



**Country:** Kenya  
**Sector:** Integrated Waste Management  
**Project:** Enhancing Resource Productivity and Environmental Performance of MSMEs in 6 African countries through the concept of Industrial Symbiosis (IS)  
**Grantee:** Kenya National Cleaner Production Centre (KNCP)  
**Partner:** African Roundtable on Sustainable Consumption and Production (ARSCP)

## Acknowledgements

The SWITCH Africa Green programme was developed by the European Commission to support African countries in their transition to an inclusive green economy, the main objective being to promote sustainable development. This is based on sustainable consumption and production (SCP) patterns, while generating growth, creating decent jobs and reducing poverty.

This impact sheet on 'Enhancing Resource Productivity and Environmental Performance of MSMEs in 6 African countries through the concept of Industrial Symbiosis (IS)' provides a snapshot of results and achievements of the project under the Green Business Development Component of Phase I (2014-2019) of the SWITCH Africa Green programme. This component supported micro, small and medium-sized enterprises (MSMEs) to apply and adopt SCP practices in their business operations.

The project was implemented by the Kenya National Cleaner Production Centre (KNCP) in partnership with the African Roundtable on Sustainable Consumption and Production (ARSCP) with the support of the SWITCH Africa Green National Focal Point Dr. Charles Mutai, Ministry of Environment and Forestry, Kenya and National Coordinator Dr. Lily Chebet Murei, United Nations Development Programme (UNDP, Kenya). The grants were managed by the United Nations Office for Project Services (UNOPS) and coordinated by Celia Marquez with support from Mercy Gatobu.

Supervision and coordination for development of the impact sheet was done by Rhoda Wachira and Patrick Mwesigye and programme support was provided by Carolyne Kilel and Sylvia Munuhe, Africa Office, United Nations Environment Programme (UNEP).

The impact sheet was compiled by Sheila Karue consultant, UNEP. Editing, layout and design was coordinated by the communication division, UNEP.

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## Background

The Kenya National Cleaner Production Centre (KNCP) supported MSMEs in Kenya to implement Resource Efficient and Cleaner Production (RECP) and Industrial Symbiosis (IS) with the aim of enhancing their productivity and environmental performance. The challenges faced by many MSMEs in Africa, as is the case in Kenya, include inefficiency in energy use due to type of fixtures and equipment, inefficient water use, poor waste management, poor record keeping and lack of data on consumption patterns and lack of awareness of RECP as well as IS. The impacts are translated to high energy, water and waste disposal bills, high levels of wastage and reduced productivity per unit of input.

Benefits to enterprises taking part in IS include improved resource efficiency, diversion of waste from landfill to useful products, water savings, carbon emissions reduction, raw material savings, green jobs creation, demand-led innovation, increased sales, reduced costs, profit and thus tax revenue at the national level.

During project implementation, in-depth assessments were conducted of MSMEs which provided baseline data for the implementation of RECP and IS interventions. The grantee provided technical capacity building support to the enterprises as they implemented RECP and IS measures to enhance their productivity. The project resulted in significant benefits for the respective MSMEs in terms of financial savings, reduced pollution, green jobs creation, energy management, diversion of waste from landfill and improved health and safety of the workers.

## Beneficiaries

The project engaged a total of 134 MSMEs, 123 of which are in manufacturing and 11 in waste collection and handling, to implement resource efficient and cleaner production as well as Industrial Symbiosis (IS).

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## Objectives

- To enhance resource productivity and environmental performance of selected MSMEs within the Nairobi metropolitan area.
- To promote sustainability among MSMEs in Nairobi by encouraging reuse of the by-products of other enterprises by using IS.
- To promote use of integrated waste management approaches.
- To demonstrate a large-scale IS network in Kenya as a basis for replication to other areas.





## Outputs

### National policy dialogue on IS

The KNCP organized a national dialogue for policy makers in 2018 to discuss IS. Participants were drawn from relevant ministries and government departments, local government, environmental protection and regulatory agencies, private sector associations, technical support institutions and representatives from UN agencies. Discussions were held on strategies to create an enabling policy framework for IS in Kenya. It was agreed that there was a need to review the Waste Management Bill to make provisions for IS as well as determine the national ministry in which to anchor IS in the country.

