



Sustainable Manufacturing and
Environmental Pollution

Workshop Report

*Policy and Regulatory Environment for Enhancing Adoption of Resource Efficiency and
Cleaner Production*

4 October 2024

Panari Hotel, Nairobi, Kenya



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This is a project output funded by the Sustainable Manufacturing and Environmental Pollution (SMEP) Programme.

Project tile: Solutions to enhance uptake of Resource Efficient & Cleaner Production (RECP) and wastewater treatment for enterprises in the Nairobi Rivers Basin.

This project is implemented by Kenya National Cleaner Production Centre (lead), Kanku Kenya Ltd and Fintech Frontiers and has been awarded a UK International Development grant to pilot solutions for water pollution in the Nairobi Rivers Basin caused by manufacturing industries. The grant has been made via the SMEP Programme and has been awarded until March 2026.

The SMEP Programme is funded by UK International Development and is implemented in partnership with the UN Trade and Development (UNCTAD) who provide technical support. UK International Development have appointed a Project Management Agent (PMA) to manage programme delivery. The PMA comprises a consortium partnership between Pegasys and SouthSouthNorth.

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Table of Contents

ABBREVIATIONS AND ACRONYMS	III
EXECUTIVE SUMMARY	1
Workshop Details	1
Specific Objectives	1
Workshop Highlights.....	1
Context of the Nairobi River Basin.....	1
Why RECP and Membrane Technology?	1
Conclusion	3
Recommendations.....	3
WORKSHOP REPORT	5
1 Introduction	5
1.1 Background.....	5
1.2 Objectives of the workshop.....	6
1.3 Expected outcomes of the Workshop	7
2 Workshop Delivery Approach	7
2.1 Organisation and Participants.....	7
2.2 Format of the Workshop	8
3 Workshop Deliberations.....	9
3.1 Opening session	9
3.2 Technical Sessions I: Actions on Industrial Pollution in NRB under the SMEP Programme	11
3.3 Technical Sessions II: Opportunities and Barriers for Adoption of RECP Measures	13
4 Suggested Directions for Policy and Regulatory Actions to Support RECP	14
4.1 Towards financing greener technologies and practices	14
4.2 Strengthening and innovating policies, regulatory measures and enforcement styles	15
5 Closing Session	16
ACKNOWLEDGEMENTS	17
RECOMMENDED CITATION.....	17
APPENDICES.....	18
Appendix A: Workshop Agenda.....	18
Appendix B: Notes from Group Break-Out Sessions.....	20

ABBREVIATIONS AND ACRONYMS

COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EPZ	Export Processing Zone
ETP	Effluent Treatment Plant
FCDO	Foreign Commonwealth and Development Office
FTA	Free Trade Area
KNCP	Kenya National Cleaner Production Centre
NEMA	National Environment Management Authority
NRB	Nairobi Rivers Basin
NRC	Nairobi Rivers Commission
RECP	Resource Efficiency & Cleaner Production
SDI	State Department for Industry
SMEP	Sustainable Manufacturing and Environmental Pollution
UNCTAD	United Nations Conference on Trade and Development
WWT	Wastewater Treatment

EXECUTIVE SUMMARY

Workshop Details

Date and Venue: 4th October, 2024, Panari Hotel, Nairobi

Organized by: Kenya National Cleaner Production Centre (KNCPC) in conjunction with the National Environment Management Authority (NEMA) and the Nairobi Rivers Commission (NRC)

Participants: Government representatives, Enterprises operating in the Nairobi River Basin, Environmental experts, Civil society organizations (CSOs), Academic and research institutions, Development Partners (UNCTAD, SouthSouthNorth), County Governments, Water and Sewerage Companies.

Purpose of the Workshop: To discuss and align policies and regulations for scaling Resource Efficient and Cleaner Production (RECP) and membrane technology adoption in enterprises to mitigate pollution in the Nairobi River Basin.

Specific Objectives

- i. To evaluate existing policy and regulatory gaps hindering RECP and advanced wastewater treatment adoption.
- ii. To identify actionable strategies to integrate RECP with membrane technology for wastewater pollution reduction at source followed by treatment of residual pollution by enterprises.
- iii. To foster partnerships among regulators, industries, and communities to mitigate pollution in the Nairobi River Basin.

Workshop Highlights

Context of the Nairobi River Basin

The river basin is vital for Kenya's socio-economic activities but faces severe pollution from industrial, domestic, and agricultural sources. Current wastewater treatment methods, though in place, have proven insufficient to meet the growing pollution challenge. Over 60% of the 4,000 industries and institutions sampled do not comply to effluent discharge standards.

Why RECP and Membrane Technology?

- RECP: Reduces resource waste and minimizes environmental impacts by improving operational efficiency in enterprises.
- Membrane Technology: A cutting-edge solution for wastewater treatment offering high efficiency in removing pollutants, aligning with pollution prevention goals.
- RECP practices and membrane technologies show significant potential to reduce water, raw materials, energy and waste by up to 95% in pilot studies.
- Lack of incentives and technical capacity are critical barriers.

