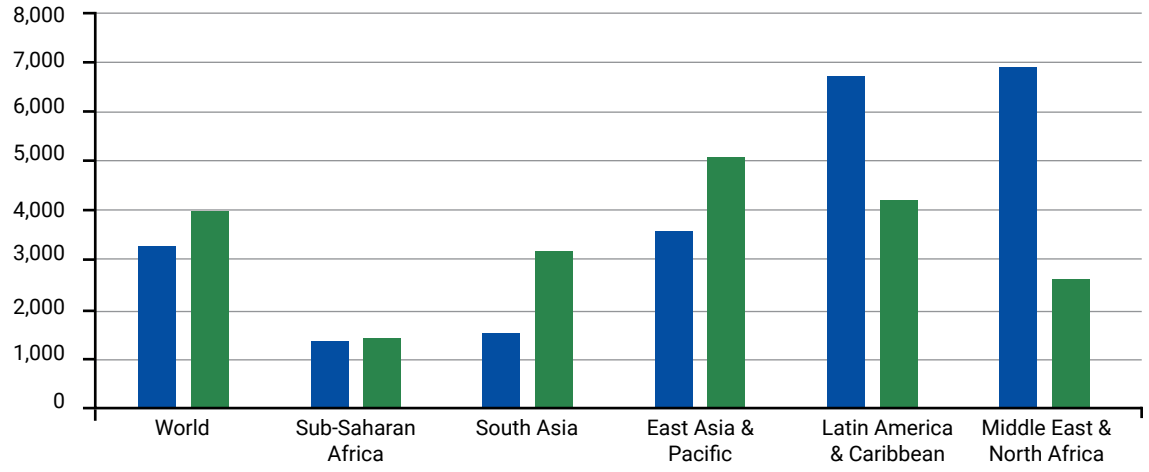
This section sets the scene for the analysis of the SWITCH Africa Green programme interventions in the sustainable agriculture sector. It provides an overview of the significance of the sector and some of the underlying sustainability issues to contextualize the SWITCH Africa Green interventions. Specifically, a review of the performance of the sector in the six countries is provided as well as the main challenges in the sector.

Agriculture is the backbone of many economies in Africa. It plays a key role in economic activity including backward and forward linkages with other sectors, job creation, export receipts, and domestic value added. As noted above, on average the sector accounts for 55 per cent of employment and about 15 per cent of GDP in SSA. According to the Food and Agriculture Organisation of the United Nations (FAO), women accounted for about 56 per cent of employment in agriculture in 2016.[1] However, the SSA region is highly heterogeneous. The significance of the agricultural sector varies considerably across the six countries as discussed below.

While there have been some improvements in key agriculture sustainable indicators, such as agricultural productivity and cereal yield, SSA still lags behind the rest of the world on these performance indicators (Figure 2.1). Agricultural productivity and cereal yield in SSA are the lowest globally. According to the Alliance for a Green Revolution in Africa (AGRA 2016), the gap in cereal yield between SSA, and Asia and Latin America continues to widen. The region also lags behind the rest of the world in the use of fertilizer, improved seeds, and associated technologies. For instance, over the period, 2014-2016 fertilizer consumption in SSA was 16.2 kg/ hectare of arable land compared to a global average of 140 kg/hectare.

1 http://faostat.fao.org/static/syb/syb_5100.pdf

Figure 2.1: Agricultural productivity and cereal yield (2016)

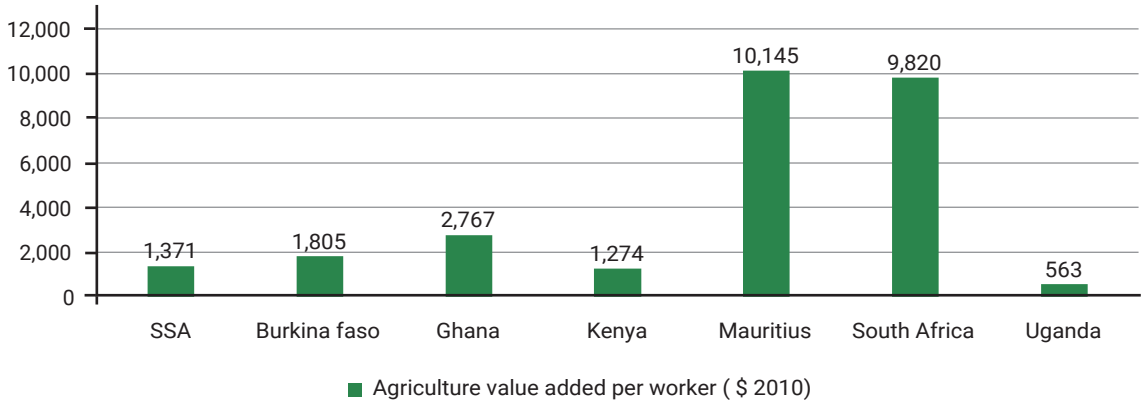


Source: World Bank (2020)

Agricultural productivity as measured by agriculture value added per worker (2010 $) ranged from $563 in Uganda to $10,145 in Mauritius in 2016. Agricultural productivity in Kenya and Uganda was below the SSA average (figure 2.2). South Africa and Mauritius are among the SSA countries that have relatively high agricultural productivity that is explained by factors such as high capital endowment and use of other inputs such as fertilizer, seeds, and irrigation (IFPRI 2016). High agricultural productivity may also be achieved through innovations that improve the quality of the produce, and transform value chains to enhance efficiency. For instance, organic produce and some certified agricultural produce command a price premium in the market. The price of organic produce is about 30 per cent above the price of conventional produce (Fuglie, K.et al. 2020). Various studies suggest that the relationship between agricultural productivity and environmental performance may be context specific. While some studies suggest that with increased productivity more output has been realized without expanding the area under under cultivation and therefore improved forest conservation, in some cases high productivity has come about through excessive input intensification with adverse effects on the quality of the soil, water and air (Fuglie K.et al. 2020).

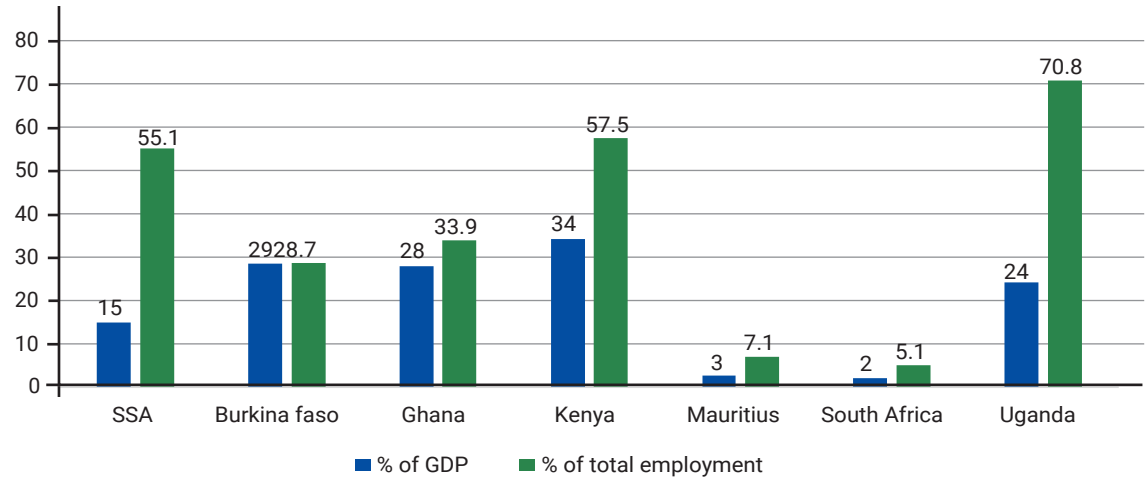
The sector's contribution to GDP varies from 2 per cent in South Africa to 34 per cent in Kenya. In Mauritius, the share of agriculture in GDP has

Figure 2.2: Agricultural productivity (2016)



Source: World Bank (2020)

Figure 2.3: Agriculture sector contribution to GDP and employment (2017)



Source: World Bank (2020)

declined from about 30 per cent in the 1970s to 3 per cent, largely because of successful diversification of the economy into industry (including manufacturing) and services sectors which account for about 29 per cent and 67 per cent in 2018 (Republic of Mauritius 2016).