### Provide technical support in resource efficient and industrial symbiosis

The capacity of the enterprises was enhanced through technical support provided to 13 MSMEs in implementing RECP and IS.

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### Waste exchange app developed

As a result of the project, a waste exchange app was developed for electronic waste.

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### Improved capacities of workers in green sectors

During project implementation, six training workshops were conducted on RECP and IS for 110 MSMEs, benefitting 219 participants, with 169 being male and 50 female. The enterprises were drawn from different sectors which included

waste recycling, manufacturing, leather processing, and waste handlers and transporters. The workshops used training manuals, presentations, brochures, a data collection toolkit, and case studies of best practices.

A waste exchange hub was developed to provide a platform where different enterprises can access information on types of waste and by-products available, which may be useful for their respective business processes.

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## Increased networking among green businesses

Staff from Kenya National Cleaner Production Centre ((KNPCPC)) participated in the 'training-of-trainers' workshop on industrial symbiosis, organized by the African Roundtable on Sustainable Consumption and Production (ARSCP) and held in Pretoria South Africa. Technical staff from KNPCPC also participated in a knowledge sharing event organized by ARSCP in Mauritius. This created an opportunity to network with other SWITCH Africa Green Programme grantees. Project beneficiaries participated in the SWITCH Africa Green Regional Networking Forums in Uganda (2016) and in Burkina Faso (2018).

## Outcomes

### Uptake of SCP practices by MSMEs

The enterprises adopted the following SCP practices:

- installing line reactors
- capacitor banks
- lagging steam pipes
- using LED bulbs
- sealing water leakages
- reusing and recycling waste

- installing energy and water meters
- recycling wastewater
- waste exchange
- staff training in RECP and IS
- installing skylights in production floors
- monitoring resources consumption.

### Improved business performance by MSMEs

Following the implementation of IS, enterprises that were previously incurring costs by disposing of their waste were now selling it and therefore generating extra income. Implementing the RECP measures resulted in enhanced productivity among the MSMEs.

## Impacts

### Environmental impacts

#### Water productivity

Following project implementation, the amount of water saved annually was 231,092m<sup>3</sup> while wastewater was reduced by 214,455m<sup>3</sup> per annum.

**the amount of water saved annually was 231,092m<sup>3</sup>**





### CO<sub>2</sub> emissions avoided

Energy efficiency and management interventions saved a total of 21,284,171.3 kWh annually translating to 15,840,042 kgs of CO<sub>2</sub> equivalent annually.

One job was created for an environmental health and safety officer to champion RECP and other environmental management aspects.

**Energy efficiency and management interventions saved a total**

**15,840,042 kgs of CO<sub>2</sub> equivalent annually.**

### Amount and type of waste treated

A total of 50,833.6 tonnes of waste was diverted from the dumpsites and exchanged among the enterprises implementing IS.

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### Economic impacts

Total savings made by the enterprises from implementing the project was USD234,060. The savings were made from implementing the RECP measures identified as leading to increased productivity in the MSMEs that were engaged.

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### Lessons learnt

- Lessons learnt from the implementation of this project show that RECP and IS are beneficial to industries and MSMEs in enhancing their resource productivity and environmental performance
- Management commitment is key in ensuring the success of RECP and IS adoption by the MSMEs
- A regulatory compliance approach can enhance the adoption and implementation of RECP and IS in the MSMEs
- Information exchange forums help MSMEs with learning and networking for adopting RECP and IS
- Continuous stakeholder cooperation and collaboration with technical institutions such as KNCPC and regulatory authorities should ensure project sustainability
- Appropriate financing mechanisms are needed to support RECP and IS investments in the MSMEs



“Backed by the organization’s top management, the implementation of these resource efficiency measures have yielded massive benefits for the company. For instance, to address the energy challenge, the company serviced the ammonia compressor & the evaporative condenser and installed a new burner, steam fittings, valves and make up pumps among other installations. This has resulted in monthly energy savings of 1.2 million shillings (\$12,000) for the company. In addition, the company has reduced its environmental pollution by installing a new burner. These steps have also resulted in an improved relationship with the community around the premises,”

Arthur Okwemba, New KCC Dandora, Kenya.



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