(i) Policy and Regulatory Landscape

Key Policies and Legislations

- *Kenya's Environmental Management and Coordination Act (EMCA) 1999*: Section 57 requires the development of Regulations on application of economic instruments for sustainable environmental management.
- *Waste Management Regulations (2006)*: regulates waste management and encourages cleaner production.
- *Water Quality Regulations (2006)*: Regulates industrial discharge
- *Water Act (2016)*: Governs water quality standards and pollution control.
- *National Environmental Policy (2013)*: Calls for sustainable industrial development.
- *Green Industry Policy (under development)*: Encourages adoption of environmentally friendly technologies.
- *Sustainable Waste Management Act (2022)*: promotes circular waste management

Gaps and Challenges on Policies and Legislation

- Enforcement style of effluent regulations does not foster the uptake of RECP
- Lack of guidelines to implement the Water Quality Regulations (2006)
- Lack of Guidelines to implement RECP by industry
- Lack of coordination between regulatory bodies like NEMA, Water Resources Authority (WRA) and county governments (i.e. Water and Sewerage Companies).

(ii) Resource Efficiency and Cleaner Production (RECP):

Benefits for Enterprises:

- Reduction in operational costs through efficient energy and water use,
- Enhanced compliance with regulatory standards (
- Improved competitiveness in export markets demanding environmentally friendly products.

Gaps and challenges:

- Lack of incentives for enterprises to invest in RECP and advanced wastewater treatment technologies.
- Limited awareness and technical expertise and funding for enterprises to adopt cleaner technologies
- Enterprises stressed the financial burden of adopting RECP and wastewater treatment technologies.
- Regulators noted limited technical resources and manpower for monitoring compliance.
- Fragmented technical support and capacity-building initiatives.

Case Studies:

- A beverage company reducing water usage by 30% through RECP practices like process optimization
- Textile industries adopting cleaner dyeing methods, cutting chemical waste by 40%.

(iii) Membrane Technology for Wastewater Treatment

Benefits to Enterprises:

- Compact and modular design suitable for urban industrial areas
- High efficiency in pollutant removal
- Enables water reuse, reducing freshwater demand.

Challenges for Enterprises:

- *Barriers* - High initial capital and maintenance costs deter SMEs
- *Technical Knowledge* - Requires skilled labour for operation and maintenance
- *Policy and Regulation* - Absence of mandates or incentives to adopt advanced treatment technologies.

Case Study:

- REPCP pilot results showing 95% pollutant removal and water recovery in a chemical factory using membrane technology

Conclusion

- The workshop underscored the critical role of policy and technology in achieving pollution prevention goals in the Nairobi River Basin.
- Immediate actions, including development of incentives, pilot programs, and capacity building, are essential to scale adoption of RECP and membrane technology.
- A co-ordinated effort involving all stakeholders is necessary to achieve sustainable industrial development and environmental conservation.

Recommendations

(i) Policy and Legislation

- Establish an RECP Hub in the Nairobi River Basin to provide technical assistance.
- Train Environment Inspectors to apply RECP as an additional tool for environmental compliance to foster its uptake
- Develop guidelines to implement the Water Quality Regulations (2006)
- The Nairobi Rivers Commission to provide a platform for coordination between regulatory bodies like NEMA, Water Resources Authority (WRA) and county governments (i.e. Water and Sewerage Companies).

(ii) Capacity Building and Awareness Creation

- KNCPC to partner with Water and Sewerage Companies and EPZA to offer training on RECP and membrane systems.
- Conduct workshops targeting SMEs to demonstrate cost-saving benefits of RECP
- Facilitate formation of Industry Sector Waste Minimisation Clubs

(iii) Resource Efficient and Cleaner Production

- Develop an integrated National Cleaner Production Strategy that mandates RECP adoption.
- Develop public-private partnerships (PPPs) to scale RECP adoption.
- Integrate Pollution Prevention Strategies by combining RECP and membrane technologies to reduce effluent volumes and improve water quality.
- Establish a multi-stakeholder Nairobi River Basin Cleaner Production Forum to coordinate efforts.
- Establish an integrated database for monitoring industrial compliance in real-time.

(iv) Membrane Technology for Wastewater Treatment:

- Include membrane technology in the list of acceptable wastewater treatment technologies.
- Promote modular and decentralized wastewater treatment units for SMEs.

(v) Funding and Financial Models:

- Introduce tax incentives or subsidies for adopting cleaner technologies. Particularly, develop regulations and guidelines to operationalise Section 57 of EMCA
- Establish a Green Technology Fund through government and donor partnerships for businesses investing in RECP or membrane technologies.
- Collaborate with banks to offer low-interest loans for cleaner production investments.

WORKSHOP REPORT

1 Introduction

1.1 Background

The place of policies and laws in shaping the outcome of interventions has been an important consideration in environmental management discussions and programming throughout the history of sustainability thinking in development. This emphasis rests on the premise that the environmental policy and legal frameworks not only depict the commitment of governments to the course of transition to sustainable consumption and production patterns but go way to also define the boundaries of the multiple pool of support base for successful implementation projects. There are different policy and legal responses to environmental pollution reduction related actions. Some are rigid and strictly geared towards sentencing the regulated community to penalties. Others are rather discursive, tending to be flexible, gentle and open to integration voluntary approaches to environmental permitting, inspection and compliance. Mindful of the possibility of these two scenarios, the Kenya National Cleaner Production Centre (KNCPC) convened a workshop for dialogue on Policy and Legal Frameworks and Resource Efficiency & Cleaner Production (RECP).

