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CGIAR

Western Africa Workshop on Waste Management and the Circular Economy

Session 9: Organic Waste, Public-Private Partnerships, and the Circular Bioeconomy

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26 - 28 August 2025

DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

UNOSD UNITED NATIONS OFFICE FOR SUSTAINABLE DEVELOPMENT

ECA

UN environment programme

GREEN GROWTH Knowledge Partnership

MINISTRY OF LOCAL GOVERNMENT, CHIEFTAINCY AND RELIGIOUS AFFAIRS REPUBLIC OF GHANA

International Water Management Institute

International Water Management Institute

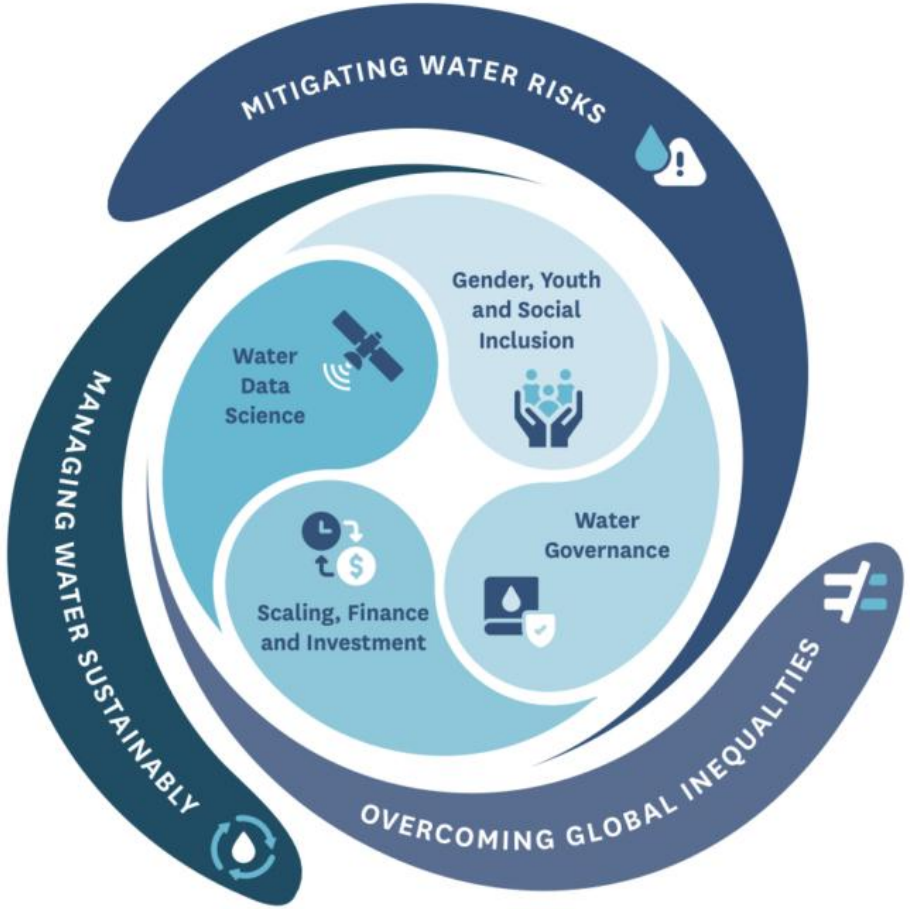
— international, research-for-development organization under the CGIAR.

Founded as the **International Irrigation Management Institute (IIMI)** in 1985

- Headquarters in Colombo, Sri Lanka, with offices across Africa and Asia.
- Operating in more than 55 countries, in the Global South.

IWMI International Water Management Institute

IWMI Strategy



MITIGATING WATER RISK

MANAGING WATER SUSTAINABLY

OVERCOMING GLOBAL INEQUALITIES

VISION

A water secure world

MISSION

Advance the transformation of water systems through collective action to generate and apply evidence for impact on sustainable, climate resilient development

Welcome & Session Overview

Aim: To explore how scalable business models, evidence-base and data-driven decision tools unlock circular bioeconomy in West African cities.

Objectives:

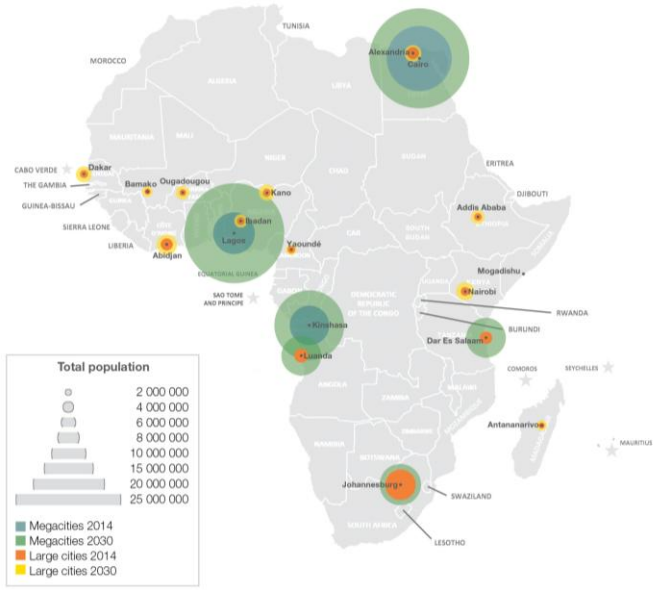
1. **Highlight scalable organic waste valorisation pathways** through regional/global case examples.
2. **Facilitate peer-to-peer learning** for scalable and inclusive circular bioeconomy solutions.
3. **Showcase CBE innovations** for informed action and evidence-based planning.
4. **Identifying actionable recommendations** for enabling CBE in policy and practice.

#1 **Unlocking the potential of organic waste in West African cities:** Priority valorisation pathways and market opportunities

Scale of the Challenge

1. Cities are expanding at the fastest rates globally

- West African cities are among the fastest growing urban areas in the world.
- Most cities lack adequate facilities, a large share of organics is left uncollected or dumped.
- Municipalities spend up to 50% of their budgets on waste management.
- Despite CE strategies, few large-scale composting, biogas, or recycling plants are operational across the region.