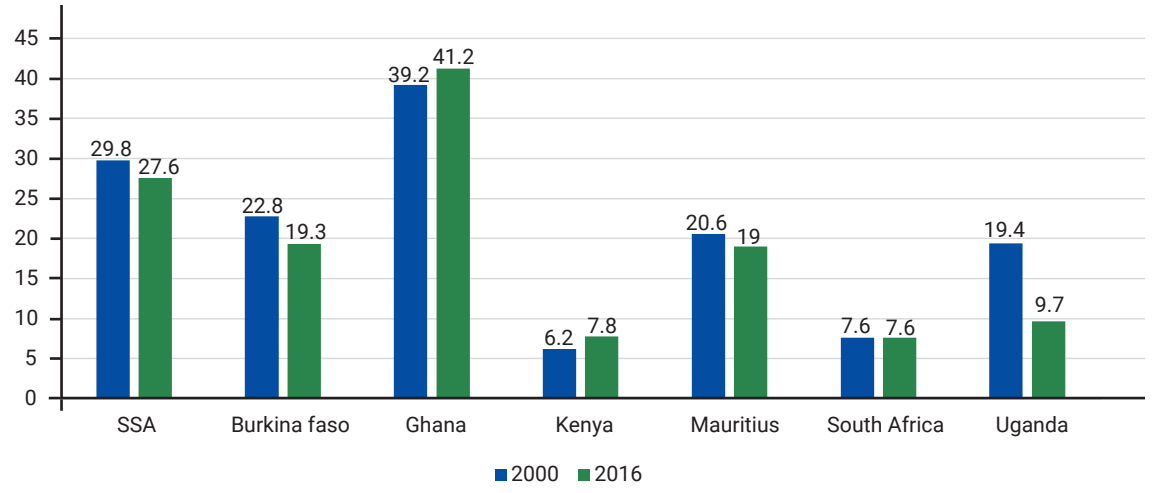
Regarding employment, the share of the agriculture sector employment in total employment ranges from 5.1 per cent in South Africa to 70.8 per cent in Uganda (Figure 2.3). The gender composition varies across the region; however, on average, 60.2 per cent of total male employment was in agriculture compared to 54.7 per cent of total female employment. This implies that 39.8 per cent and 45.3 per cent of male and female employment, respectively, was in the other sectors of the economy.

In SSA, growth in agricultural output has largely been achieved through the expansion of land under cultivation and reliance on abundant manual labour (AGRA, 2016). Between 2000-02 and 2014-16, agriculture land as a percentage of the land area increased from 42 per cent to 44 per cent. In Asia and South America, growth has been driven by intensification and increased labour productivity, respectively. According to the Organization for Economic Cooperation and Development (OECD)-FAO Agricultural Outlook 2016-2025, the role of productivity is expected to increase. Further expansion in land under cultivation (where there is under-utilized land) is possible and could be realized, but at an environmental cost - by clearing forest land. Yet, forest area as a percentage of the land area declined from 29.8 per cent in 2000 to 27.6 per cent in 2016. Among the six countries, Burkina Faso, Mauritius and Uganda recorded reduced forest cover between 2000 and 2016 (Figure 2.4)

At the regional level, the Comprehensive Africa Agriculture Development Programme (CAADP) is the African Union's blueprint that sets national targets for governments to promote the transformation of the agricultural sector. These targets include a 6 per cent agricultural growth rate, and an allocation of 10 per cent of national budgets to agriculture. However, performance on CAADP has been mixed, and according to AGRA (2018), only 20 of the 47 member states are on track towards achieving the commitments.

The six countries are implementing country policy strategies that prioritize the agricultural sector including SDG targets related to sustainable agriculture (Box 1.1). From 2011, Burkina Faso implemented the Strategy for Accelerated Growth and Sustainable Development (SCADD) which identifies agriculture, livestock, fisheries, and forestry sectors as key in tackling poverty, estimated at 50.7 per cent. The strategy sought to increase productivity through the implementation of various measures including subsidizing or distributing improved seeds and agricultural inputs, capacity building on good agricultural practices, irrigation, and increased market access (IMF, 2012). Burkina Faso is one of the countries

Figure 2.4: Forest area (percentage of land area)



Source: World Bank (2020)

that has met the CAADP public expenditure threshold but most of the expenditure is concentrated in cotton[2]. According to the Ghana Medium Term Agricultural Sector Investment Plan (METASIP) II, 2014–2017, the key issues facing the agriculture sector include low average yield and high post-harvest losses, low productivity of smallholders, degraded landscapes and over-reliance on rain-fed agriculture.

In Kenya, the Kenya Vision 2030, the Medium-Term Plan III, and the Agricultural Sector Transformation and Growth Strategy (ASTGS) 2019-2029 prioritize agriculture and most recently the Kenya President's Big Four priority agenda for 2017-2022 includes food security. The goals of ASTGS include increasing income, agriculture value addition and boosting household food resilience. The Mauritius Vision 2030 and the strategic plan (2016-2020) for the food crop, livestock, and forestry sectors provide the policy thrust for the agricultural sector. According to the strategic plan, successful diversification of the economy has contributed to the steady decline of the sector's contribution to the economy. Mauritius is a net food importer, and the gap has been widening, thus increasing import dependency. The strategy outlines the need to shift to sustainable agricultural practices, including bio-farming, sustainable forest management, sheltered farming, and eco-friendly crop production techniques. The key policy challenges include food and nutrition security, competitiveness, developing climate resilience,and strong-value chains.

The Uganda Vision 2040 and the National Development Plan (NDP 2010-2020) prioritizes agricultural development and the main goal is to promote sustainable production, productivity, and value addition in the agriculture sector.

South Africa's agricultural policy framework is anchored on the NDP 2030: Our Future – Make it Work, and the Agricultural Action Plan (APAP) for 2015-2019. The APAP outlines measures key for the sector, including enhancing growth and competitiveness, environmental sustainability, governance, and infrastructure development.

Sustainable Agriculture related SDG target

Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding, and other disasters and that progressively improve land and soil quality.

2 FAO, Country fact Sheet on food and agriculture policy trends, April 2014. http://www.fao.org/3/i3760e/i3760e.pdf

In the past, growth in agriculture has been driven by expansion in the area under farming activities. However, this model of growth is becoming problematic due to pressure on land. Where there is unutilized land, such expansion might come about through forest clearing and therefore could have immense environmental costs. The major challenge is, therefore, to achieve growth through improvement in productivity and yields. The region also faces challenges related to climate change and variability, particularly because rain-fed agriculture is dominant.

Also, SSA has the highest rate of food insecurity globally. Other challenges include weak infrastructure, governance, land degradation, high input costs, low productivity in the subsistence subsector, and lack of competitiveness.

A transition to sustainable consumption and production practices and patterns has the potential to help address some of the challenges including soil quality, yields, and resource efficiency.

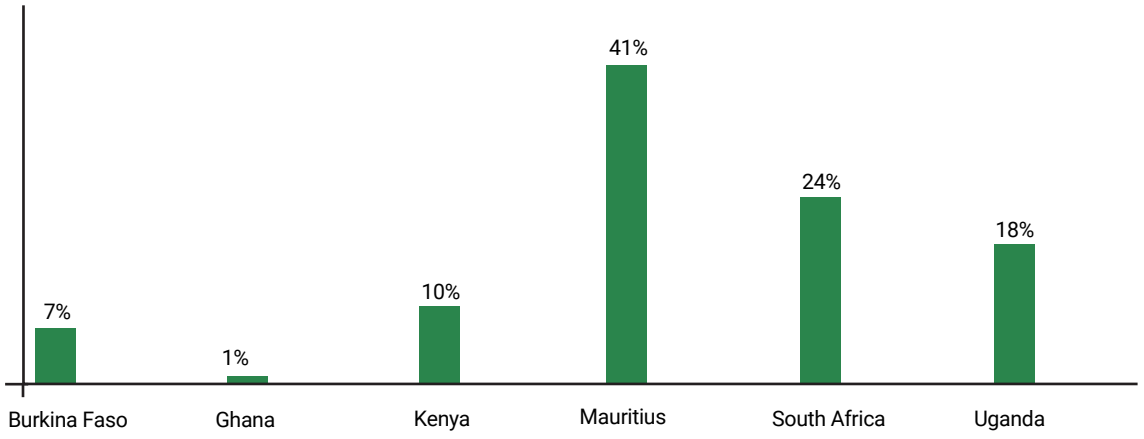
3. Approach and methodological framework

The objective of this report is to document the implementation of the first phase of the SWITCH Africa Green programme in the agriculture sector focusing on the business development component. It presents an analysis, synthesis, and summary of the interventions and results. Mixed methods of data collection were used including survey questionnaires targeting MSMEs and grantees, desk review, on-site visits, case studies, expert peer reviews, and stakeholder consultations and validation of the report. The report was discussed and validated during a regional sector meeting on sustainable agriculture held on 27-28 November 2019. 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 14 May 2018 and 22 June 2018, to collect relevant data from the project beneficiaries and grantees through questionnaires targeting at least 30 per cent of the project beneficiaries and all the 34 grantees. The sample was selected ensuring that logistical and data collection costs and related activities are conducted within the project time frames and overall budget limits. The selected MSMEs are representative across all the business types. Six national workshops were held, one in each country, to brief and discuss the data collection instruments with grantees and MSMEs to ensure quality data gathering.

The enterprise questionnaire was designed to obtain data on different dimensions of the project including effectiveness, impact, and equity. Consequently, the data collection instruments cover a wide range of issues including data before and after SWITCH Africa Green interventions, and qualitative and quantitative

Figure 3.1: Distribution of MSMEs by country



Source: SWITCH Africa Green Programme Survey Data

data on achievements, data on employment by gender, challenges, and lessons learned. The grantee questionnaires covered issues such as grantee interventions, challenges, and lessons learnt. Further, the survey data instrument covers project implementation and results consistent with EU's green economy SIG framework discussed below.