The Workshop, held on 4th October 2024 at Panari Hotel in Nairobi City County, was organized as part of the activities of the project, “Enhancing Uptake of Resource Efficiency & Cleaner Production in Enterprises with Piloting Membrane Technology and Financial Services for Wastewater Treatment in the Nairobi Rivers Basin”. The overarching aim of this project is to contribute towards reducing environmental pollution from enterprises and institutions within the Nairobi Rivers Basin (NRB) through application RECP technologies and practices, a proactive and preventive life cycle strategy for bringing about conservation of resources, elimination of toxic raw materials, and reduction of wastes and emissions.

This project is a multi-stakeholder faceted initiative. At the supra-national level, it is anchored on the larger Sustainable Manufacturing and Environmental Pollution Programme (SMEP), developed by the Foreign Commonwealth and Development Office (FCDO) of the Government of United Kingdom in partnership with the United Nations Conference on Trade and Development (UNCTAD), and managed by SouthSouthNorth and PEGASYS International. At the macro-national level, the lead implementing partner for the project is KNCPC. KNCPC works with two country project country delivery partners: Kanku Kenya Limited as the provider of the Membrane Filtration Technology for Wastewater Treatment; and Fintech Frontiers Limited as the financial service analyst and green investment advisor to the partner industries and institutions. At micro-level, the primary target partners are multiple industries and institutions drawn from the NRB.

The project implementation employs a multi-dimensional approach. On one hand, it focuses on the challenges internal to the target industries and institutions. On the other hand, it leverages the competence and capabilities of various public and private sector actors in the domains of environmental sustainability management within the NRB. Thus conceived, the core project activities direct to engagements with the target industries and institutions are location and pollution source mapping; wastewater (influent and effluent) sampling and determination of baseline & project end-term pollution loading levels; trainings on RECP principles, tools and methods for the partner industries and institutions; detailed in-plant/facility

on-site RECP assessment and development of the RECP improvement options and action plans for the partner industry/institution; provision of preliminary technical support for adoption of RECP improvement measures including aspects on green finance modeling and wastewater treatment technologies with a focus on the Membrane Filtration Technology; RECP implementation monitoring, performance evaluation and excellence recognition awards.

From the external environment influencing perspective, KNCPC integrates the participation of agencies in the realm of rehabilitation and restoration of the NRB, namely Nairobi Rivers Commission (NRC); Ministry of Environment, Water and Natural Resources; Ministry of Industrialization, Trade and Enterprises Development; National Environment Management Authority (NEMA); Kenya Association of Manufacturers (KAM); Kenya Private Sector Alliance (KEPSA); and county governments of Kajiado, Kiambu, Machakos, Makueni, Nairobi City and Kiambu.

This workshop was the 4th in the series of quarterly consultative meetings with representatives from various actor agencies that are involved in the project delivery journey. Given the multifaceted nature of the problem of environmental pollution the project seeks to address and the highly dynamic environmental governance context for its implementation, the overarching objective of these consultative meetings is to amplify the implementation and sustainability support base for the project through an interactive vision sharing that accelerates co-evolution of project results with the decision-making regime elements. The first consultative meeting was expressly to introduce the project to the stakeholders. The second and third meetings were meant to update the stakeholders on the progress and emerging challenges and to lobby for their support in addressing those challenges during the implementation period.

The fourth meeting, which is the subject of this report, aimed to delve deeper into the policy and legal environment. This exploration is essential for identifying success factors that could facilitate the adoption of Resource Efficient and Cleaner Production (RECP) technologies and practices, as a strategic means to reduce environmental pollution in the Northern River Basin (NRB). This report reflects the policy and legal perspectives discussed during the workshop.

1.2 Objectives of the workshop

1.2.1 Overall objective

To establish the challenges and opportunities associated with environmental policy and legal frameworks of Kenya for adoption of RECP technologies and practices by industries and institutions within the NRB, with a view to improving their performance on environmental compliance and resource productivity.

1.2.2 Specific objectives

- i. To evaluate existing policy and regulatory gaps hindering RECP and advanced wastewater treatment adoption.
- ii. To identify actionable strategies to integrate RECP with membrane technology for wastewater pollution reduction at source followed by treatment of residual pollution by enterprises.
- iii. To foster partnerships among regulators, industries, and communities to mitigate pollution in the Nairobi River Basin.

1.3 Expected outcomes of the Workshop

Anticipated benefits specific to the project industries and institutions in the NRB were:

- i. Increased facilitative policy & legal environment for integrating environmental compliance technologies and practices into their operations.
- ii. Increased trust, mutual understanding and working relationships between the regulators and the regulated community.
- iii. Flexible environmental permitting, inspection and compliance enforcement that is tailored to the operations context of the regulated community while addressing the overarching goal of instilling ecological dignity.
- iv. Cohesive interaction with the business and/or organizational ecosystem components while enlisting an accelerated environmental compliance and resource productivity.

2 Workshop Delivery Approach

2.1 Organisation and Participants

The workshop was organized by KNCP. As the lead project implementing agency, KNCP designed the workshop method and oversaw the planning and invitation of all the participants. The occasion was graced by representatives of the SMEP programme management partners, namely Henrique Pancini, UNCTAD and Amanda Dinan, SouthSouthNorth. The target participants were drawn from agencies in the realm of rehabilitation and restoration of the NRB, as well as those with diverse mandate, expertise and experience working with industries and institutions on matters environmental sustainability.