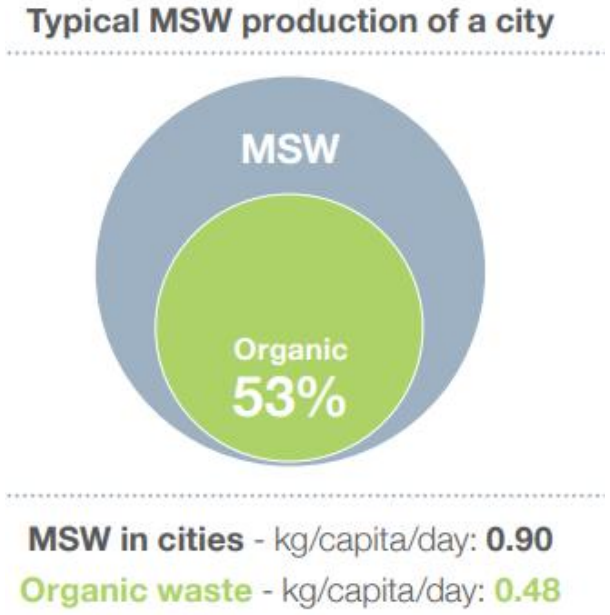


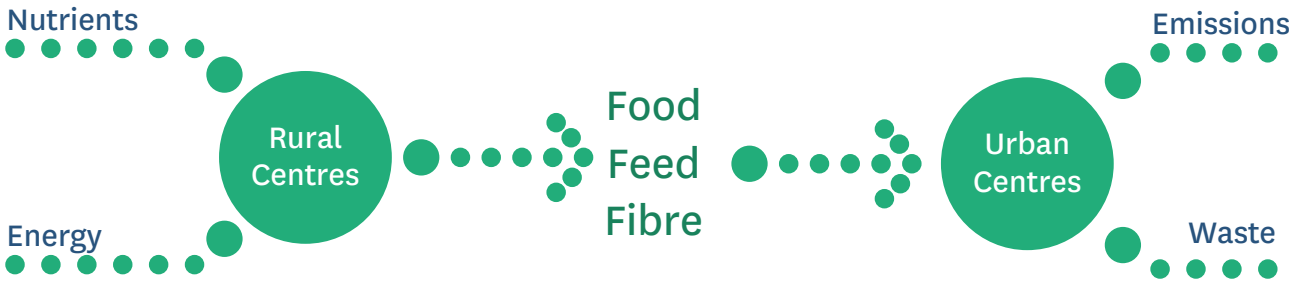
Source: City population data/estimates from UN DESA, urban population growth rates calculated by IFs v7.22 based on World Development Indicators.

Scale of the Challenge

2. Cities are becoming vast nutrient sinks.

- Cities growing demand for food, much of it is imported from rural areas.
- Nutrients flow into cities through food and feed, but only a fraction returns to farms.
- Up to 50–80% of city waste is organic, yet valuable nutrients end up in dumpsites, drains, and water bodies.





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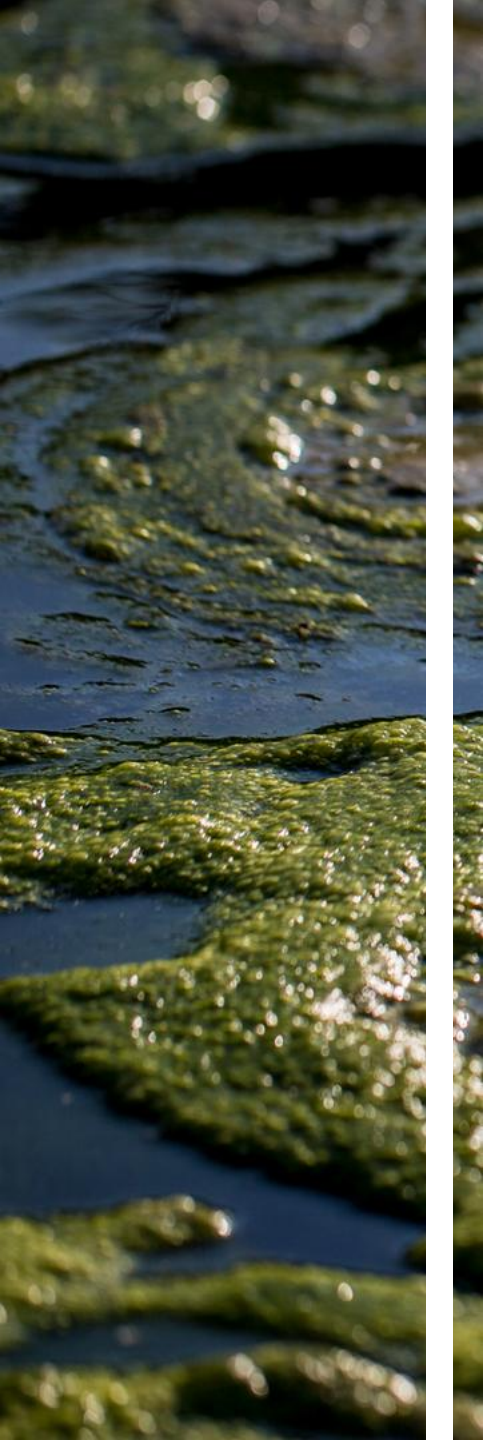
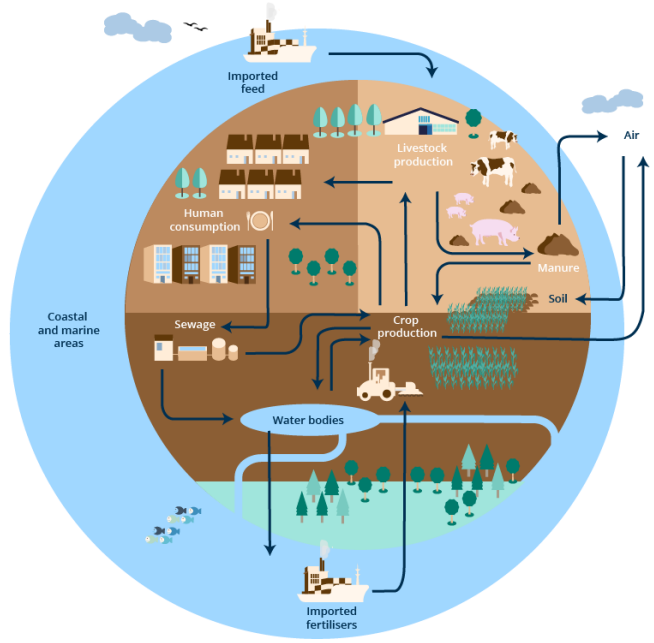