The SWITCH Africa Green supported projects in the sustainable agriculture sector were implemented in all the six countries. As explained below, the programme was implemented through a call for proposals, where grant applications were evaluated based on objective criteria that included the financial and operational capacity of the applicant, and the quality of the proposal. The successful grant applicants selected the beneficiary MSMEs. Consequently, the distribution of successful grantees and beneficiary MSMEs varies across countries and sectors. Table 4.1 provides a summary of the project grants and the number of beneficiary MSMEs in the sector across the six countries. The beneficiary enterprises are diverse and include community-based organizations, limited companies, cooperatives, sole proprietorships, associations, and self-help groups. Thirty-four per cent are start-ups having been in operation for less than one year. There were 1013 out of 443 enterprises that were surveyed that are distributed as summarized in Figure 3.1.

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. The desk 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 information collected through the SWITCH Africa Green survey. A case study data collection methodology was adopted to complement the other methods. It provides in-depth information on the activities and achievements at the enterprise level and how they relate to the programme interventions.

The approach used in the analysis and reporting is consistent with the EU's green economy sector results chain, the green economy SIG framework4 developed by the EU Commission's DEVCO. The SIG framework reflects the underlying logic or causal chain on how the project objectives are to be realized running through activities and interventions, outputs, outcomes, and the impact. The framework, therefore, helps to explain why and how the results have been achieved.

3 Some of the MSMEs were clustered during the survey especially where they belong to the same association.

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

Conceptually, the SIG framework reflects the underlying theory of change underpinning the actions undertaken under the SWITCH Africa Green programme. 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.

Under the business development component, the actions target enterprises, consumers, households, and workers in the specific sectors. 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 and training; 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: outputs, outcomes, and impact. The impact refers to the goal that the programme aims to achieve, namely: decouple agricultural growth from waste generation and adverse environmental effects, and contribute to improved wellbeing. The outcomes measure the effectiveness of SWITCH Africa Green interventions in inducing a change in behavior towards the application of SCP practices. These are captured through policy, institutional capacity changes, and performance induced through 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 related to the project or programme.

The analysis and reporting faced several challenges. These include data availability and limitations, heterogeneity of enterprises, products and the business environment across the six countries and development of the appropriate results indicators. While there was no baseline study at the beginning of the project, 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 measurements, perhaps reflecting the heterogeneity of the firms, thus rendering the data aggregation rather difficult and tedious. The enterprises produce a broad range of agricultural products, both crops, and livestock. These are explained by lack of capacity including insufficient record keeping and ability to measure and monitor environmental indicators such as GHG at the MSMEs level. 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 using data captured in grantee reports and case studies. 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 for youth and non-youth. However, the reported data on youth employment is not disaggregated by gender. Without additional data, it is assumed that the non-youth gender employment structure holds for the whole sector.

Figure 3.2: Results chain diagram for Agriculture sector

Green Business Development

SWITCH Africa Green Interventions

- Knowledge resources and tools
- Capacity building
- Enhanced business networking and market linkages
- Awareness creation of SCP
- Eco-enterprise support and incubation

Outputs

- Improved capacities of Business Development Services (BDS) to promote SCP practices by MSMEs
- Increased Networking among green business
- Improved capacities of workers in sustainable agriculture sector
- Improved awareness of consumers

Outcomes

- Uptake of SCP practices by MSMEs supported
- Improved Business Performance of MSMEs
- Increased market demand for environmental goods and services

Impacts

- Decoupling of agricultural growth from environmental degradation
- Improved human well-being

Output Indicators

1. Number of knowledge products and tools developed with project support
2. Number of BDS providers and MSMEs supported
3. Number of SCP scaling-up mechanisms established
4. Number of sub-sectors / supply chains where SCP has been supported
5. Number of networking events organised and number of actors attending them
6. Number of individuals trained by the project on SCP practices
7. Number of training schemes / programmes developed with project support

Outcome Indicators

1. Number of MSMEs reporting the adoption of SCP practices
2. Number of green jobs sustained/created
3. Number of MSMEs reporting increased turnover as a direct result of support received
4. Amount of savings generated from improved resource efficiency (material, water and energy)
5. Percentage of sales of certified products of total sales by MSME
6. Number of new sustainable products
7. No. of MSMEs reporting improved capacity and awareness of SCP

Impact Indicators

1. Area under Organic farming
2. Water and energy efficiency
3. GHG Emission reduction
4. Yields
5. Contribution of sustainable agriculture to GDP
6. Employment rate by gender in sustainable agriculture
7. Waste generated
8. Soil quality
9. Mean nominal monthly earnings of workers by gender

Proxy and Indirect Impact Indicators

1. No. of MSMEs reporting improved status (such as income, health and social cohesion)

Source: Adapted from EC International Cooperation and Development, Green Economy, Sector Indicator Guidance, https://www.switchtogreen.eu//wordpress/wp-content/uploads/2018/07/SIG-sector-Green-R_final.pdf

4 SWITCH Africa Green interventions

4.1 Interventions

The overall goal of the SWITCH Africa Green programme is to contribute to sustainable development and poverty reduction in Africa by promoting SCP practices. During the first phase of the SWITCH Africa Green programme which started in March 2014 and ended in February 2019, grants were awarded to 34 successful grantee applicants to support MSMEs in the uptake of SCP practices in the priority sectors in Burkina Faso, Ghana, Kenya, Mauritius, South Africa, and Uganda. The overall funding from the EU during the first phase was EUR19,000,000.

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 selected the beneficiary MSMEs. Consequently, the distribution of successful grantees and beneficiary MSMEs varies across the pilot countries and sectors.

During the first phase, the funding to various projects in the sustainable agriculture sector is estimated at USD2,985,745.38 and benefited 443 enterprises (Table 4.1). The support was directed towards enhancing the capacity of MSMEs through interventions such as capacity building and coaching, development and deployment of knowledge and information tools and resources, awareness creation, and fostering partnerships and market linkages.

The projects summarized in table 4.1 were financed by the EU and implemented by the UN Environment in collaboration with UNDP and UNOPS. At the country level, they were implemented by various partners.

Table 4.1: SWITCH Africa Green supported projects in sustainable agriculture

Country	Project Title	No. off beneficiary enterprises	Budget (USD)
Burkina Faso	Transforming Household Waste into Agricultural Fertilizer (P/TRADEMFA)	42	200,000.00
Kenya	Up-scaling sustainable commercial production of medicinal plants	10	250,000.00
Mauritius	A model for sustainable production and consumption practices and eco-entrepreneurship development	47	203,146.00
	Developing capacity amongst Rodriguans to adopt green businesses	67	250,000.00
	Increase capacity building of the fisher's community of Rodrigues	30	230,500.00
	Promoting Sustainable Local Agriculture through Green Retail and Green Hospitality (SUS-AGRI)	36	249,655.18
South Africa	Sustainable production and commercialization strategies in the agri-food sector in South Africa - SUPRA	30	248,033.00
	Collaborating to facilitate investments and shifts to a green-economy - Port Elizabeth western catchment areas.	58	250,000.00
	Management of sustainable energy production from IWM and agricultural processing systems	84	250,000.00
	Embedding sustainability in South Africa's red meat sector	11	250,000.00
	Awareness creation and capacity building on eco-labeling for the agricultural sector	9	210,000.00
Uganda	Eco-agriculture-sesame livelihoods	15	194,411.20
	Promoting green and inclusive business practices in the tourism industry in the Albertine Nile Region	4	200,000.00
All six countries across all priority sectors	Promoting eco-entrepreneurship in Africa -SEED		1,500,000.00
Total		**443**	**2,985,745.38**[5]

5 The total excludes the multi-country SEED project

The Burkina Faso project was in three provinces in northern Burkina Faso and focused on supporting MSMEs in the production and use of organic fertilizer in agricultural production and benefitted 42 micro- and medium-size scale enterprises. The project on up-scaling sustainable commercial production of medicinal plants was implemented in Western Kenya to promote commercial cultivation and processing of indigenous traditional medicinal plants and the manufacturing of derived products.

In Mauritius, four projects were implemented and specific areas of focus include: sustainable promotion of fresh fruits and vegetables; the bio-cultivation of Gombava lime plants and the production of chili paste and other food products in Rodrigues Island; and training and technical support to strengthen organic and innovative farming capacities in areas such as pig rearing and horticulture. A total of 180 small scale enterprises from Mauritius and Rodrigues benefitted.

Five projects were implemented in South Africa including: sustainable livestock production in the rangelands of South Africa, sustainable agriculture and environmental restoration in Port Elizabeth, and capacity building for farmers and MSMEs in Limpopo, Eastern Cape, KwaZulu, Gauteng, and Mpumalanga. There were 192 direct beneficiaries.

The projects that were implemented in Uganda benefitted farmer groups in Albertine Nile and Northern Uganda, and support for organic production of sesame in Lira District in agro-tourism Northern Uganda. A summary of the interventions, outputs, and results of the SWITCH Africa Green programme in sustainable agriculture that is consistent with the SIG results framework is provided in Annex I.

4.2 Results of SWITCH Africa Green

This section explores how and whether the implementation of SWITCH Africa Green programme activities in sustainable agriculture have triggered changes in the development conditions or behaviour of the beneficiaries towards the realization of the goal of the

programme. The objective is to decouple agricultural growth from environmental degradation and contribute to improved human wellbeing. 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, as discussed above in the methodological framework.