A total of 68 people drawn from 33 stakeholder agencies and organisations participated in the Workshop. The primary target participants for the Workshop were the SMEP partner enterprises, officers of the technical support institutions, and state officials in the domains of environmental policies and regulations in Kenya. A deliberate effort was made to reach out to the top management and decision makers in the respective target group organizations, the intention being to create partnerships for RECP interventions from the centres of power and authority. The 33 stakeholder agencies and organisations whose representatives participated in the workshop were:

1	Brookside Dairies Limited	18	Kiambu County Government
2	County Government of Kajiado	19	Leather Apex Security of Kenya
3	County Government of Machakos	20	Mavoko Slaughterhouse
4	Environment Institute of Kenya (EIK)	21	Ministry of Investments Trade and Industry, (State Department for Industry [SDI]).
5	Fintech Frontiers Limited	22	Nairobi City County Government (NCCG)
6	Friends of Ondiri Wetland	23	Nairobi Rivers Commission (NRC).
7	Government of Makueni County	24	National Museums of Kenya (NMK)

8	Haco Industries Limited	25	Neema Livestock and Slaughtery Limited
9	Kanku Kenya Limited	26	SouthSouthNorth
10	Kansai Plascon Limited	27	Supra Textiles Limited
11	Kenya Association of Manufacturers (KAM)	28	Ten Senses Africa (EPZ) Limited
12	Kenya Forest Research Institute (KEFRI)	29	The Technical University of Kenya (TUK)
13	Kenya Leather Development Council (KLDC)	30	Thika-Athi Rivers Development Authority (TARDA)
14	Kenya Industrial Research and Development Institute (KIRDI).	31	Thika Water and Sewerage Company (THIWASCO)
15	Kenya National Cleaner Production Centre (KNCPC)	32	Ultravetis East Africa Limited
16	Kenya Private Sector Alliance (KEPSA)	33	UNCTAD
17	Kenya Sweets Limited	34	University of Nairobi

2.2 Format of the Workshop

The workshop deliberations consisted of keynote addresses, technical presentations, group breakout roundtable discussions and plenary discussion sessions and closing remarks, as reflected in the Workshop Agenda (Appendix A).

- **Opening Session:** Covered the welcome remarks and opening/keynote addresses, by heads of government agencies and the SMEP project partners. This session was primarily meant to set the scene for the deliberations and spur the thoughts of the participants towards the objectives of the Workshop.
- **Technical Session:** Was aimed at addressing the first specific objective of the workshop by providing essential materials leading participants to underscore the RECP- Policy/legal nexus. This session constituted a summary account of the RECP principles and experiences of KNCPC with its implementation of RECP in Kenya, East Africa and across African countries, delivered by Dr. Jane Nyakang'o as an elaboration on her opening remarks; a presentation on the objective, activities of the project, implementation status and lessons learned from the emerging challenges, delivered by Steve Nyamori; and presentations on the Membrane Filtration Technology for Wastewater Treatment (WWT) including the experience of Ultravetis East Africa Limited in applying it, water efficiency practices at Mr. Green, and financial modelling for innovations in green growth.
- **Group breakout sessions:** Participants were split into group breakout sessions with a view to having a guided in-depth discussion on specified aspects of policies and legal frameworks relevant to RECP.
- **Plenary sessions:** Were critical to addressing the second and third specific objectives of the Workshop. During these sessions, the deliberations of each group breakout session were presented and jointly examined for facilitating and/or inhibiting adoption of RECP measures in the NRB, thereby opening windows to the options for strengthening the policy and legal arena

for adoption of RECP technologies and practices. The mix of plenary and round table discussions offered participants opportunities to interact and learn about the current practices and emerging issues in RECP applications.

- **Closing session:** Expressly devoted to delivery of end-note remarks.

3 Workshop Deliberations

3.1 Opening session

3.1.1 Opening remarks and context setting presentations

Dr. Jane Nyakang'o (Figure 1) called the workshop to order, made the welcome remarks and acknowledged the presence of Keynote speakers and opened the floor for rounds of self-introduction by other participants. On this occasion, she underscored the core objective of the workshop by observing that the diverse organizational affiliations of the participants were a firm foundation for strengthening partnerships to ensure that policies and regulations are responsive to adoption and diffusion of RECP in the NRB.



Figure 1. Dr. Jane Nyakang'o, KNCP, delivering opening remarks

3.1.2 Keynote address

Henrique Pancini, UNCTAD

Henrique (Figure 2) provided an overview of the role of UNCTAD in assisting countries towards pollution reduction, adding that UNCTAD encourages zero discharge models and collaborates with like-minded partners across global settings.



Figure 2. Henrique Pancini, UNCTAD, delivering his keynote address

Amanda Dinan, SouthSouthNorth

Amanda (Figure 3) described SMEP as a programme with very high ambitions of pollution reduction in Sub-Sahara Africa and Asia and enlisted that she was impressed by the knowledge and commitment of the KNCPC team during project implementation and said that she looked forward to various partners in Kenya granting support to the work KNCPC is doing under the SMEP programme.



Figure 3. Amanda Dinan, SouthSouthNorth, delivering her keynote address

Dr. Pamela Olet, Nairobi Rivers Commission

The commission relies on collaboration and support of stakeholders towards the rehabilitation and restoration of Nairobi Rivers with the view that it is extended countrywide other than just in the Nairobi Rivers Basin, said Pamela. She noted further that the NRC has developed thematic areas with pollution reduction being a key aspect and by adopting an integrated approach in the activities of the commission. She observed that there is a need to move from

too much research to working towards livelihood improvement, and that this shift means addressing the increase in pollution levels especially in the waterbodies in Kenya by involving Kenyans in the exercise.