Scale of the Challenge

3. Cities are facing environmental and health risks

- Decomposing organic waste is a **major source of methane** –28x more potent than CO_2
- Uncollected organics **clog drainage channels**, leading to **frequent urban floods**.
- Accumulated organic waste **attracts pests and pathogens**, leading to disease outbreaks.
- Leachates from **organic waste contaminate rivers and coastal waters**, causing algal blooms, fish kills, and ecosystem degradation.



Source: European Environment Agency, 2025

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Transitioning to a Circular Bioeconomy:

6 Priority Valorisation Pathways

Composting for soil nutrient supplementation

Organic waste to animal feed & protein

Biochar for carbon sequestration & soil health

Anaerobic digestion for biogas & nutrient-rich effluent

Biomaterials for packaging & construction

Water recovery & reuse for irrigation & aquaculture

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CBE goes beyond innovations and can deliver multiple benefits:

- Drive **responsible production & sustainable consumption.**
- Support **rural development**, create **jobs & resilient livelihoods.**
- **Restore ecosystems** & **build climate resilience.**
- Prevent and eliminate **unwanted waste and pollution.**

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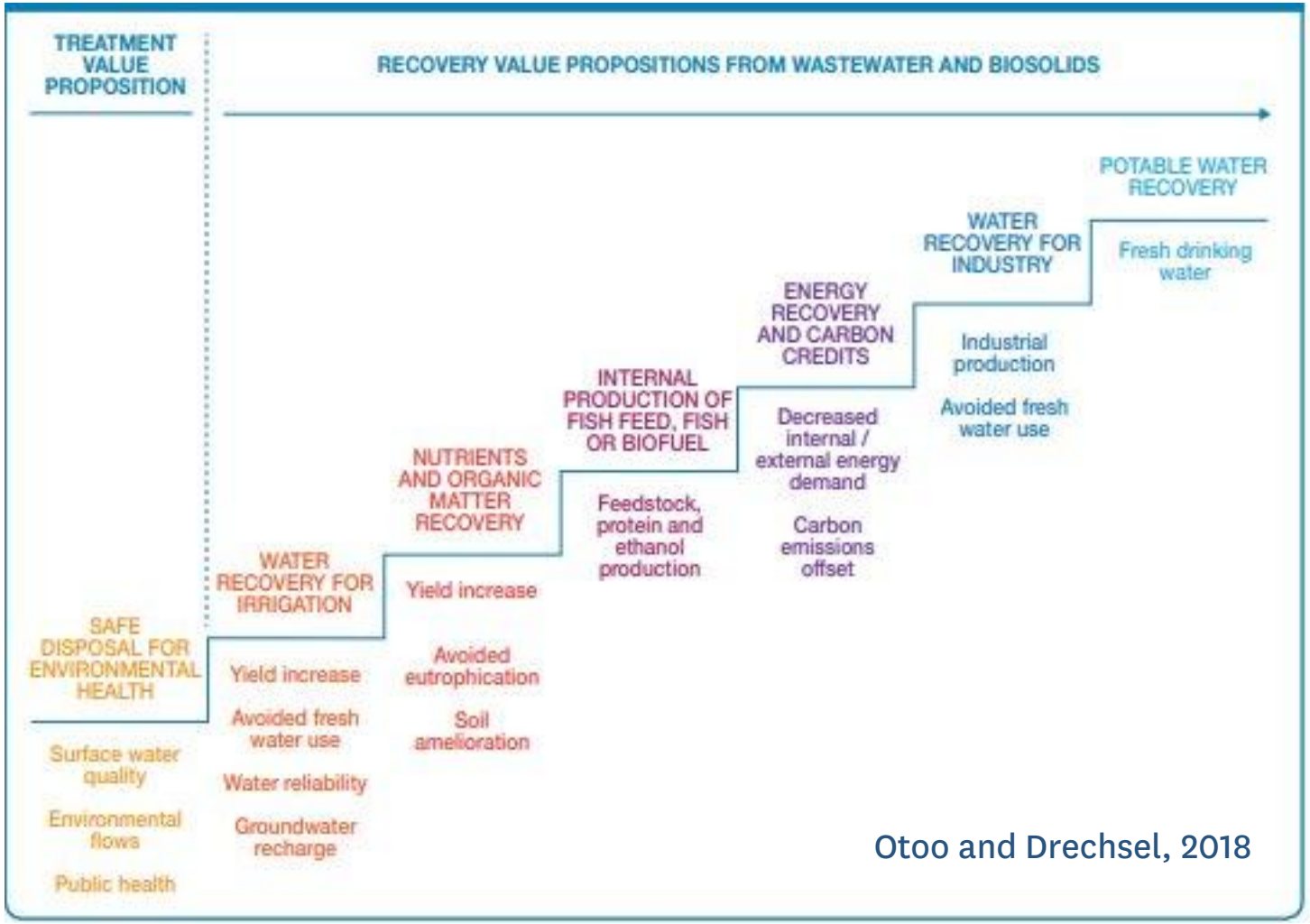