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

- development and deployment of knowledge and information resources including toolkits such as sustainable procurement and marketing guidelines to support MauriGAP, factsheets on honeybush cultivation, and sustainable agricultural practices such as minimum tillage, post-harvest practices, integrated pest management, and inter-cropping;
- capacity building events and MSMEs support including coaching activities, training on green business solutions, eco-labelling, and certification;
- awareness creation, sensitization and facilitating networking and learning; and
- support for improvement in the policy environment.

Box 4.1: Certification a conduit to promote organic agriculture, SKC SURAT & CO LTD

SKC SURAT & CO LTD

Mauritius

SKC Surat & Co Ltd is an import, distribution, and flagship company that transacts retail of fruit and vegetables across the island. The company engaged with the Mauritian government as a key strategy to support good agricultural practices for healthier fruits and vegetables. The SWITCH Africa Green supported project aimed at promoting the certification of the company's products through the MauriGAP-certification scheme.

The MauriGAP certification is based on the promotion of responsible sustainable production practices and the production of safe food within a sustainable framework. The Good Agricultural Practices (GAP) are agricultural production management principles promoting environmental sustainability, reducing the use of chemical inputs and ensuring a responsible approach to worker's health and safety. To be certified the company reviewed its procurement policy and mechanism to create the market pull towards its supplier planters. It also negotiated contracts between the farmers and retailers to create the demand for MauriGAP-certified fresh fruits and vegetables. The company has assisted in the certification of 30 planters and has a target to reach 100 planters.

On marketing the sustainable produce, the company has used social media and advertising campaigns in newspapers and in-store.

The impact of the project has seen the company contributing to the reduction of the carbon footprint, reduction of water consumption and contamination, and improvement of the local biodiversity through better agricultural practices. Economically, the company has demonstrated that it is possible to create a differentiation strategy based on MauriGAP as there is a growing concern for safer food and better education of consumers on MauriGAP and the difference between certified and non-certified produce.

The short- and medium-term effect of the interventions is to realize the change in behavior and performance, especially in the uptake of SCP practices, improved business performance, and increased awareness of SCP. The results are discussed along three dimensions of sustainable development, namely: economic, social, and environmental. The selected economic indicators consistent with the SIG framework include the capacity of MSMEs, new business opportunities, cost savings generated, and turnover. On the social dimension, the key indicators include job creation, gender inclusion, and safety at work. The environmental dimension is analyzed based on the implementation of 3Rs (reduce, reuse, recycle), energy, and water-use efficiency.

4.1.1 Economic results

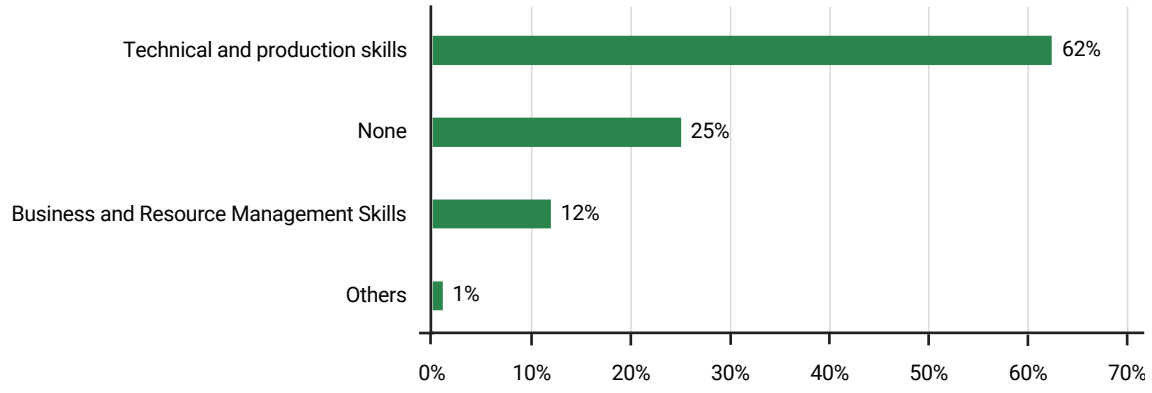
As expected, the strategic interventions undertaken through the programme, including capacity building, development and deployment of knowledge resources, and awareness creation led to increased uptake of SCP practices, and improved skills and capacity of the beneficiary firms

Staff capacity

4.1.1.1 Staff capacity

Sixty-two per cent of the surveyed enterprises reported that they had acquired technical and production skills. Twelve per cent of the surveyed enterprises indicated that they had acquired resource and business management skills. Some of the skills include organic farming; weed control and management; organic sesame disease control and management; pre-harvest, harvesting and post-harvest management. Others include permaculture, certification, standards, market requirements, rangeland management, and animal nutrition and health. (figure 4.1).

Figure 4.1: Staff capacity – new skills



Source: SWITCH Africa Green Programme Survey Data

"Mr Jaunkeepersad from Trou aux Cerfs is amongst the first to receive MAURIGAP certification MGN-CP-2017-0022. Certification requires regular audits of good agricultural practices and controlled use of chemicals.

Carrots from Mr Jaunkeepersad's farm are now available in our stores in Bagatelle and La Croisette."

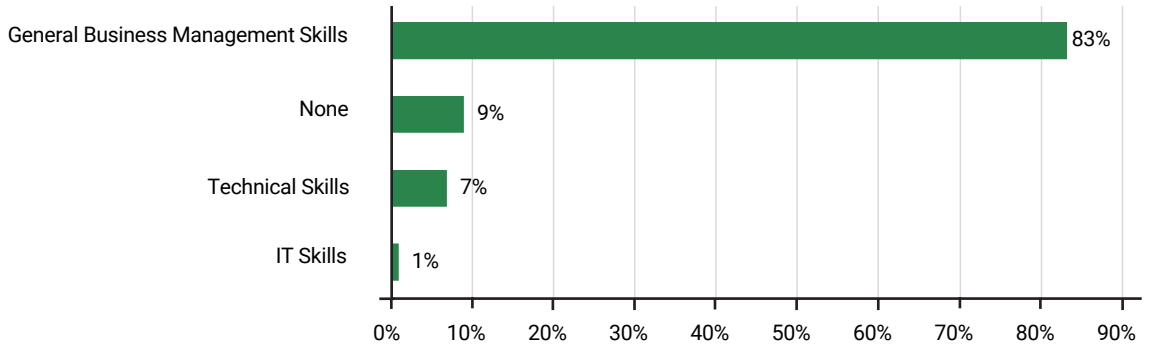
Remember, good agricultural practice, safer fruits and vegetables."

Pa badine avek nu manzé.

4.1.1.2 Business Skills

The SWITCH Africa Green programme organized and delivered various training activities to enhance the business skills of MSMEs, including record keeping, planning, and monitoring. Based on the survey, only 9 per cent of the enterprises reported that they had not acquired new business skills. The majority (91 per cent) of the surveyed enterprises indicated they had acquired new business skills. The skills are mostly in record keeping, entrepreneurship, costing, bookkeeping, technical skills, marketing, and communications (figure 4.2).

Figure 4.2: Improved business skills



Source: SWITCH Africa Green Programme Survey Data

"The cooperative learned how costing works, as well as the basic finance management. We also learned how important record-keeping is and how it is applied to reporting."

-Steinkopf Bulletrap Cooperative, South Africa.

Box 4.2: Cultivation of indigenous medicinal plants - Shabwali 20th Self Help Group, Kenya

Makueni Tourism and Cultural Centre (MTCC) is a community-based organization (CBO) in Kenya.

The MSME participated in training on the improved sustainable production of medicinal plants, diversification of cultivated medicinal plants and use of toolkits on various aspects of cultivation ,including :seed collection; preparation; storage and seedbed site selection; seedbed construction; preparation and sowing; seedbed management and land preparation; transplanting; soil and water conservation; energy-saving and organic farming.

After the SWITCH Africa Green training, the farmers in the self-help group employed SCP practices such as the use of secateurs instead of machetes for cutting the stems of the plants; adopted the integration of harvested banana waste for crop residue management; use of waste banana stems for construction of seedbeds instead of the more expensive and environmentally destructive use of timber and bricks; mulching using cut pieces and banana leaves for covering and mulching seedbeds. Additionally, they maximized land use by enabling the plot to accommodate more plants as opposed to random cultivation and broadcasting of seeds.

The impact of these interventions has been vast with the group being able to install energy-saving stoves through investing the proceeds of the sale of medicinal plant materials. The installation of the energy-saving stoves in their kitchens has led to a reduced quantity of firewood use by 300 per cent compared to the quantity previously used in the traditional cooking stoves. This has reduced the demand for firewood where you are required to acquire a permit each trip and thus protects the forest, which leads to reduced CO_2 emissions.

Intercropping of Ocimum kilimandscharicum plants with mondia whytei and other plants resulted in 332 per cent increase in the number of plants grown in the area, and 114 per cent in the value of the produce. Also, the use of measurements and planting in rows of other plants led to a 15 per cent increase in the number of plants and yield and income from the land.

Through harvesting of medicinal plants using secateurs instead of machetes, 96 per cent of the stems of plants sprouted successfully. Unlike the use of machetes that damaged the stem, leading to a loss in plant regeneration of more than 70 per cent.