She advised that there is need to identify and invest in solutions that are workable based on practical examples or from historical evidence so that as a country Kenya does not keep implementing solutions that are improbable.

Prof. Erastus Gatebe, State Department for Industry

Prof. Erastus Gatebe noted that the Ministry is planning to restructure the database for manufacturers to improve the operations of the sector. He was concerned that industry harassment by regulators has resulted in involuntary compliance which is not sustainable in the long run. He disclosed that the Ministry planned to conduct training and complete review of the Industrialization Policy by the end of 2024. He noted further that the Ministry is keen on provision of incentives and appropriate policies such as tax waivers in line with East African Community (EAC) and COMESA FTA Guidelines to enable industries move to a more efficient production processes.

Still, he emphasized that effective systems for monitoring and evaluation should be implemented to improve feedback mechanism for environmental reporting to encourage the growth of the manufacturing sector while complying with environmental regulations. The Ministry is keen on strengthening public-private Partnership when it comes to funding and investments. He deplored the technical and financial constraints and slow legislative procedures as major challenges still facing industries and institutions in Kenya.

3.2 Technical Sessions I: Actions on Industrial Pollution in NRB under the SMEP Programme

Presentations were made to underscore the bearing of environmental policy, legal and administrative frameworks in Kenya, based upon lessons learned from the completed project activities and related experiences of KNCPC and other actors involved in activities aiming at promoting sustainable consumption and production.

3.2.1 Progress of the project implementation

Steve Nyamori, the Deputy Director, KNCPC presented on the project and its linkage to NRC action plan, stating that it was in line with the thematic area on industrial Institutional Pollution: Waste to Rivers specifically on the Industrial and Institutional Pollution Control component. He took the participants through the project activities and roles of the partners. He highlighted that 224 industries & institutions from five counties of the NRB (Nairobi City, Kiambu, Kajiado, Makueni and Machakos), drawn from representing 29 sectors had been recruited for participation in the project.

3.2.2 Membrane Filtration Technology for Wastewater Treatment

Pavan, Kanku Kenya limited, explained about the use of membrane technology in wastewater treatment emphasizing its efficiency and versatility which involves using semi-permeable membranes to separate contaminants from water, allowing to produce high-quality treated water. He took the participants through the implementation of Membrane Technology for

wastewater treatment at the first project site (Ultravetis East Africa Limited) explaining the improved water quality after treatment.

3.2.3 Industry Experience with RECP and Membrane Technology: Ultravetis East Africa

Regina Irungu, Production Manager, Ultravetis East Africa Limited, took the participants through their experience with RECP and use of the membrane filtration technology for wastewater treatment. She explained the challenges the company faced with the earlier Effluent Treatment Plant (ETP), namely heavy pollution loading, unscrupulous technology service providers, and high cost of maintenance. She was grateful that the company was the first site for installation of the membrane filtration technology for wastewater treatment under this SMEP programme supported project, there was a recorded improvement in treated effluent quality. The company has applied for the ISO 9001:2015 EMS certification and confirmation assessments already done.

3.2.4 Water Efficiency & Wastewater Management in Plastic Recycling: The Case of Mr. Green

Participants were treated to a description of intervention in water efficiency and wastewater management strategies at Mr. Green, also an SMEP Programme grantee. The presenter accounted for the change in water consumption level, noting that Mr. Green had recorded a significant reduction amounting to 50M3 per hour after enhancing water reuse. Mr. Green intends to use the savings made to purchase and install a machine for generation of plastic granules for production of new products.

3.2.5 Financial modelling for RECP applications

Titus Karanja elaborated on the financial models that are being developed as part of the project's output. He noted that the models are intended to be used by financial institutions in determining the feasibility for funding of the RECP proposals. Titus reported that the Project Viability Assessment Model is complete, but the project credit model would be demonstrated in the stakeholder meeting to follow. He also emphasized the importance of data in the development of financial models and the benefit of the consultative stakeholder meeting organized by KNCPD that has been key in further refining the models.

3.2.6 Discussions on Technical Presentations

Questions/Concern raised	Response provided
Many technology service providers for wastewater treatment tend to deliver inefficient technologies, which negatively impact the industries, both financially and render them non-compliant with respect to environmental regulations.	There is a need to have a list of technology providers, developed and certified by the regulators. This may ensure that the technology service providers are held to account for their services.
Durability and cost of maintenance for the membrane filtration technology for wastewater treatment.	It depends mainly on the characteristics of the effluent and the volume of the effluent; the

	<p>membranes are cleaned through back wash system to reduce clogging.</p> <p>The membranes must be replaced regularly depending on the effluent characteristics or if the system is less effective. Incorporation of RECP assessment before installation would be useful.</p>
Consideration of other types of wastewater treatment technologies. There is need for a database of the best available technologies for WWT for industries.	Other technologies for wastewater treatment should be considered, especially if efficient during operation.
The WWT should also address sludge management.	<p>Currently sludge being disposed of at the Municipal dumpsite by majority industries, but research should be done to use the sludge in other activities for example agriculture or the WWT technology should be efficient enough to reduce sludge generation through application of RECP technologies in their production processes.</p> <p>Nature-based solutions should be adopted to address pollution issues, especially solutions for wastewater treatment</p>
Mechanism of warranty assurance for technology for wastewater treatment technology	Selection of the ETP is highlighted in the 4 th Schedule of Water Quality Regulations which stipulates the type of technology to be installed depending on characteristics of effluent
<p>The authority is working with other agencies to address issues with river pollution through capacity building for community-based organizations and participate in actual river cleaning.</p> <p>There is need to develop a system of demonstrating annual pollution reduction in Kenya</p>	System of demonstrating annual pollution reduction is being used by KNCPC to promote uptake of RECP.