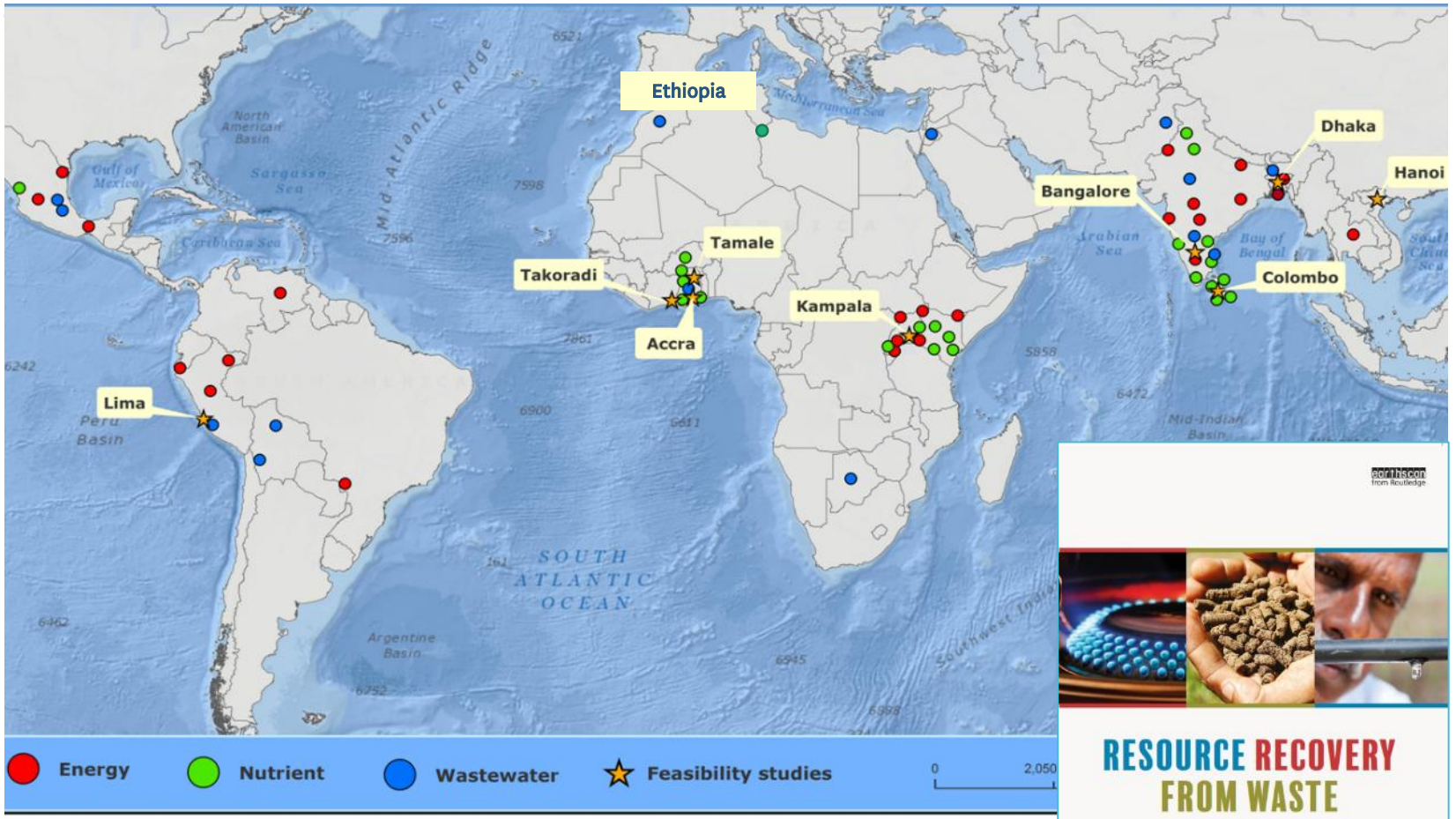
Otoo and Drechsel, 2018

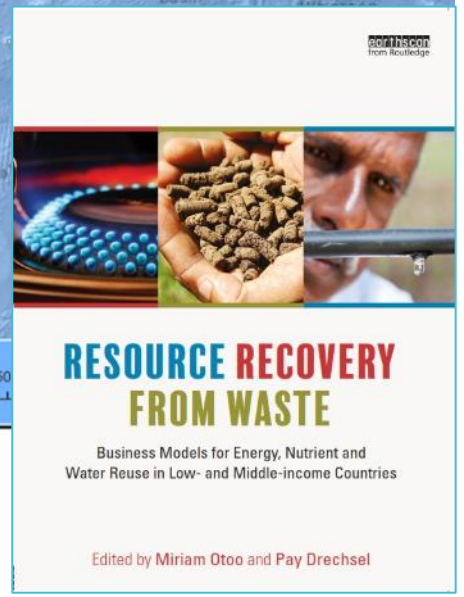
Various value propositions possible; however, not all are equally feasible.

- High-value options (e.g., potable water) have steep technical and financial barriers.
- Lower-tier options (e.g., composting) have quicker entry points but struggle with market uptake.
- Context-specific prioritization and viable business model is essential.

#2 Understanding CBE Business Models & Enabling Conditions for Scaling and Inclusive Market Development

Global Assessment of CBE Business Models





- 180 CBE business cases screened
- 60+ cases had an in-depth analysis
- 23 business models extracted/developed

  (+18 models only for FSM)
- Model feasibility tested in 15 cities/towns
- 4 PPP models with IWMI facilitation/support

Otoo, M., & Drechsel, P. (2018). *Resource recovery from waste: business models for energy, nutrient and water reuse in low- and middle-income countries*. Routledge - Earthscan.

