

# Building the standards before the market writes them without us.

A \$546 billion circular economy opportunity is being built across Africa — projected to create 11 million jobs by 2030, according to the African Circular Economy Alliance and the African Development Bank. . HUMANDREAM Foundation is building the governance architecture that determines whether it serves 33 million smallholder farmers or prices them out permanently. The window to establish development-mandate standards is 3 to 7 years. It is open now.

## 165

### COUNTRIES, NO MANDATE

As of COP30, 165 countries had made no NDC commitment to reducing food loss or food waste, according to WRAP's analysis of nationally determined contributions submitted by October 2025.

## 3–7 yrs

### GOVERNANCE WINDOW

Before commercial operators write LMIC circular food standards. Open now. Closing.

## \$546B

### MARKET BEING BUILT

Africa's circular economy opportunity by 2030 (AfDB/ACEA), almost entirely ungoverned for community access.

## 33M

### SMALLHOLDER FARMERS

Across sub-Saharan Africa — who collectively produce up to 90 percent of the region's food supply — at risk of exclusion from circular food systems built from their communities' waste.

## THE GOVERNANCE WINDOW

# The standards have not been written. The window is open. It is closing.

As of COP30, 165 countries had made no NDC commitment to reducing food loss or food waste, according to WRAP's analysis of nationally determined contributions submitted by October 2025. This is not an oversight. It is a vacuum, and who fills it is being decided now. Food loss and waste generate 8 to 10 percent of global GHG emissions, nearly five times all aviation combined (UNFCCC/UNEP, 2024).

## The Commercial Operators Arriving

Black soldier fly protein is growing at 28 to 34 percent CAGR globally across multiple market analyses. Commercial BSF operators are actively evaluating African markets. Commercial fertilizer companies Yara and OCP are entering organic product lines using existing agro-dealer networks. These operators serve profitable customers: commercial farms, export agriculture, and urban institutional buyers. Thirty-three million smallholder farmers are not the profitable customer. Without governance standards requiring community access provisions, they will be priced out of a system built from their own communities' waste.

## The Institutional Moment

The African Union adopted its Continental Circular Economy Action Plan in July 2025. The AfDB incorporated circularity into its Ten-Year Strategy 2024 through 2033. NDC revision cycles across 165 countries will adopt governance standards for circular food systems. The question is whether those standards embed development mandate or commercial interest. The governance window is not a metaphor. It is a 3 to 7 year period before commercial operators establish regulatory relationships, waste supply contracts, and institutional market presence in SSA cities. Once those relationships are established, governance standards become retrofits that commercial operators resist rather than benchmarks they are required to meet.

### SIX LOSSES WITHOUT GOVERNANCE STANDARDS

DIMENSION	WITH GOVERNANCE STANDARD	COMMERCIAL DEFAULT
Food Security	3 to 5M people with certified inputs at cost-plus; cooperative access guaranteed	33M smallholder farmers priced out; no access mandate exists
Employment	Informal sector integrated; cooperative margins retained locally; living wage provisions	Waste pickers displaced; 11M jobs become piece-rate commercial labour
Climate	NDC gap closes; methane reduction at scale mandated; food waste's 10% GHG addressed	165-country governance vacuum persists; food waste GHG unaddressed
Industry	AfDB conditionality routes \$546B through development-mandate governance	Commercial standards govern 50+ SSA cities for 30 years
Gender Equity	50%+ women employment constitutional and enforceable; fiduciary board roles	No mandate; gender provisions become optional CSR with no enforcement
Global LMIC	135+ countries adopt open governance blueprint; no country proves from scratch	Each country inherits commercial standards by default

These are not independent risks. The governance vacuum in one dimension reinforces every other. The window to prevent all six simultaneously is the same 3 to 7 years. The architecture that addresses all six at once is the Open Protocol Library.

## WHAT CTVCS IS

# The hub is the evidence base. The Open Protocol Library is the legacy.

A minimum viable anaerobic digestion and composting hub in Nairobi converts urban organic waste into certified agricultural inputs for smallholder cooperatives. Every operational decision becomes a published governance standard, openly available for AfDB, the AU, and national governments to adopt before commercial operators write their own version.

## The Operational Model

Sub-Saharan Africa's cities generate more than half of municipal solid waste as organic material, approximately 57 percent on average with East African urban markets trending higher, and the majority of that material is currently landfilled at enormous methane cost. Rural smallholder farmers simultaneously face rising fertilizer prices and declining soil health from continuous monoculture. The CTVCS hub collects institutional organic waste from Nairobi markets, hotels, universities, and restaurants. That waste becomes KEBS-certified organic fertilizer and liquid digestate, distributed to cooperative societies in Central Kenya at cost-plus pricing, guaranteed by off-take agreements with buyer-of-last-resort provisions.

## Hub-Spoke-Satellite Architecture

A central hub serves peri-urban farmers at 0 to 40 kilometres by direct delivery. Spoke distribution points at 40 to 80 kilometres supply near-rural cooperatives with weekly bulk compost. Satellite micro-composting units at 80 to 150 kilometres process local organic materials using hub digestate as a microbial inoculant, dramatically reducing transport cost and emissions. The satellite model is the replication breakthrough: county governments can deploy it through existing extension officers without building new hubs, at a fraction of hub capital cost.

## Technology Sequencing Principle

Phase 1 is anaerobic digestion and composting only. Black soldier fly protein (Phase 2) and rural biogas cylinder distribution (Phase 3) activate only when prior operations are stable and market scoping confirms demand.

Technology activation follows demonstrated demand, not supply capability. This prevents the premature capital deployment that causes most LMIC circular hub failures.

