

# URBAN-RURAL NUTRIENT & CARBON CYCLE (URNCC)

Mainstreaming circularity approaches for sustainable urban development and healthy soils in Maharashtra

## Background

Almost 40% of India (147 million hectares) is affected by land degradation, and 3.7 million hectares suffer from **depletion of soil organic matter and nutrients**. The major drivers of land degradation are agricultural practices, improper irrigation, cultivation in vulnerable or low potential land, and overuse of agro-chemicals.

In India more than 54 million metric tons (MT) of municipal solid waste are generated every year of which 50% is organic. Without treatment, organic waste, containing valuable nutrients and carbon originating in agricultural fields, accumulates in urban environments. This loss of nutrients from rural agricultural landscapes contributes to its degradation. There is a potential to **recycle urban organic waste into compost and other soil enhancing products** to return nutrients and carbon back to the soils.

## Government Initiatives

The Government of India is actively engaging on several fronts to address existing challenges for urban waste management and the depletion of rural agricultural soils at the same time. One approach, implementing the **Swachh Bharat Mission (SBM)** across the country

is to adopt modern and scientific methods for urban solid waste management. The SBM guidelines demand activities that reuse a maximum of organic solid waste as manure. The mission aims to increase the capacities of urban local bodies (ULBs), including financial and technical support in the form of grants for the establishment of solid waste processing facilities at each ULB. In addition, the Ministry of Chemicals and Fertilizers has introduced a Policy on Promotion City Compost with Market Development Assistance (MDA) to scale up the production and consumption of city compost by supporting ULBs and manufacturers who sell city compost in the form of a subsidy of Rs.1500/MT.

To realize its national targets under the Agenda 2030 for Sustainable Development on Land Degradation Neutrality (LDN) to restore 26 million hectares of degraded land by 2030, the **National Mission for Sustainable Agriculture (NMSA)**, under the Ministry of Agriculture and Farmers Welfare (MoAFW), promotes organic agriculture and agroecological farming practices to improve soil health management. To strengthen agroecological principles and value chains, MoAFW, in collaboration with NABARD and National Cooperative Development Corporation (NCDC) as implementing agencies, has launched the Central Sector Scheme (CSS) on "Formation and Promotion of Farmer Producer Organizations (FPOs)". Cluster Based Business Organizations (CBBOs) will be set up at the state and cluster levels to form and promote about 6,000 FPOs by 2024.

### URBAN

Growing urban population

54 million MT solid waste generation

27 million MT organic waste

Challenges in waste management

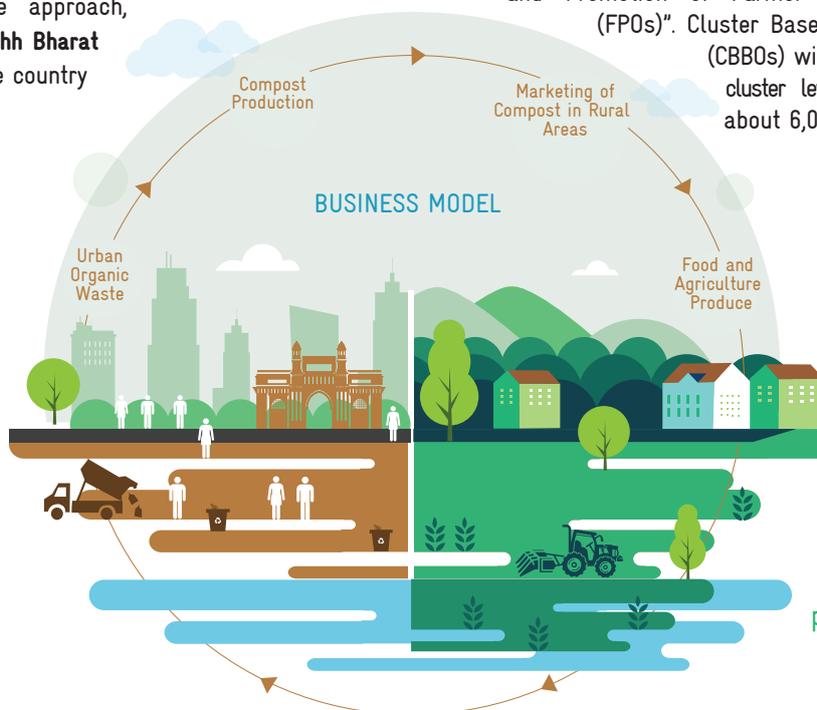
### RURAL

Intensive cultivation

147 million ha land degraded

3.7 million ha depleted of organic matter

Growing population pressure on limited land



# Piloting a Circular Economy Model: Urban-Rural Nutrient & Carbon Cycle (URNCC)

URNCC is a **cross sectoral circular economy approach**, where waste is considered a resource in the agriculture value chain. In the cities, urban organic waste is recycled and processed into compost. The compost is then used on farms in rural areas to increase soil organic carbon and add nutrients. The model pilots an end-to-end approach in Maharashtra addressing institutional and policy gaps by supporting research, capacity development, product branding and the establishment of market linkages using digital solutions.