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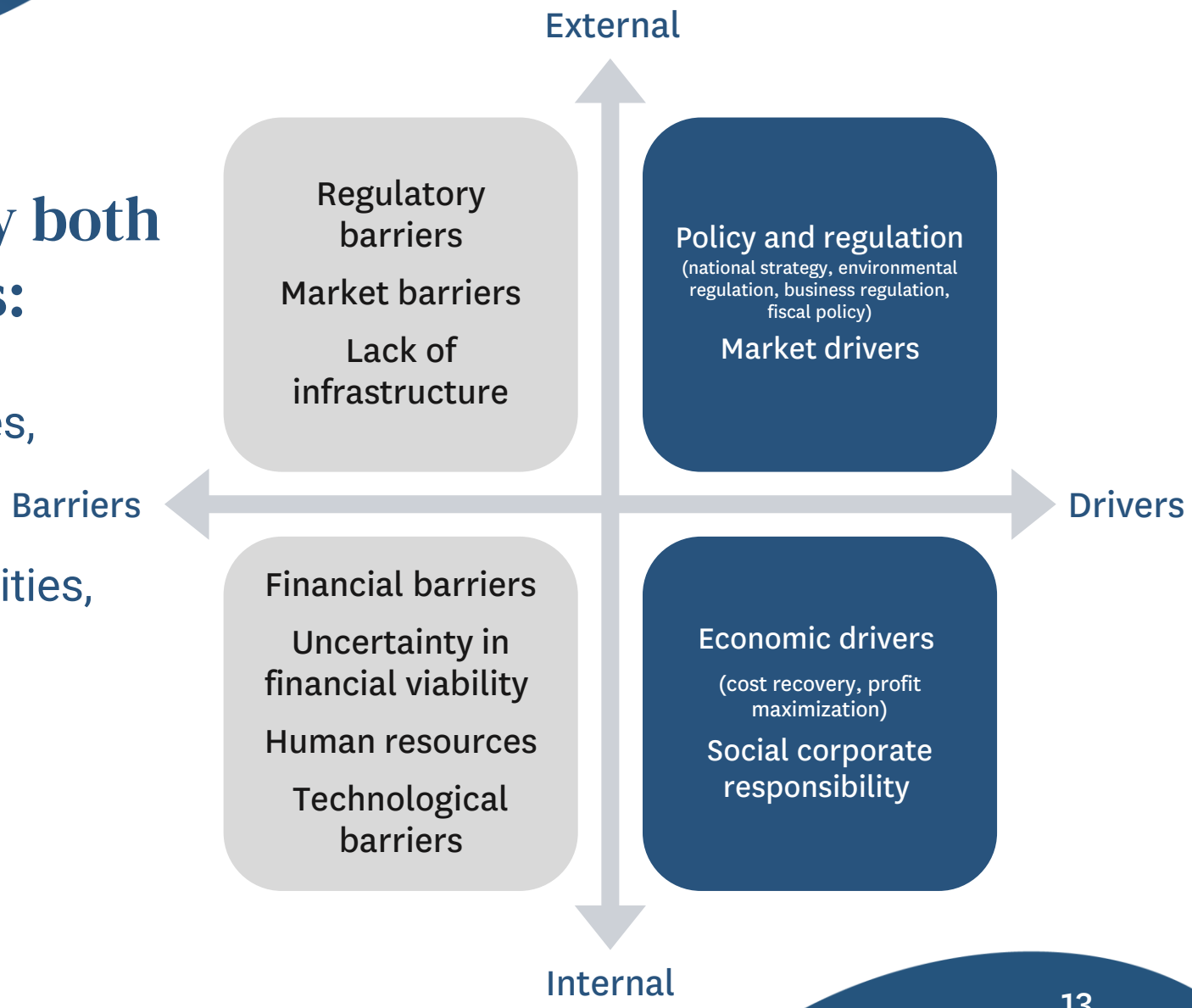
CBE Businesses are driven by both external and internal factors:

- **External drivers**: regulatory pressures, market demand
- **Internal drivers**: new profit opportunities, cost recovery mechanisms, environmental sustainability.



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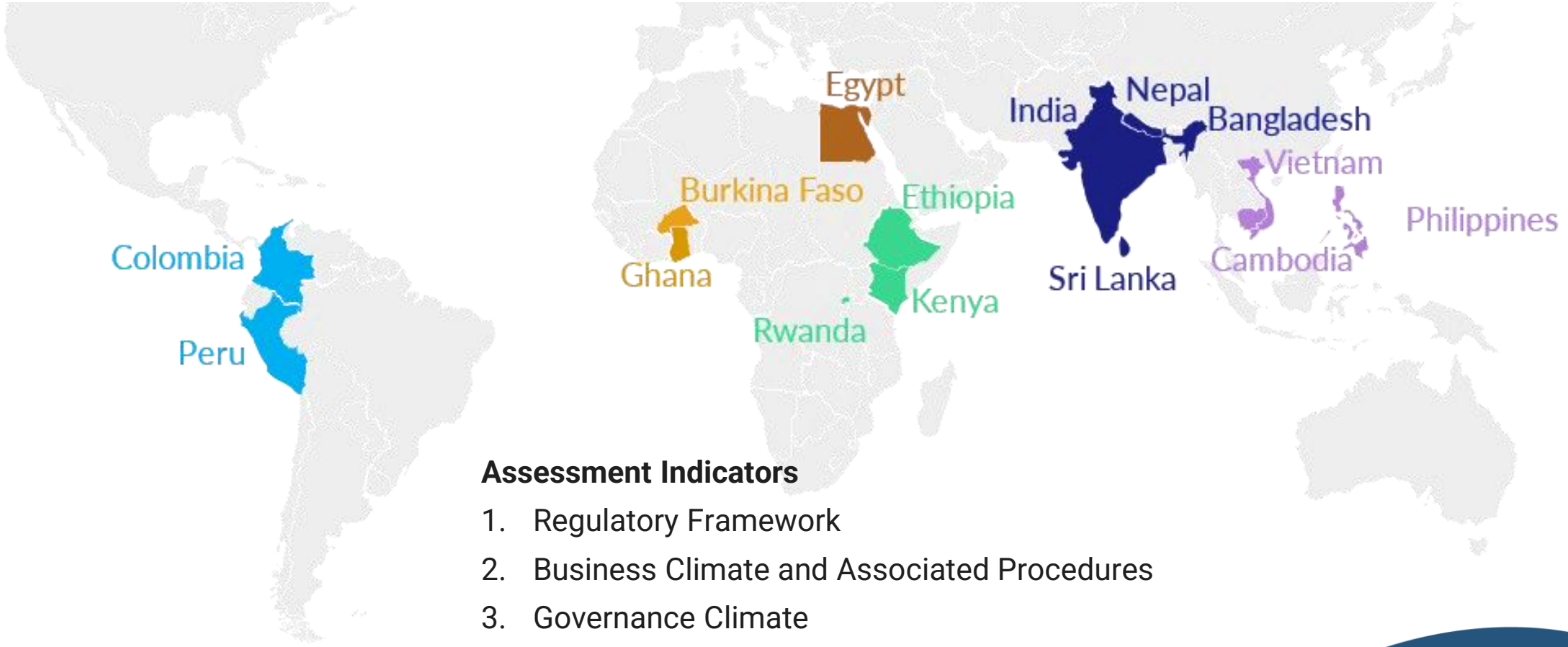
Investment Climate Studies on CBE Businesses