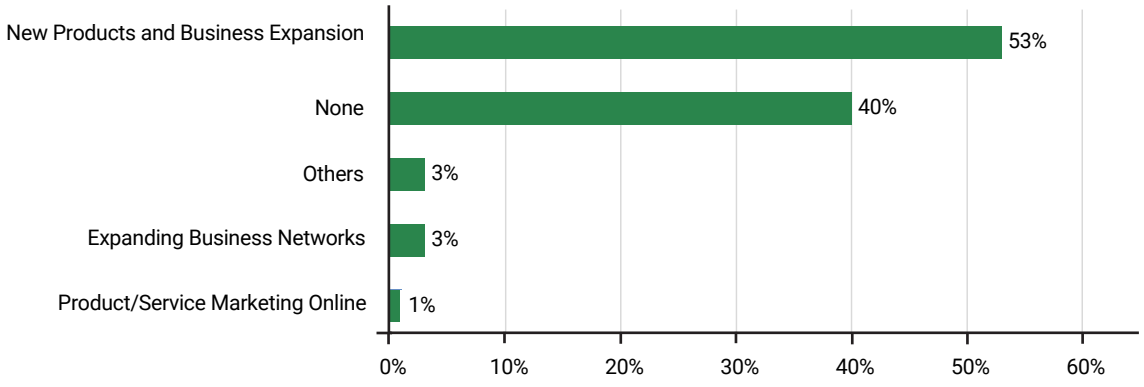
4.1.1.3 Emerging business opportunities

The implementation of SCP practices generated new opportunities for beneficiary enterprises. More than half of the surveyed enterprises reported new opportunities arising through business expansion and new products. The new products include organic fertilizer, diversification into horticulture and livestock, inter-cropping, and introduction of new breeds. (Figure 4.3).

"The marketing of compost as a business is another opportunity of lucrative business."

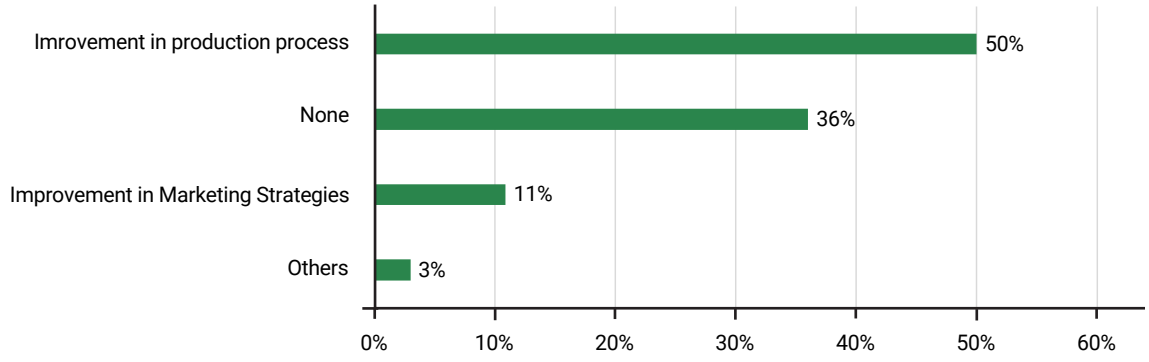
-Albert OUEDRAOGO, Burkina Faso.

Figure 4.3: New business opportunities



Source: SWITCH Africa Green Programme Survey Data

Figure 4.4: Increase in sales



Source: SWITCH Africa Green Programme Survey Data

4.1.1.4 Increase in sales

The percentage of the surveyed enterprises that reported increased sales turnover as a direct result of the SWITCH Africa Green programme in sustainable agriculture is 61 per cent (Figure 4.4). Fifty per cent of the enterprises attribute the improvement in sales to improvements in the production process, and 11 per cent to improved marketing strategies.

4.1.2 Social results

4.1.2.1 Employment

The employment data reveals that about 2, 400 persons were employed in the sampled enterprises at the time of the survey. The percentage of youth employment ranges from 12 per cent in Kenya to 47 per cent in Uganda. The gender dimension of youth employment was not reported, but if the non-youth gender composition is assumed to apply across the sector, the data indicate that the percentage of women participating in the programme ranges from 25 per cent in South Africa to 81 per cent in Burkina Faso (Table 4.2).

According to the survey data, about 48 per cent of the enterprises reported that new jobs had been created that could be attributed to the SWITCH Africa Green programme. While this percentage might appear low, the 14 per cent who are categorized as 'others' are largely sole-proprietorship start-ups (Figure 4.5), thus representing new employment opportunities. A total of 9,983 new jobs were created. However, some of the jobs are affected by seasonality and are largely dependent on family labour.

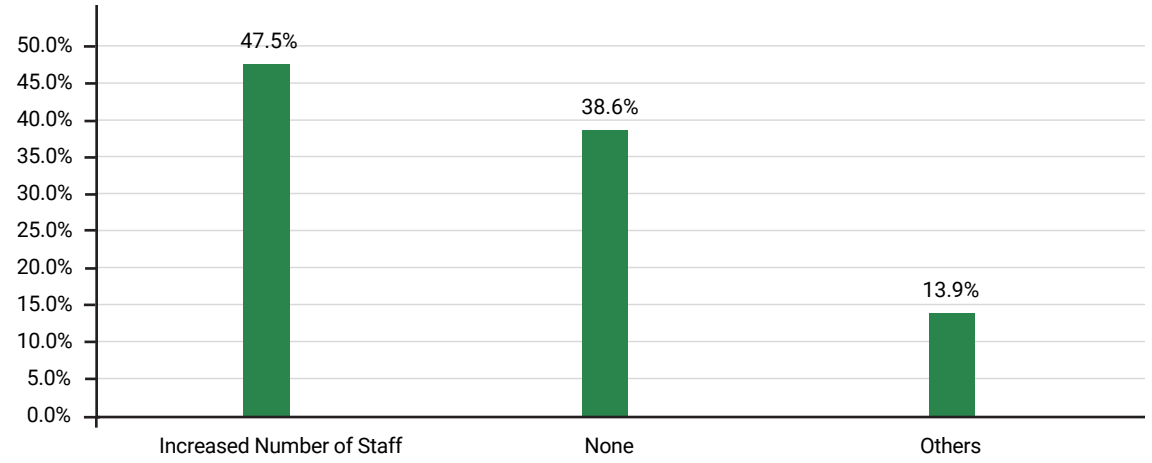
4.1.2.2 Working conditions

The SWITCH Africa Green supported projects in the agricultural sector contributed to improved working conditions of workers in the surveyed enterprises. Sixty-three per cent of the surveyed enterprises reported improved health and safety at the workplace because of reduced health hazards and workplace accidents. Most of the surveyed firms reported that they had adopted

Table 4.2: Employment in agriculture

Country	Female Employees	Male Employees	Youth Employees
	Employees by gender and youth (percentage country total)		
Burkina Faso	81%	19%	38%
Ghana	29%	71%	46%
Kenya	28%	72%	12%
Mauritius	71%	29%	17%
South Africa	25%	75%	17%
Uganda	73%	27%	47%

Figure 4.5: Percentage of MSMEs reporting creation of new jobs



Source: SWITCH Africa Green Programme Survey Data

Box 4.3: Eco-agriculture provides agribusiness niche to a child mother

The project sought to increase livelihood opportunities for youth sesame-farmers in rural northern Uganda through access to eco-agriculture production and marketing.

Ms. Christine Akullo is a child-mother of one boy. Before the project interventions, she was in a group - Agweng Child Mothers with 20 members. Their group aims to help each member solve her socio-economic problems and their activities include saving ("Boli cap"), and the sale of group members' labour. However, because of a lack of skills and support, the group was not able to transform the lives of members.

This changed from March 2015 when Sesame Green Jobs Uganda project took them on. The various training events that their group members received on saving, organic farming, farming as a business, and collective marketing changed the way they conducted their businesses. Ms. Christine borrowed UGX300,000 (€75) from the group to grow 3 acres of soybean in the first season. With organic farming technologies, she harvested 500 kgs of clean soybean seeds and earned UGX500,000 (€125). The next season she planted 3 acres of sunflower from Mukwano and as she pointed out, "I harvested 10 bags and earned UGX1.2 million (€250)." Immediately, she constructed a 2-room permanent house, bought a solar lighting unit and paid school fees (UGX400,000) for her sister at Aloi Fatima Secondary School.

With increased income, Ms. Christine increased her weekly savings to UGX10,000 (€2.5) and land size to 6 acres. At the end of 2016, she bought one cow and seven goats, shifted her child to a good private school and diversified into citrus fruit production. She now has a cow with a calf and citrus orchard and expects to harvest 4,000 kgs of soybean worth UGX4.8 million (€1200). With this money she has planned to pay her boy's school fees in Senior One in Agweng Parents Senior Secondary School.

appropriate procedures and standards, and initiated the use of protective clothing and equipment such as gloves, safety boots, and protective masks.

4.1.3 Environmental results

Among the key objectives of the projects in agriculture were to help improve resource efficiency in SMEs' particularly, water- and energy-use efficiency to improve environmental performance, and promotion of organic agriculture.