3.3 Technical Sessions II: Opportunities and Barriers for Adoption of RECP Measures

A collaborative problem-solving approach was employed during the workshop for purposes of unravelling the opportunities and barriers for adoption of RECP measures in the NRB. To this effect. Participants went into group break-out discussion sessions to point out specific challenges around application of RECP options, and to suggest actionable solutions towards addressing them. Three thematic areas for the group break-out discussion sessions were:

- Designing responsive policy and regulatory measures and enforcement styles to support RECP

- Implementing best practices and technologies in industrial operations and organizational settings.

Instruments, incentives and disincentives for financing greener technologies and practices.

The groups presented the issues that emerged from their respective deliberations, proposed solutions and recommendations during the final workshop plenary discussions session (Figure 4). A summary of the issues raised in the respective group discussions are presented in Appendix B.



Figure 4. Participants air their views during the plenary discussion

4 Suggested Directions for Policy and Regulatory Actions to Support RECP

A wide range of suggestions towards creating and sustaining an enabling policy and legal environment for uptake of RECP emerged from the group break-out sessions and plenary discussions. They touched on the challenges and opportunities around industry compliance with environmental regulations, options for pollution prevention and enhanced environmental compliance, and potential strategies for enabling industries and institutions adopt appropriate technologies and practices grounded in the RECP philosophy for reducing environmental pollution footprints, including technical capacity improvement, provision of financial services, bolstering strategic sector cooperations, deployment of appropriate information, communication and technologies (ICT, and infrastructure improvement. This section highlights these concerns, resolvable into three mutually interactive strategic action points: financing greener technologies, inculcating favorable policy and regulatory environment for switchover to green practices, and strategies for leveraging on multi-actor core competences and capabilities through sector collaborations in managing for environmental pollution reduction.

4.1 Towards financing greener technologies and practices

On the types of technologies for green financial support, participants expressed the view that,

- Integrating RECP trainings, assessments and continuous advisory support to prevent or minimize the generation of pollution at source
- Promoting effluent treatment technologies that use renewable energy and are tailored to specific sector needs
- Increased investments should be in the waste treatment facilities, especially around promoting recycling of the currently problematic plastic and electronic waste streams.

- A mix of green financing instruments should be experimented with, and their application should be informed by prior feasibility studies and industry needs assessment. Possible financial instruments available to the regulated community highlighted at the workshop are deposit bonds, guaranty funds, revolving funds, suppliers buy backs/supplier guarantees, environmental Insurance and impact finance.
- More effort is required in awareness raising and capacity building for industries & institutions as well as financial institutions in green financing, with a view to equipping them with technical skills in environmental cost accounting such as cost of water & energy, techniques for RECP data collection and use in environmental impact analysis.
- Facilities should be encouraged to apply and/or experiment with nature-based solutions to address pollution related issues, especially solutions for WWT.
- Development and promotion of incentives for adoption of green technologies and practices should take the form of a recognition awarding schemes for exemplary performance on pollution reduction efforts; creation of a national hub for cleaner technology service providers and instituting a performance incentives scheme for exemplary compliance.

4.2 Strengthening and innovating policies, regulatory measures and enforcement styles

Re-engineering of policies, regulations and administrative frameworks for uptake of RECP measures should take the direction of:

- Encouraging green financing innovations at industry level, by technology providers, and development of green financing packages by financial institutions and service providers.
- Fostering application of disincentives such as fines and penalties on turnover and increasing the cost of environmental cleaning up.
- Preparing RECP technologies for different sectors, preparing guidelines for dealing with sludge from the wastewater treatment plans
- Developing and continually updating a comprehensive Best Available Technologies (BAT) Databases and Guidelines for the Technology Service Providers
- Marshalling a critical political will to support RECP transition by regularly convening a Cleaner Production multi-actor dialogue forum
- Establishing facilitative physical and internet assisted infrastructure to expand the space for emergence, growth and maturity of green innovations and environmental creativity. Such actions could include designation of special county waste sorting and segregation sites, and electronic portals/ hub for resource leveraging for industrial symbiosis networks.
- Adopting a multi-agency approach to environmental permitting and compliance inspections. This strategy has the potential of contributing to deconstruction of the myth of enforcement as a punitive action as commonly perceived by the regulated community, controlling for corruption loops, reducing the financial 'burden' and enhancing time efficiency of compliance enforcement efforts.
- Retooling the regulations to integrate RECP and use of other voluntary environmental compliance tools among the regulated community.
- Research and Universities should develop clubs/hubs and coordinate the activities on RECP knowledge sharing, free information disclosure and case studies development to inspire a culture of resource efficiency.