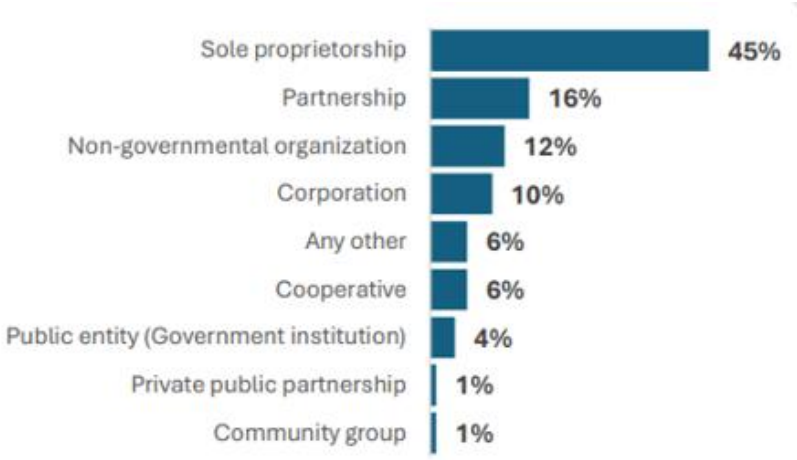


Assessment Indicators

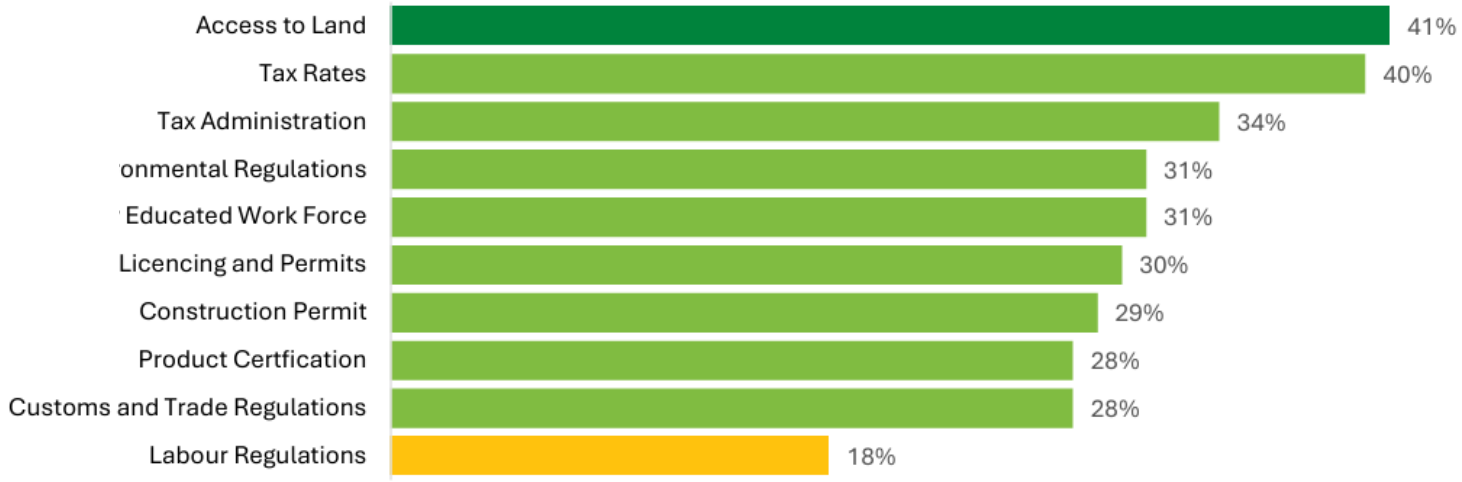
1. Regulatory Framework
2. Business Climate and Associated Procedures
3. Governance Climate
4. Access to Finance
5. Entrepreneur Ecosystems

Investment Climate Studies on CBE Businesses: Nigeria

Profile of CBE Enterprises



CBE enterprises reporting policy & infrastructure as major constraints



Business environment indicators	
Duration to obtain license (days)	55
Number of procedures to obtain license	6
Cost of license and permit (Naira)	139,088
Management time spent dealing with license (%)	26%
Number of days to renew license (days)	1-20
Cost to renew license (Naira)	20,000-50,000

Provision of electricity	
% of firms suffering power outage (%)	90
Number of outages per week	6-10
Loss due to power outage (% annual sales)	37.5
Firms that own/share generator (%)	66
Electricity from generator (%)	90