4.1.3.1 Energy and water efficiency

The surveyed enterprises adopted various measures to enhance resource efficiency. Eighteen per cent of the enterprises adopted energy-efficient technologies, mainly the use of solar for pumping water and energy-saving stoves. On the other hand, 52 per cent of the enterprises implemented water-efficiency interventions such us reuse, rainwater harvesting, water conservation, and installation of water-saving devices.

Table 4.3 summarizes the survey data by water sources and water-use interventions. Thirty-nine per cent of the surveyed enterprises depend on rain-fed agriculture. Eighteen per cent and 25 per cent of the enterprises use water from boreholes and mixed sources, respectively. One-third of the enterprises that depend on rain-fed agriculture implemented rainwater harvesting interventions.

4.1.4 Implementation of 3Rs

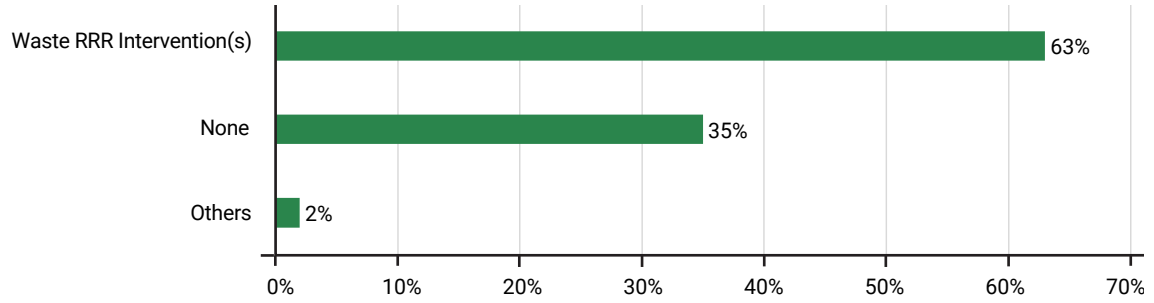
Regarding the 3R interventions used, about 63 per cent of the enterprises implemented waste reduction, reuse and recycle measures including composting, use of waste for mulching, and as fuel (Figure 4.6).

This section has discussed the outcomes of the SWITCH Africa Green programme interventions in the sustainable agriculture sector. The findings reveal that sustainable agriculture offers opportunities for employment and income generation, and opportunities to contribute to improved environmental performance. The results also indicate an improved uptake of SCP practices directly attributed to the SWITCH Africa Green programme. While the programme emphasized the promotion of participation of youth and women in sustainable agriculture, there is scope for increased participation.

Table 4.3: Water sources and water-use interventions

Sources of water							
Water Use Intervention							
	Borehole	**Mixed**	**Others**	**Rain-fed**	**River Water**	**Service Provider**	**Total by Intervention**
Installation of water saving devices	2%	14%	0%	1%	3%	0%	20%
Others	2%	0%	0%	0%	0%	0%	2%
Rainwater harvesting	0%	2%	0%	13%	1%	0%	16%
Regular maintenance and monitoring	2%	1%	0%	0%	0%	0%	3%
Reuse	0%	3%	0%	1%	0%	0%	4%
Water conservation	2%	1%	0%	0%	1%	0%	4%
Water tank construction	1%	1%	0%	0%	1%	1%	4%
Total by water source	**18%**	**25%**	**1%**	**39%**	**7%**	**6%**	

Figure 4.6: Implementation of 3Rs



Source: SWITCH Africa Green Programme Survey Data

"The group recycles the crop residues by ploughing them back into the soil"

-Wabedi Mer Farmer's Group, Uganda

Box 4.4: Vegetable production using Organic Fertilizer - OUEDRAOGO Albert & brothers, Burkina Faso

OUEDRAOGO Albert & brothers Burkina Faso

The vegetable production sector in northern Burkina is faced with storage difficulties leading producers to sell their crops at a low price. The type of production is unsustainable due to the increasing use of chemical fertilizers leading to the continual change of production areas.

Before SWITCH Africa Green, the MSME OUEDRAOGO Albert & brothers, was faced with losses due to poor storage and excessive use of chemical fertilizers. The project trained the MSME on converting household waste into agricultural fertilizer through composting. The interventions included integrated management of household waste, appropriation of suitable techniques for composting waste, the substitution of chemical fertilizer by compost, and the technique of building a compost pit, amongst others.

The impact of these interventions was that the MSME was introduced to sustainable agricultural practices that were less harmful to the land and awareness was raised on the impact of chemicals on the quality of production, the duration of conservation, the degradation of cultivable land.

The MSME, as a result, has reduced its use of chemical fertilizer by 50 per cent from 20 bags per year to 10 bags and a 20 per cent reduction in pesticide use. With the production of compost, from 2016 to 2018, a total saving of 30 bags of fertilizer in XOF450,000 was realized by the MSME. With improved storage of harvest, the MSME has also been able to sell 50 per cent of its potato at harvest and 50 per cent four months later. This has significantly cut out post-harvest losses.

Additionally, the MSME has created two additional direct jobs and five indirect jobs (women for the potato and okra harvests). As a result of the profits generated, the MSME was able to acquire three bicycles (worth a total of XOF150,000) for its employees. The MSME notes an improvement in the living conditions of these workers and himself, and an improvement in financial independence.

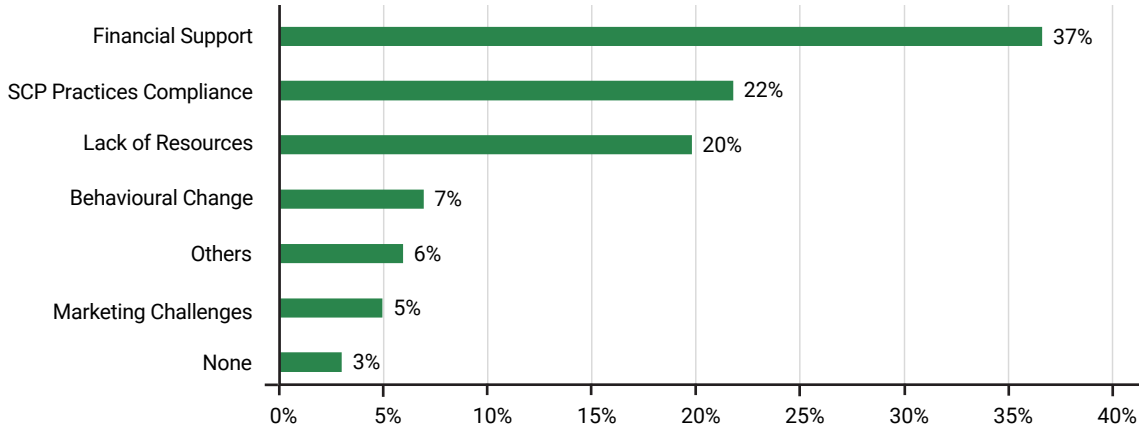
5. Opportunities, challenges, and lessons learnt

While the application of SCP patterns and practices in the agriculture sector offers multiple opportunities including job creation, income generation, and environmental benefits, various challenges need to be addressed to support the transition to sustainable agriculture. Through the SWITCH Africa Green survey, beneficiary enterprises identified the challenges they faced during the implementation of SCP measures. Also, during the regional sector meeting on sustainable agriculture held on 27-28 November 2019, stakeholders discussed and validated this report, thereby providing additional information on the challenges, lessons, and opportunities. There are multiple opportunities, challenges, and experiences. The key challenges relate to the need for financial support, broad resource constraints, government policy environment, compliance with SCP practices, marketing, and behavioural change (Figure 5.1). The key challenges are discussed below.

1. Financial support

About 37 per cent of the MSMEs indicated that they needed financial support to implement SCP interventions. A review of the responses reveals that there are diverse needs. These include operational costs such as electricity and transport as well as capital investments. The investments include start-up capital, investment in renewable sources of energy such as solar for water pumping biodigesters, and reservoir water tanks to enhance water efficiency. Several MSMEs also needed finance to acquire better farming equipment and tools.

Figure 5.1: Challenges faced by MSMEs



Source: SWITCH Africa Green Programme Survey Data

2. Compliance with SCP

Twenty-two per cent of the enterprises reported that tedious processes were their major challenge. A review of the responses reveals that the problem is noted particularly in keeping farm records and documentary evidence for certification purposes, where eco-labelling and certification are involved. For instance, the SWITCH Africa Green programme supported capacity building on Standard MauriGAP level 1 (MS 184:2015) which the Government of Mauritius is developing and implementing as voluntary GAP and eco-labelling scheme. It is noted that the level of awareness and capacity of planters to meet the certification is a challenge. Also, there is little incentive for shifting to GAP when the green products do not attract a price premium in the market.

3. Lack of resources

Lack of resources is reported as the third major challenge in the sector. A closer examination of the issues raised indicates a diverse range of issues. The recurrent issues include lack of electricity and or unstable power supply, poor infrastructure, high cost of inputs, lack of agro-processing equipment, access to land, and farm tools and equipment.