## OUR APPROACH IN MAHARASHTRA

In 2019, the GIZ project **"Soil protection and rehabilitation of degraded soil for food security in India" (ProSoil)** implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of German Federal Ministry for Economic Cooperation and Development (BMZ) in partnership with National Bank for Agriculture and Rural Development (NABARD) introduced the URNCC initiative in the state of Maharashtra. The Government of Maharashtra under SBM provided the infrastructure for compost production and introduced the 'HARIT' (Sanskrit for "green") label for branding the compost. Currently, there is a potential to produce 350,000 MT of city compost every year. For the ULBs this represents a business potential of around 200 crores INR (20 to 25 Mio EUR).

### Gaps and Challenges

**Awareness about circularity in the urban-rural interface.**

**Limited capacities at ULBs to produce quality compost as per FCO norms.**

**Challenges in assuring quality and 'HARIT' standards of city compost and testing at heavy metal contamination due to limited facilities.**

**Gap in marketing and market linkages to rural farmers and farming communities for city compost.**

**Non availability of city compost application guidelines for farmers.**

**Inadequate promotion of city compost through demonstration plots.**

### Intervention Areas

**GIZ and its partners are addressing these gaps and challenges through various activities including developing capacities at ULBs and FPOs to establish functional and profitable supply chains and business models for the compost.**

-  **Capacity development programmes for ULBs and FPOs** on quality compost production as per Fertiliser Control Order (FCO) norms.
-  **Engagement with State Agriculture University (MPKV)** for scientific crop trials on city compost for recommendations to farmers
-  **Development of guidelines/SOP** on compost processing.
-  **Quality assurance** of city compost to ensure acceptance and application by farmers in their agricultural farms.
-  **Promotion of 'HARIT' brand** certification and label.
-  **Compost testing** to avoid heavy metal contamination.
-  **Exposure visits and demonstration plots** for farmers and FPOs for promotion and use of city compost.
-  **Development of a digital tool 'HARIT Ticker' app** for monitoring and marketing of city compost.
-  **Tri-Partite (NABARD, UDD, GIZ) state level steering and governance** structure for promoting and implementing URNCC in the state of Maharashtra.
-  **Development of viable business models for ULBs and FPOs underway** for production, distribution, and promotion of city compost.

## Achievements

URNCC has contributed to improve the compost value chain in Maharashtra.



Increased demand of city compost among farmers and FPOs due to demonstration plots and exposure visits in various parts of the state. An average yield increase of 12-15% has been experienced. One FPO in the project area has procured 200 MT of city compost, which could only meet a partial demand of the farmers.



ULBs in the state are following the SOP on compost processing.



Involvement of FPOs in distribution and marketing of city compost under 'HARIT' brand considering the growing demand of city compost.



Handholding support to selected ULBs for quality compost production.



HARIT' brand certified compost meets the FCO standards.



'HARIT Ticker' app is accessible to all interested farmers and FPOs and has improved compost monitoring and marketing. All state ULBs are registered as compost producers (total 395) on the platform.



## HARIT Ticker

URNCC greatly supports the use of digital tools for monitoring and marketing of quality compost, to assure demand, access and use of city compost by farmers. 'HARIT Ticker' is a tool to support the circularity approach enabling the use of the innovative advantages of blockchain, such as transparency, encryption and secure transactions. The application offers all important functions for monitoring and supply chain management such as inventory, production, procurement (sales-purchase), logistics, warehousing and management, quality control, yield management and analysis. It allows for greater transparency even with multiple stakeholders. The Indian government in the state of Maharashtra supports the use of the app and relies on it to subsidise urban compost. Currently the application is in the pilot phase in cooperation with the Government. As a digital market platform, it easily connects compost producers and consumers. The platform can also be used to market other value-added soil enhancing products such as biochar, phosphate rich organic manure (PROM) and Terra Preta.

## Potential for Mainstreaming URNCC

All interventions and activities under URNCC have the potential to be scaled across India with the Ministry of Housing & Urban Affairs under SBM. SBM envisages clean cities by adopting urban solid waste management and by increasing the capacities of ULBs and the private sector to build the components of a circular economy.

Piloting URNCC in Maharashtra is contributing to achieve the national SBM mandates. Taking a look at the total volume of organic waste generated in India, a potential of around 2 million MT compost can be produced (10 % of 20 million MT or-ganic waste) and applied on 400,000 ha land (average application rate of 5 tons per ha) every year.

URNCC is a **triple-win contributing to economic gains, the national LDN targets and climate goals**: mainstreaming those viable business-oriented models offers economic potential for ULBs and FPOs to strengthen the city compost value chain. Quality city compost improves soil health and contributes to increased agricultural productivity and climate resilience of farmers. This approach intrinsically contributes to climate mitigation by reducing greenhouse gas emissions in the cities and by carbon sequestration in soils.



### Project Name

Soil protection and rehabilitation of degraded soil for food security in India (ProSoil)

### Commissioned By

German Federal Ministry for Economic Cooperation and Development (BMZ)

### Project Region

PAN India

### Lead Executing Agency

National Bank for Agriculture and Rural Development (NABARD)

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