5 Closing Session

Dr. Jane Nyakang'o delivered the closing remarks. She emphasized the centrality of RECP in policy and regulatory frameworks, key to the success of SMEP Programme project in the NRB. She noted further that scaling up these interventions were necessary to create more impact. The NRC gave assurance that the Commission is devoted to working very closely with KNCPC and her SMEP partners, including NEMA and the Ministry of Industrialization, in all respects leading to restoring the lost environmental dignity of the NRB.

ACKNOWLEDGEMENTS

Letter of Acknowledgement

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Dr. Jane Nyakang’o (PhD)

Executive Director, Kenya National Cleaner Production Centre

RECOMMENDED CITATION

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APPENDICES

Appendix A: Workshop Agenda



Sustainable Manufacturing and
Environmental Pollution

**Enhancing Uptake of Resource Efficiency & Cleaner Production in Enterprises with Piloting
Membrane Technology and Financial Services for Wastewater Treatment in the Nairobi
Rivers Basin**

Workshop Agenda

**Policy Dialogue Workshop on Industrial and Institutional Pollution Prevention in the Nairobi Rivers
Basin at Panari Hotel, Mombasa Road, Nairobi City County, 4th October 2024**

TIME AND ACTIVITY	RESPONSIBILITY
8:30 AM – 9:00 AM: Registration and Welcome Coffee <ul style="list-style-type: none">Participant registration.Informal networking and light refreshments	Ms. Rosemary Rabilo
9:00 AM – 9:15 AM: Opening Remarks <ul style="list-style-type: none">Welcome and Workshop Agenda run throughRemarks by the environment regulator, NEMARemarks by the Chairman of NRCOfficial opening, PS Industry	Dr. Jane Nyakang'o, Director KNCP
9:15 AM – 10:00 AM: Technical Session 1 - Context Setting Presentations <ul style="list-style-type: none">Industrial and institutional Pollution in the Nairobi River Basin: Challenges and Opportunities – SMEP ProjectOverview of the environmental pollution in the context of the Nairobi Rivers BasinTowards greening industries and enterprises in Kenya <i>Plenary discussions</i>	KNCP NRC Prof. Erastus Gatebe, Industrialisation Secretary
10:00 AM – 10:30 AM: Coffee Break	
10:30 AM – 11:30 AM: Technical Session 2–Actions on Industrial Pollution under SMEP Programme	Steve Nyamori, D/Director KNCP

<ul style="list-style-type: none"> • Presentation 1: Progress on SMEP project implementation and Efforts towards Resource Efficiency and Pollution Prevention • Presentation 2: Presentations on WWT: <ul style="list-style-type: none"> I. Membrane technology for wastewater treatment (10 minutes) II. Experience of Ultravetis East Africa Limited (10 minutes) III. WWT at Mr Green - Plastics Recycling Facility (10 minutes) • Presentation 3: Financial Models for Enhancing Uptake of RECP and WWT <p><i>Plenary Discussions</i></p>	<p>Pavani Gadhi, CEO Kanku Kenya Geogina Irungu, Ultravetis EA Mr Green</p> <p>Titus Karanja, CEO Fintech Frontiers</p>
<p>11:30 AM – 1:00 PM: Technical Session 3 – Policy and Regulatory Framework</p> <ul style="list-style-type: none"> • Presentation 1: Challenges around industry compliance with environmental regulations • Presentation 2: Policy options for pollution prevention and enhanced environmental compliance by industry & institutions, with special reference to the NRB • Presentation 3: Potential strategies for enabling industries and institutions adopt appropriate environmental pollution approaches (technologies and practices) • Plenary Discussions on gaps, challenges, and opportunities for policy enhancement. 	<p>NEMA</p> <p>KNCP</p>
<p>1:00 PM – 2:00 PM: Lunch Break</p>	
<p>2:00 PM – 3:00 PM: Technical Session 4 – Collaborative Problem-Solving</p> <p>Break-out groups to address specific challenges and develop actionable solutions.</p> <ul style="list-style-type: none"> • Group 1: Designing effective regulatory measures and enforcement style • Group 2: Implementing best practices and technologies in industrial operations and organizational settings • Group 3: Engaging stakeholders in pollution prevention efforts. <p><i>Plenary Discussions:</i> Groups present their proposed solutions and recommendations</p>	<p>Moderation: NEMA, KNCP, NRC and NCCG</p>
<p>3:00 PM – 4:30 PM: Closure Session</p> <ul style="list-style-type: none"> • Next steps: A briefing on Preparing a synthesis of workshop outputs into a collaborative action plan to be shared after the workshop for feedback integration and adoption • Closing remarks 	<p>KNCP</p>
<p>4:30PM – 5:00PM Coffee/Tea Break and Participants’ departure at own pleasure</p>	

Appendix B: Notes from Group Break-Out Sessions

Towards financing greener technologies and practices: Instruments, incentives and disincentives.