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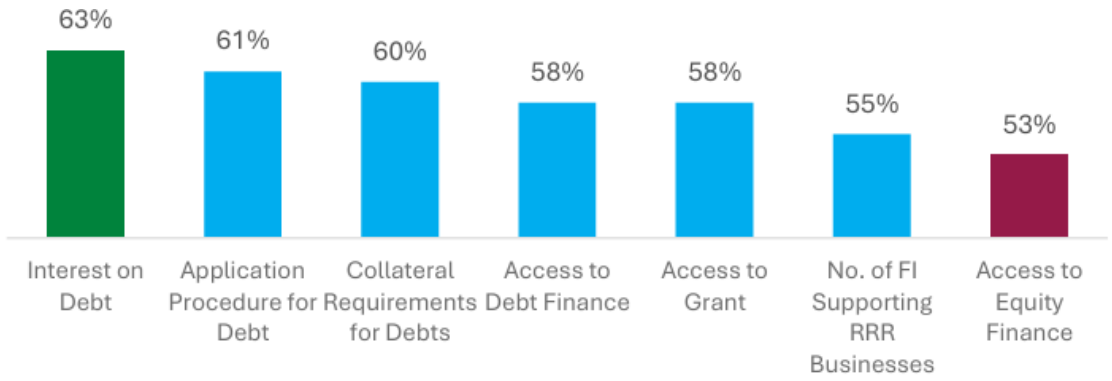
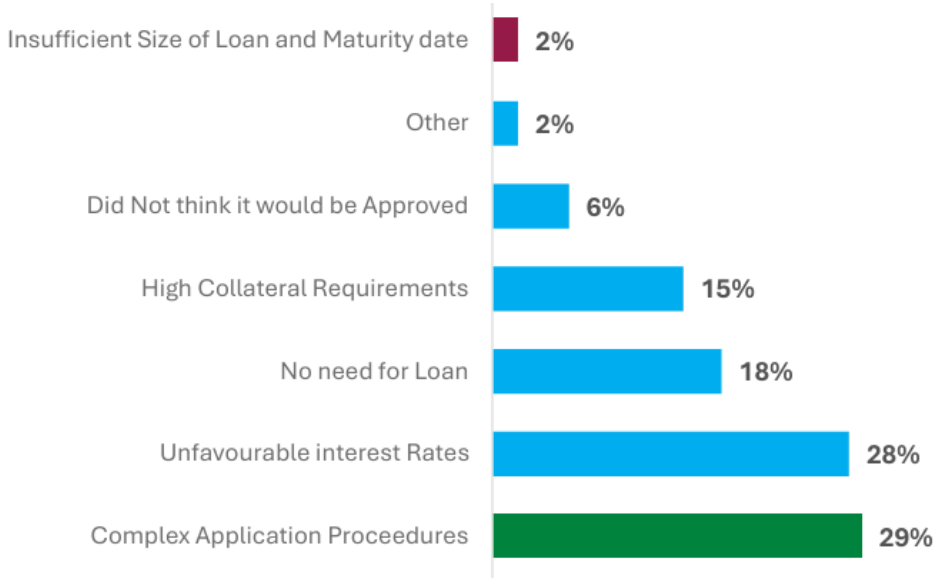
Investment Climate Studies on CBE Businesses: Nigeria

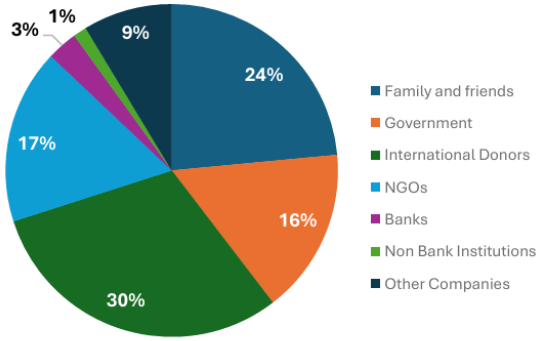
CBE enterprises reporting factors of finance as major or severe constraint

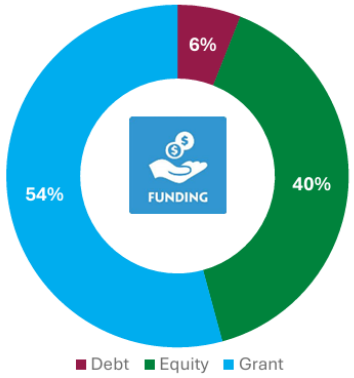


CBE enterprises reporting reasons for not applying for a loan



Sources and types of finance received since establishment of the business





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Business Models for Wastewater Reuse in Aquaculture

- Fish production integrated in a decentralised wastewater treatment plant
- Low-cost technology; high value product can achieve OPEX and CAPEX recovery
- Strong potential for replication in developing countries, where land is available
- Compliance with health safety is important.

Empowering Women-led Informal Circular Businesses

- Tailored training in CBE models to women and youth engaged in informal recycling.
- Empowered women and youths to produce high-quality biomass briquettes.
- Co-design viable business model—cooperative model for small-scale business.

Enabling Circularity in Nature+ Agricultural Systems

Community-led Black Soldier Fly (BSF) Plant

- Tailored training in BSF models provided to farming community, women and youth
- Empower community to co-design business model and operate the enterprise

Lessons Learnt

- **High potential for bundling CBE solutions** – strong viability in inclusive, community-led, women- and youth-led models (Kenya & Ghana).
- **Weak financial and technical viability** – limited investments, lack of scalable/context-appropriate models, and low acceptance of bio-based products.
- **Limited innovation scaling** – driven by poor data, weak demand, and fragmented markets.
- Huge **data gaps and absence of multi-criteria evaluation for decision-making**

GROUP ACTIVITY
(30 minutes)

#3 From research to practice: Guiding evidence-based planning and investments through decision support systems and multi-stakeholder platforms.

CBE Innovation Hubs | Scaling & Acceleration Programs

Ghana | India | Vietnam | Colombia

Ghana | India | Vietnam | Colombia

NEXT

CircularEconomy4Ghana Innovation Challenge

Circular Bioeconomy Innovation Hub - Ghana

CGIAR MULTIFUNCTIONAL LANDSCAPES

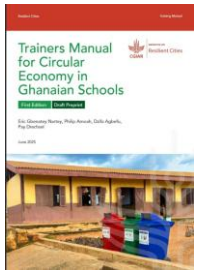
CGIAR FOOD FRONTIERS AND SECURITY

A multistakeholder platform for a one-stop shop for training, advisory, research, demonstration, and knowledge sharing.