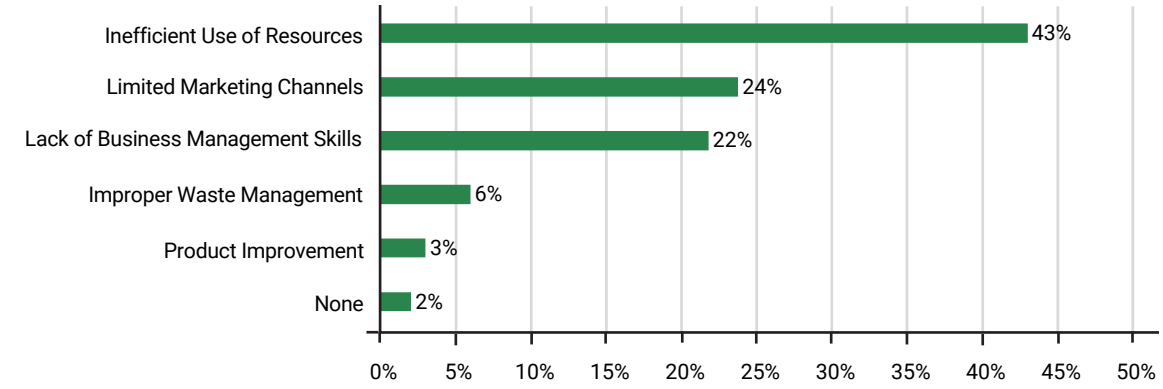
4. Other challenges

The other key challenges that were reported included:

a. behavioral change especially among group members to support SCP practices;
b. marketing challenges particularly related to the competitiveness of sustainable products relative to the conventional products that fetch similar prices in the market;
c. adverse weather conditions were cited as a challenge. As noted above, 39 of the surveyed enterprises rely on rain-fed agriculture and are thus highly vulnerable to climate change and variability;
d. lack of government support; and
e. diseases.

During the implementation of the programme, various toolkits were developed and used for capacity building. The toolkits include business administration, green business toolkits, planting and harvesting, and resource efficiency, and monitoring and evaluation. The survey data reveals that 97 per cent of the enterprises learnt different aspects of sustainability through the application of the toolkits. Forty-three per cent learnt efficient resource utilization including water-use efficiency, energy efficiency, and soil, crop and pest management. Other areas addressed through toolkits include marketing, business management skills, and waste management (Figure 5.2). This finding underscores the need for capacity building for MSMEs.

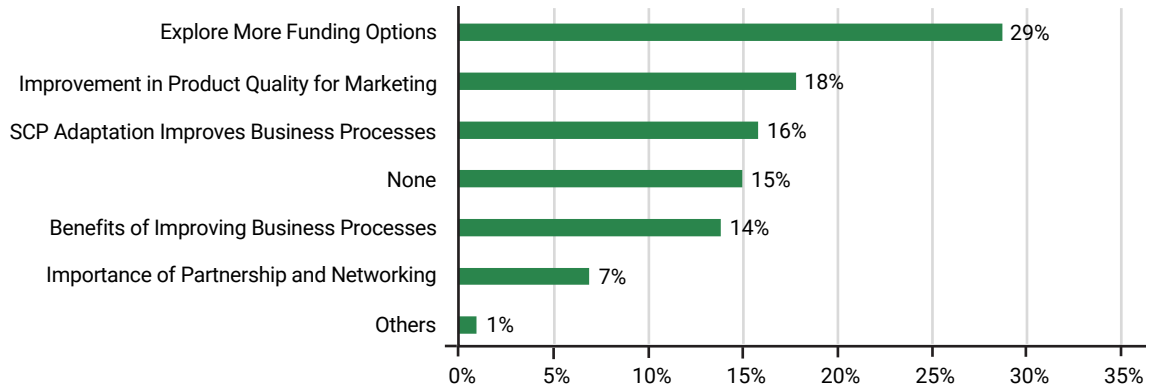
Figure 5.2: Lessons learnt from SWITCH Africa Green toolkits



Source: SWITCH Africa Green Programme Survey Data

Figure 5.3 summarizes the various lessons learnt by the surveyed enterprises during the implementation of the programme. Twenty-nine per cent of the enterprises indicated that from their experience there was a need to explore more funding options as the sources of funding are limited. The experience of 18 per cent of the enterprises is that improved quality matters for market access. This finding underscores the importance of producing quality agricultural products that meet market demands including food safety. Sixteen per cent of the enterprises appreciate the importance of adoption of SCP practices, improved business processes (14 per cent), and partnerships and networks (7 per cent) (Figure 5.3).

Figure 5.3: Lessons learnt from the implementation of the project



Source: SWITCH Africa Green Programme Survey Data

6. Conclusion and recommendations

The findings reveal that the application of SCP practices in agriculture has economic, social, and environmental benefits. The results also indicate that the interventions of the SWITCH Africa Green programme trigger the envisaged change in behavior and enterprise performance and thus support the transition to sustainable agriculture development. This is reflected in the reported improved capacity of MSMEs, improved performance, and uptake of SCP practices. While the project emphasized the participation of women and youth in sustainable agriculture, there is scope for increasing the labour participation of women and youth in the sector. The findings in this report provide a basis for the following set of recommendations.

1. Financing transition to sustainable agriculture

Financing the transition to sustainable agriculture is a significant challenge as noted above. At the enterprise level funds are required to implement resource-efficient technologies in energy- and water-use to upscale and implement innovative green technologies. Innovative green financing mechanisms, including green funds and fiscal incentives are required to support the adoption of green technologies in the sector. Public investment in agricultural infrastructure, extension workers, and protection of the environment is encouraged and should leverage private sector resources in arrangements such as public-private partnerships.

2. Capacity building and knowledge sharing

Experience from Mauritius with the implementation of MauriGAP indicates that capacity building and awareness are important in greening agriculture, especially where standards and certification are required. Overall, the SWITCH Africa Green programme developed various knowledge and information resources and delivered training on various aspects of SCP practices in the agriculture sector.

Many beneficiary enterprises underscore the importance of SCP and skills for improved business performance. Some of the relevant areas for continued capacity building and knowledge sharing include business skills to support commercialization of agriculture, soil management, pest and weed control, eco-innovations and solutions, and standards and certification.

3. Policy and regulatory framework

The challenges experienced by MSMEs during project implementation point to the need to create an enabling environment for a thriving private sector in sustainable agriculture. There is thus a need to review and align the policy and regulatory framework to support sustainability including productivity, up-take of SCP practices, and resilience. The key areas include rural transport and agriculture infrastructure, mitigation and adaption policy measures, agricultural research and innovation systems, and fiscal incentives such as subsidies and tax incentives that support sustainable agriculture.

4. Climate change

Innovative solutions need to be developed that enable the consideration of the impact of climate change in sustainable agriculture – including permaculture, conservation, urban agriculture and use of traditional knowledge and systems of coping.

5. Other policy areas

Other important policy dimensions that were noted include rural infrastructure, agricultural research, extension services, and innovation systems.

7. References

Alliance for a Green Revolution in Africa (2016), Africa Agriculture Status Report: Progress Towards Agriculture Transformation in Sub-Saharan Africa, (Issue 4). Nairobi: Alliance for a Green Revolution in Africa (AGRA)

Alliance for a Green Revolution in Africa (2018). Africa Agriculture Status Report: Catalyzing Government Capacity to Drive Agricultural, (Issue 6). Nairobi: Alliance for a Green Revolution in Africa (AGRA)

Fuglie, K., Gautam, M., Goyal, A. and Maloney, W.F. (2020). Harvesting Prosperity: Technology and Productivity Growth in Agriculture. Washington, DC:

World Bank (2020), World Development Indicators, http://wdi.worldbank.org/table (Accessed May 31, 2020)

International Food Policy Research Institute (2016), Agricultural productivity in Africa : trends, patterns, and determinants / edited by Samuel Benin. DOI: http://dx.doi.org/10.2499/9780896298811

International Monetary Fund (2012), Burkina Faso: Strategy for Accelerated Growth and Sustainable Development 2011–2015, https://www.imf.org/external/pubs/ft/scr/2012/cr12123.pdf
World Bank (2020), World Development Indicators, http://wdi.worldbank.org/table (Accessed May 31, 2020)

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

World Bank (2020), World Development Indicators, http://wdi.worldbank.org/table (Accessed May 31, 2020)

Republic of Mauritius, Mauritius Vision 2030 Foreign Affairs. (2017), Innovative and Globally Competitive

Republic of Mauritius (2016), Strategic Plan (2016 - 2020) for the Food Crop, Livestock and Forestry Sectors

Republic of Uganda. (2015), Second National Development Plan (NDP II) 2015/16-2019/20. https://consultations.worldbank.org/Data/hub/files/consultation-template/materials/ndpii-final11.pdf

Republic of Kenya (2018), Ministry of Agriculture, Livestock, Fisheries and Irrigation, Agriculture Sector Transformation and Growth strategy

SWITCH Africa Green (2018). Review of laws, policies, and business environment: Country Implementation Report and Plan: Ministry of Environmental and Forestry, Republic of Kenya

SWITCH Africa Green (2016). The country Implementation Report and Plan, Republic of Mauritius. Ministry of Social Security, National Solidarity, and Environment and Sustainable Development

SWITCH Africa Green (2017). Review of laws, policies, and business environment: Country Implementation Report and Plan, Government of Uganda, Ministry of Water, and Environment.