What	Who	When	Barriers
<p>Types of green technologies to be financed</p> <ul style="list-style-type: none"> i. Customized/fit for purpose Effluent treatment plants for sector needs ii. Renewable energy for ETP iii. Waste treatment facility: Plastic recycling and others iv. Financing the RECP at an industry level or technology providers: ensuring that industries are applying the best possible interventions to minimize pollution v. Guidelines for technology service providers should be built on life cycle approach 	<p>KNCP/ NEMA/ TECHNOLOGY PROVIDERS/ Mol/ EPRA/ Industries/ KAM/ KEPSA/ Legislators/ KEBS/NRC</p>	<p>Immediate</p>	<ul style="list-style-type: none"> • Conservative culture • Risk aversion
<p>Types of green financing instruments</p> <ul style="list-style-type: none"> i. Deposit bond-implementation of the regulations ii. Green bond iii. Sustainable finance initiative by financial institutions iv. Guaranty fund v. Revolving fund vi. Suppliers buy backs/ supplier guarantees vii. Environmental Insurance 	<p>KNCP/ NEMA/ TECHNOLOGY PROVIDERS/ Mol/ EPRA/ Industries/ KAM/ KEPSA/ Legislators/ KEBS/ KBA/ business member organizations/ Leather Association/ COUNTY GOVERNMENT/ Impact finance fund and other</p>	<p>Immediate</p>	<ul style="list-style-type: none"> • Knowledge gap

<i>viii.</i> Impact finance			
<p>Capacity building needs for industries & institutions in green financing</p> <ul style="list-style-type: none"> <i>i.</i> Cost accounting- cost of water, for financial institutions <i>ii.</i> Data collection in industry/ laboratories <i>iii.</i> Funds provided for raising awareness <i>iv.</i> Promoting a culture of Industrial Symbiosis <i>v.</i> ToTs for knowledge exchange/ benchmarking <i>vi.</i> Awareness creation on regulation/technology/green financing <i>vii.</i> Regulators (NEMA) are trained on green financing <i>viii.</i> Funding for advocacy 	KNCP/ Leather Apex/ KIRDI/ NEMA/ KIRDI/ ACADEMIA/ KEBS/ MITI/ INDUSTRY ASSOCIATIONS	Immediate	<ul style="list-style-type: none"> • Decision maker attention (capacity building to low level staff not decision makers)
<p>Incentives</p> <ul style="list-style-type: none"> <i>i.</i> Recognition kitty and awarding schemes <i>ii.</i> National hub for technology service providers <i>iii.</i> Demonstration stations/ exhibitions for technology providers <i>iv.</i> Product Premiums for industry, for example less water used for production of a particular product <i>v.</i> Pollution trading <i>vi.</i> Performance incentives for compliance regulators 	NEMA/ MINISTRY OF FINANCE/ MITI/ COUNTY GOVERNMENTS	Immediate	<ul style="list-style-type: none"> • Long consultation and policy development cycles • Tight fiscal space (GoK broke?)

Disincentives <ul style="list-style-type: none"> i. Fines and penalty on turnover ii. Cost of environmental cleaning up 	NEMA	Immediate	<ul style="list-style-type: none"> • Resistance by industry • Judicial processes • Corruption
Strengthening and innovating policies, regulatory measures and enforcement styles			
Enforcement and Monitoring	NEMA, EIA/EA experts, planning and lands, NCCG, SDI, inspectors, the proponents,	All the stages planning, implementation and production	<ul style="list-style-type: none"> • Conflict of interest • Lack of segregated destinations • Lack of funds • Lack of political good will • Insufficient Knowledge/education and awareness • Lack of tax incentives • Enforcing on EPR • Lack of environmental awareness and training (unintended pollution by producers due to lack of knowledge) • Corruption • Retooling the regulations to include RECP • Inclusion of other agencies with the relevant mandates. • Reports on the feedback/shortfalls to be published
Innovation on Enforcement			<ul style="list-style-type: none"> • Integration of Nyumba Kumi Initiative • Regular Meeting

			<ul style="list-style-type: none"> • Annual Customer service • Enforcement code of conduct
Reporting	Planning department and Proponent	Before, during and after	<ul style="list-style-type: none"> • Non-collaboration with other stakeholders while zoning and allocation of land
Reviewing	Internal and regulators	Regularly (Internal) Quarterly (External)	<ul style="list-style-type: none"> • Noncompliance with review feedback
Implementing best RECP technologies and practices in industrial operations & organisational systems			
Guidelines on RECP technologies	Ministry of industry - supported by KCNPC, NEMA, NRC, KIRDI, water recourses authority, County government (Chemical, meat processors, tannery, dairy, food & beverage, water and sewerage companies (critical -receive highly conc wastewater), abattoirs	End of 2025	Resources mobilization, Transparency - access to credible data/info
Training	Ministry of industry, KNCPC, NEMA, NRC, Water resources authority, NITA, KEFRI (Industries & supporting institutions, environmental assessment experts, water quality experts etc...)	Continuous	Resistance from industries - Making trainings mandatory by NEMA
Workshops/sensitization forums	Ministry of industry, KNCPC, NEMA, NRC, Water resources authority, NITA, KEFRI, KAM, KEPSA, County government (Industries - staffs)	Continuous	Resistance from industries/ low prioritization - Making workshops mandatory by NEMA and company to sent senior staff(s), Corruption

Industry sector waste management clubs	Ministry of industry, KNCPC, NEMA, resident association, Water & Sewerage companies	Continuous	Resources mobilization, data accessibility, willingness to join the organizations
Certification	Ministry of industry, NEMA, KIRDI, KNCPC, County government, KAM, KEPPSA	Continuous	Developing the certification system/scheme, auditing & certifying, accountability - KEBS (transparent & accountable) - KNCPC - technical support
Industry awards	Ministry of industry, NEMA, KIRDI, KNCPC, county government	Continuous	Resources mobilization
Success stories	Ministry of industry, NEMA, KIRDI, KNCPC, County government, KAM, KEPSA	Continuous	Information disclosure