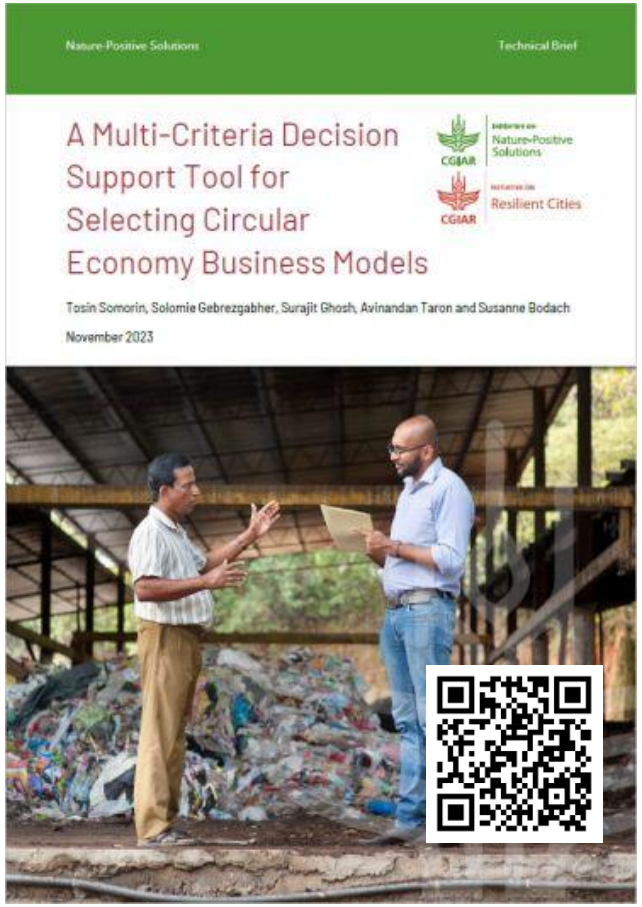
- 20+ Co-owners and Scaling Partners
- 7 Living Labs – Biogas, Composting, Wastewater Treatment & Aquaculture, Biomass Briquettes
- CBEIH co-owners have offered over 40 trainers spanning 15 expertise areas.
- 12000+ school children trained & 22 Schools (1280 pupils) RRR/CE clubs established

cbeih.iwmi.org/

Book a visit to any of the labs here.



Decision Support Systems for Sustainable Waste Management

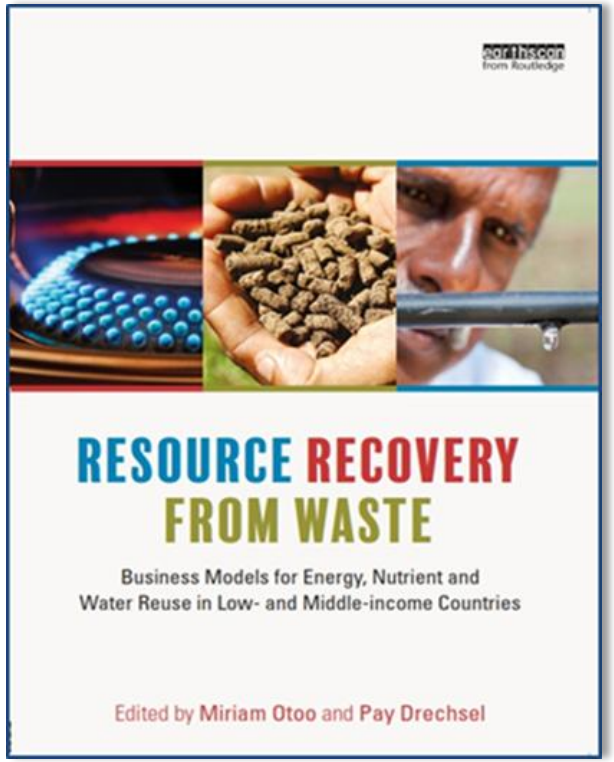


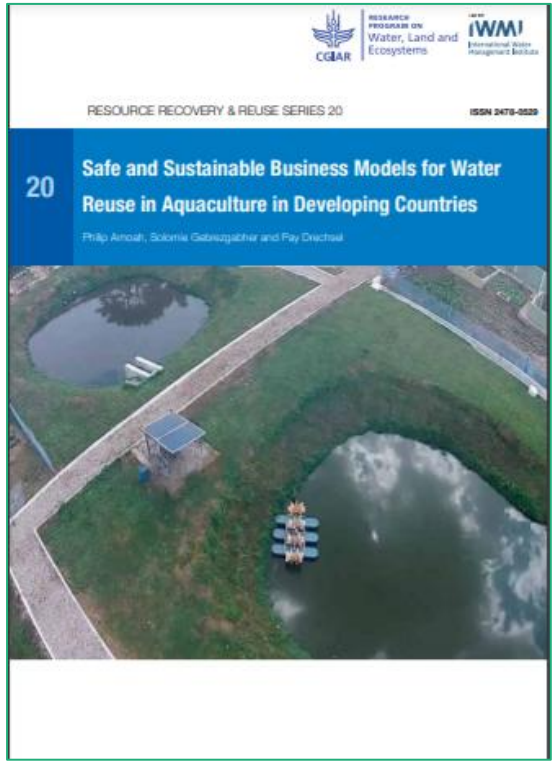
For holistic assessment of CE/RRR approaches, business models, and interconnected objectives.

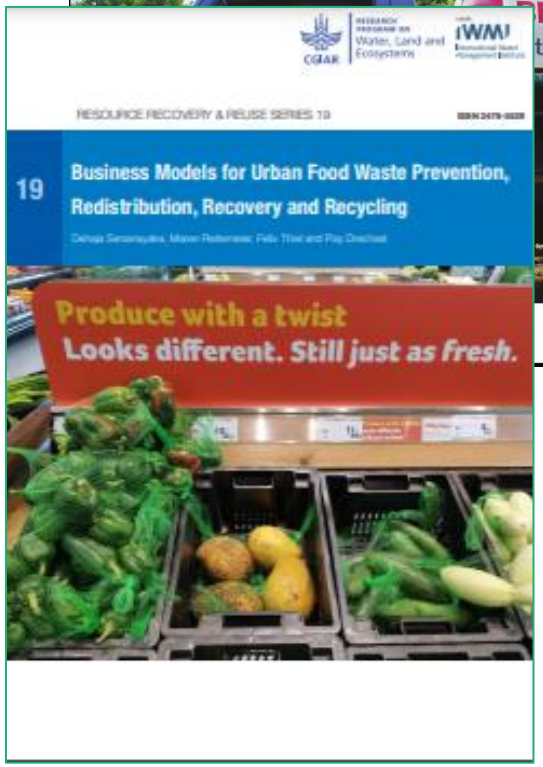
- A rapid assessment of suitable locations for CE business models in a given context.
- A quick narrowing of options of CE business models for a given waste stream and technology options, while considering the priorities and interests of various stakeholders.
- a user-friendly interface and an interactive data visualization dashboard for result analysis.

Free Downloadable Resources

RRR business models are now available to download for free at
http://www.iwmi.org/resource-recovery-from-waste







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Thank you.

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Innovative water solutions for sustainable development

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