8. ANNEX I: Selected SWITCH Africa Green interventions

SWITCH Africa Green Strategic Interventions	Outputs	Outcomes
Knowledge Resources	• Sustainable procurement guidelines to support MauriGAP • Green marketing guidelines- MauriGAP • 10 factsheets on honeybush cultivation • Sustainable agricultural practices – South Africa • 20 Toolkits on Ocimum kilimandscharicum, Mondia whytei and health, and safety	9,983 jobs created during the implementation of the programme 48% of the MSMEs employed additional staff - 63 % of the MSMEs reported improved health and safety at the workplace
Capacity building	• 71 planters undergoing MauriGAP Certification • Training on MauriGAP standards level 1 (DMS 184:2014) • 30 farmers on sustainable agricultural practices – South Africa • Four pilot hotels and five retailers to promote agro-tourism and production of certified FFV -Mauritius • Policy paper for sustaining MauriGAP extension to farmers • 65 trained in green procurement, green marketing, and hotspot analysis • 240,000 hectares put under sustainable rangeland management • 95 hh supported in Rangeland management • 5 new sustainable businesses created • 10 No. - training on honeybush farming • Training of 8 officers of the Ingquza Hill Local Municipality • Training workshop with policymakers - Kwazulu Natal Department of Agriculture and Rural Development (DARD) • 4 workshop projects were conducted on sustainable production and commercialization strategies • 38 marketplaces established in the Kakamega county; • Training of 627 community members in SCP practices • 360 community members participating in forest conservation • 15 farmer groups, 10 MSME staff, 10 local leaders, 10 government staff were trained in different topics within the organic production of sesame • 15 youths were trained as ToT on eco-agriculture • Recruitment of 9 trainee coaching experts to increase the pool of experts for ecolabelling services in South Africa • 31 women were trained on Gombava cultivation • 112 farmers (75 from Limpopo, 29 from Eastern Cape, 6 from KwaZulu, 1 from Gauteng and 1 from Mpumalanga).	55% of the MSMEs implemented new policies during the project implementation 57% of the enterprises implemented 3Rs 88 % of the enterprises reported social impact including social inclusiveness, economic activity, and youth empowerment 89 planters MauriGAP certified 36 planters certified MauriGAP (including 8 through pilot projects) 5 new sustainable businesses created 91 per cent of enterprises reported improved staff capacity in areas such as business planning, quality management, communication, and marketing 59 per cent of the enterprises reported new emerged business opportunities

SWITCH Africa Green Strategic Interventions	Outputs	Outcomes
Awareness creation, Networking & Communication	• Standardized posters, banners, and flyers on MauriGAP • Awareness creation forums were held by way of presentations, panel discussions, expos, conferences, exhibition, electronic and social media platforms including information dissemination through developed information booklets and leaflets • Global G.A.P. Brochure • multi-stakeholder advisory board to support consultation and the consumer awareness campaign on MauriGAP in Mauritius • Kampala, GreenBiz forum, Kimberly Business Forum, Bloemfontein Business Forum	61% of the enterprises reported improved sales directly associated the programme

Annex II: List of participants			
SWITCH Africa Green Regional Sector Meeting on Sustainable Agriculture			
27-28 November 2019,			
Nairobi, Kenya			
No.	**NAME**	**COUNTRY**	**ORGANIZATION**
1	Emile Nounagnon Houngbo	Benin	National University of Agriculture (UNA)
2	Bassono Benjamin Yworega	Burkina Faso	Ministry of Animal Resources
3	Bationo Becquet Polycarpe	Burkina Faso	Ministry of the Environment, Green Economy and Climate Change
4	Binto Traore Ouedraogo	Burkina Faso	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
5	Boureima Ouedraogo	Burkina Faso	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
6	Compaore Albert	Burkina Faso	Ministry of the Environment, Green Economy and Climate Change (MEEVCC)
7	Ezona Alida Koala-Kier Bazye	Burkina Faso	Chamber of Agriculture
8	Ouedraogo Jaochim	Burkina Faso	Ministry of the Environment, Green Economy and Climate Change (MEEVCC)
9	Relwende Cecile Belem	Burkina Faso	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
10	Savadogo Adama	Burkina Faso	General Directorate of Plant Production
11	Sidibe Ousmane	Burkina Faso	Ministry of the Environment, Green Economy and Climate Change
12	Yassia Savadogo	Burkina Faso	Association Jeunesse Solidaire pour le Développement Véritable (AJSDV)
13	Colette Maba	Cameroon	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
14	Fofiri Nzossie Eric Joël	Cameroon	Ministry of Environment, Protection of Nature and Sustainable Development - EBAFOSA
15	Michel Takam	Cameroon	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
16	Patrick Lang Sama	Cameroon	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
17	Koya Natoueu Jean Claude	Côte d'Ivoire	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
18	Bernard Lutete Di Lutete	Democratic Republic of Congo	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
19	Azeb Dagne	Ethiopia	Environment, Forest and Climate Change Commission (EFCCC)
20	Brihanu Assefa Seyoum	Ethiopia	Ministry of Agriculture
21	Cheru Abera Zeberga	Ethiopia	Ministry of Agriculture
22	Getaneh Abrha	Ethiopia	Ministry of Health

No.	NAME	COUNTRY	ORGANIZATION
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24	Misgana Elias Kallore	Ethiopia	UNEP Liaison Office in Addis Ababa, Ethiopia
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26	Sileshi Bekele Tekle	Ethiopia	Ministry of Agriculture
27	Wordy Hashim Abdullahi	Ethiopia	Environment, Forest and Climate Change Commission (EFCCC)
28	Ahmed Aderibigbe Salami	Gambia	Ecosystem Based Adaptation for Food Security Assembly (EBAFOSA)
29	Ataa Konadu Agyemang	Ghana	National Cleaner Production Centre (NCPC)
30	Daniel Digber	Ghana	National Cleaner Production Centre (NCPC)
31	Enyonam Edwina Quist	Ghana	Ministry of Food and Agriculture
32	Florence Agyei	Ghana	Women in Agriculture
33	Gibrilla Ahmed	Ghana	Ministry of Food and Agriculture
34	Helena Dodd	Ghana	Environmental Protection Agency
35	Kingsley Ansah Bekoe	Ghana	United Nations Development Programme (UNDP)
36	Lambert Faabeluon	Ghana	National Cleaner Production Centre (NCPC)
37	Selina Okaebea Amoah	Ghana	Environmental Protection Agency
38	Yussif Abdallah	Ghana	Tolon District Assembly
39	Agnes Muchanji	Kenya	Shamiloli Forest Conservation Group
40	Albin Ruto Sang	Kenya	Ministry of Agriculture, Livestock and Fisheries
41	Amos Kiptanui	Kenya	County Government of Kiambu
42	Caroline Njiru	Kenya	WWF Kenya
43	Carolyne Kilel	Kenya	United Nations Environment Programme (UNEP)
44	Celia Marquez	Kenya	United Nations Office for Project Services (UNOPS)
45	Christine Chege	Kenya	CIAT-Kenya
46	Christopher Mulielie Nasibi	Kenya	County Government of Kisumu
47	Collins Choge	Kenya	Transnational Bank
48	Cosmas Munyeke	Kenya	County Government of Kajiado
49	David K. Kamau	Kenya	County Government of Nyandarua
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52	Dr. Wilber Lwande	Kenya	Consultant
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55	Fabienne Pierre	Kenya	United Nations Environment Programme (UNEP)
56	Fabrice Pinard	Kenya	National Union of Coffee Agribusinesses and Farm Enterprises Limited (NUCAFE)
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64	Jane Atieno Odero	Kenya	County Government of Nakuru
65	Jane Macharia	Kenya	National museums of Kenya
66	Jane Njeri Reuben	Kenya	Ministry of Agriculture, Livestock and Fisheries
67	Jane Wambui Kamangu	Kenya	County Government of Nakuru
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69	Jones Yawovi Dzinekou	Kenya	Tangaza University College
70	Joseph Njoka Mbogo	Kenya	Ministry of Agriculture, Livestock and Fisheries
71	Joyce Wambui Kamande	Kenya	SEED Kenya
72	Julia Koikai	Kenya	Odupa Enterprises
73	Juliette Biao	Kenya	United Nations Environment Programme (UNEP)
74	Kamala Ernest	Kenya	United Nations Environment Programme (UNEP)
75	Kevin Kanyuira Gikonyo	Kenya	County Government of Kisumu
76	Leah Mutinda	Kenya	Fairtrade
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82	Marius Vogel	Kenya	Embassy of Switzerland
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86	Mercy Kinoti	Kenya	Rena Farms
87	Mercy Mwende	Kenya	Sweet and Dried Enterprises Ltd
88	Nancy Wanjiku Berenju	Kenya	Kiambu Strawberry Growers and Processors
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93	Pauline Kimani	Kenya	Pamat Foods Ltd
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97	Ranieri Portilho	Kenya	Etimos Foundation
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116	Winfred Katumo	Kenya	County Government of Kiambu
117	Winnie Khaemba	Kenya	SEED Kenya
118	Zablon Mwirotsi	Kenya	Shabwali 20th Self Help Group
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123	Collet Antonia	Mauritius	Agriculture Enterprise
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Sustainable Tourism

Integrated Waste Management

Green Manufacturing

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