

SUCCESS STORIES **26**



TOWARDS A CIRCULAR ECONOMY

Researchers with the International Water Management Institute (IWMI) have developed, under the resource recovery and reuse (RRR) program, novel approaches that simultaneously reduce the waste burden and increase the supply of resource inputs in developing countries. As IWMI strives to replicate these approaches in Africa and Asia, it can be expected to generate considerable benefits, including reduced dependence on imported raw materials, less environmental damage and the creation of new “green” industries.

FROM REFUSE TO REUSE

In low- and middle-income countries, only a small proportion of the rapidly growing urban population has access to costly modern sewer systems. This leaves the great majority reliant on “on-site” sanitation systems, consisting of pit latrines and septic tanks, or on open defecation. Only an estimated 8% of the fecal sludge or human waste collected in low-income countries is ever treated – compared to 70% in high-income countries. Vast amounts of untreated wastewater containing fecal sludge are discharged into landfills, wetlands or the sea, where they pose a major threat to human and ecological health.

Untreated wastewater also represents an enormous missed opportunity, as it contains potentially valuable resources (water, nutrients and energy), which can be recovered and safely reused for diverse purposes. In a pioneering effort to tap the productive potential of this natural resource – the only one that is actually increasing – IWMI researchers have spent over a decade analyzing the technical, institutional and business options for **resource recovery and reuse** (RRR) from different waste streams. Beyond its health and environmental benefits, RRR should also lower the sanitation sector’s dependence on government subsidies through the generation of income from marketable products, which can help cover the costs of waste treatment.

Key results from IWMI’s research on RRR are described in the 2018 volume *Resource recovery from waste*, which profiles 24 innovative business models arising from nearly 50 case studies. The models involve the use of human waste to make fuel briquettes, fish feed and fertilizer, and are ready for large-scale testing and implementation in different regions. They are supported by a review of the regulatory and financial environments needed to enable RRR in low- and middle-income countries. *Resource recovery from waste* is a major sourcebook for policymakers as well as for university professors and students of engineering, economics, the environment and business.

PARTNERS IN INNOVATION GHANA

Various RRR models are already being implemented or are under consideration. The furthest along involves a public-private partnership that is turning fecal sludge into fertilizer pellets in Accra, Ghana. In 2017, the partners launched the JVL Fortifer Compost Plant, which produces a safe, nutrient-rich fertilizer – known as *Fortifer*TM – from human and other organic waste. The product has been officially certified for its quality and effectiveness, and shown to improve the growth and yield of crops such as okra, tomatoes, green peppers, cabbage, lettuce, maize and rice. When operating at full capacity, the plant will annually process 12,500 cubic meters of human waste collected from local latrines into 500 metric tonnes of fertilizer for crop production. Development of a second *Fortifer*TM plant is under way in Ghana’s Eastern Region, and the hope is to replicate the process in other cities. In an important step forward, the Government of Ghana added waste-based composts to its fertilizer subsidy program, acknowledging IWMI’s research. Expanding the production and use of *Fortifer*TM should reduce farmers’ dependence on imported fertilizers, while creating new jobs, reducing public health risks and ensuring a cleaner environment.

KEEN ON COMPOST IN GHANA

“The current introduction of commercial compost production by some organizations, and the initial positive results of the ‘From Waste to Food (WaFo)’ project being undertaken by IWMI-Ghana, have given assurance to the government of the availability of a high-quality compost material which could be promoted through the fertilizer subsidy program. The Ministry of Food and Agriculture, therefore, wishes to express its appreciation to IWMI-Ghana for the technical support provided as well as contributions made during stakeholder consultations in working out the modalities for the inclusion of the organic fertilizer program.”

- Emmanuel Asante Krobea, Director of Crop Services, Ministry of Food and Agriculture, Ghana

POLICY SUPPORT IN SRI LANKA

As part of a wider effort to explore the potential of RRR in Asia, IWMI researchers began work on this approach in the Institute's host country, Sri Lanka. Responding to a request from the government, they provided advice on how to incorporate fecal sludge management into a new national sanitation policy. The original draft of the policy paid little attention to on-site sanitation systems, even though up to 96% of Sri Lankan households depend on septic tanks to handle sanitation waste. Based on IWMI's research, a new section of the policy was prepared that addresses the challenges and opportunities that on-site sanitation systems pose.

The new policy is expected to benefit millions of Sri Lankans by reducing health and environmental risks, while opening up new opportunities to produce safe and environmentally friendly products. The national cabinet formally approved the policy in late 2017, and the Ministry of City Planning and Water Supply, fully acknowledging IWMI's contribution, invited the Institute to assist in policy implementation.

As an immediate outcome of IWMI's policy interventions, the ministry has agreed to introduce septage treatment and reuse in a staged manner through all 335 of the country's Local Authorities (such as municipal and urban councils). IWMI is also working with the ministry on national guidelines for the reuse of sewage sludge. In addition, IWMI has authored a draft publication with the Central Environmental Authority (CEA) on guidelines for safe fecal sludge production technology.

To help build local capacity for action, IWMI researchers embarked on a major training effort focused on the business skills and technical abilities of key stakeholders in dozens of compost plants already established around the country. The training included an introduction to the use of pelletizing and co-composting techniques for fecal sludge and municipal solid waste. It also strengthened the technical and business capacity of sanitation service providers for compost production and sale.



Municipal solid waste compost unit in Negombo, Sri Lanka.

A GREEN LIGHT FOR SRI LANKA'S SANITATION POLICY

“We are pleased to inform you and your institute that the national sanitation policy has been approved by the cabinet of ministers. We would like to thank your institute's continuous support throughout the process to make this policy a success. The ministry expects your continuous contribution during the planning and implementation phases of the policy to achieve the SDG 6 targets in Sri Lanka.”

- K. G. D. Priyanka, Director (Development), Ministry of City Planning and Water Supply

TOWARDS A CIRCULAR ECONOMY

IWMI supports the transition to a circular economy through research on low-cost options for treating agricultural and septic waste, and on RRR business models. “A number of investors and national authorities in low-income countries have requested our assistance,” says Miriam Otoo, leader of IWMI's RRR Research Group. “Resource recovery and reuse can make an important contribution to living sustainably, within our planetary boundaries.”



Application of the organic fertilizer *Fortifer*TM to a rice crop in Ghana's Eastern Region.

DONORS AND PARTNERS

IWMI's work on RRR forms part of the CGIAR Research Program on Water, Land and Ecosystems (WLE), supported by CGIAR Trust Fund donors. This work has also received bilateral support from the Bill & Melinda Gates Foundation, Swiss Agency for Development and Cooperation (SDC), International Fund for Agricultural Development (IFAD), German Federal Ministry for Economic Cooperation and Development (BMZ), World Bank and African Development Bank (AfDB).

ABOUT IWMI

The International Water Management Institute (IWMI) is a non-profit, scientific research organization focusing on the sustainable use of water and land resources in developing countries. IWMI works in partnership with governments, civil society and the private sector to develop scalable agricultural water management solutions that have a real impact on poverty reduction, food security and ecosystem health. Headquartered in Colombo, Sri Lanka, with regional offices across Asia and Africa, IWMI is a CGIAR Research Center and leads the CGIAR Research Program on Water, Land and Ecosystems (WLE). www.iwmi.org

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