## Collective Impact Backbone

HUMANDREAM is the governance architect, not the operator. A government statutory agricultural research institution co-authors quality protocols. A national cooperative federation coordinates off-take and demand-side market development. A government standards body co-designs certification. A Kenyan organic waste processing operator provides Year 1 technical support. Each partner does what they do best; no single partner controls the architecture.

## Open Protocol Library

9 Governance Standards in Development, not as proprietary standards, so development institutions can adopt protocols as public governance benchmarks. Built from Nairobi operational evidence and published before commercial operators establish market presence.

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| <p>1 Phase 0: Guaranteed Waste Supply Protocol<br/>Governs urban organic waste MOU portfolio to prevent supply concentration risk</p> <p>2 Phase 0-1a: Demand-Side Development Protocol (DSDP)<br/>Structures cooperative farmer pre-commitment across three distance tiers before distribution begins</p> <p>3 Phase 1a: Financial Architecture and Mission-Lock Protocol<br/>Embeds cost-plus pricing, cooperative board seats, and community equity as enforceable governance conditions</p> <p>4 Phase 2a: Regulatory Comparative Analysis Protocol<br/>Generates replicable regulatory assessment methodology for LMIC circular food hub investment evaluation</p> | <p>5 Phase 2a: Spatial Design Standards Protocol<br/>Defines hub-spoke-satellite architecture enabling replication without new hub construction at each site</p> <p>6 Phase 1b: Informal Sector Integration Protocol<br/>Governs waste picker integration through community consent and three documented pathways before hub operations begin</p> <p>7 Phase 0: Failure Recovery Protocol<br/>Three-tier contingency framework with farmer backstop provisions, designed before hub commissioning</p> <p>8 Phase 1b: BSF Governance Standard<br/>Community-access standards for insect protein operations, published before commercial-scale market entry in East Africa</p> <p>9 Phase 2b: Rural Biogas Logistics Protocol<br/>Cooperative delivery-model governance for rural biogas access, complementary to Kenya's existing safety frameworks</p> |
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## IMPACT ARCHITECTURE

# Five simultaneous benefit streams. One governance architecture unlocks all of them.

The City-To-Village Circular Food System (CTVCFS) model generates interdependent benefits that cannot be disaggregated without destroying the model's logic. Each stream is contingent on governance standards being established before commercial entry, which is why the governance window is the primary intervention, not the hub itself.

### GOVERNANCE-SCALE IMPACT

## 3–5M

#### Improved Food Security

FOOD  
SECURITY

People with certified organic inputs at cost-plus pricing across 50+ SSA cities and global LMIC replication over 20 years. Mission-lock provisions ensure commercial market growth cannot price cooperatives out.

## 500K+

#### Living-Wage Green Jobs

EMPLOYMENT

Formal jobs, direct and induced, across 50 SSA cities. Living wage, cooperative-owned, with informal sector integration provisions. Africa's circular economy is projected to generate 11 million jobs by 2030. CTVCFS governance standards determine whether those jobs carry community ownership or commercial extraction terms.

## 15%

#### Global Methane Reduction

CLIMATE

Food loss and waste governance addresses the waste sector's estimated 18 percent share of total global methane mitigation potential under the Global Methane Pledge framework, making it one of the fastest and most cost-effective methane abatement opportunities documented by UNEP. Food loss and waste generate 8 to 10 percent of global GHG emissions, nearly five times all aviation combined (UNFCCC/UNEP, 2024). CO<sub>2</sub>e avoided across 50 cities over 20 years spans methane avoidance, avoided fertilizer production emissions, soil carbon, and biogas displacement of charcoal.

## 50%+

#### Women in Employment

GENDER  
EQUITY

Constitutional across all replication cities, not aspirational. Cooperative board representation provisions give women fiduciary governance roles. Anti-uncompensated-labour provisions in satellite design prevent unpaid work being imposed on women smallholders. Without governance standards, these protections become optional CSR with no enforcement mechanism.

## 135+

#### Global LMIC Replicability

LMIC SCALE

Countries beyond SSA including South Asia, Southeast Asia, and Latin America face identical governance vacuums. The Open Protocol Library, designed for adoption by the AfDB and the AU Continental Circular Economy Action Plan, means no country needs to prove the model from scratch.

### WITHOUT GOVERNANCE STANDARDS

33M smallholder farmers priced out. 11 million jobs become piece-rate commercial labour with no cooperative ownership or living wage provisions. The 165-country NDC governance gap persists for another decade, leaving food waste's 10% of global GHG unaddressed. Gender equity provisions become optional CSR with no enforcement mechanism. Each LMIC country inherits commercial standards by default.

### LAYER 1 EVIDENCE BASE

NAIROBI HUB DIRECT IMPACT, YEAR 10. THIS IS NOT THE IMPACT CLAIM. IT IS THE PROOF-OF-CONCEPT THAT MAKES THE GOVERNANCE STANDARD DEFENSIBLE.

22,500 people direct; 55 to 80 formal jobs at hub, spoke, and satellite facilities; 10+ open governance protocols published;

Input cost reduction for cooperative members; break-even target at Month 30 to 36.

### THREE-REGION GOVERNANCE ARCHITECTURE

The governance architecture is designed for LMIC replication from inception. The Nairobi proof-of-concept generates the empirical evidence base from which open protocols are derived. Those protocols are then absorbed by AfDB, GIZ, and AU financing conditions, requiring compliance across all development-financed circular food hubs in the following geographies.

#### SSA ANCHOR

##### Kenya, Ghana, Nigeria

Nairobi proof-of-concept through Accra and Lagos via AfDB Feed Africa 2.0 flagship designation and IFAD East and Southern Africa Hub financing conditionality. Kenya County Government satellite programme proposal targeting Kiambu and Murang'a by Year 5. AU CCEAP agri-food Priority Sector 3 engagement via IITA's AU Commission pathway.

#### SOUTH ASIA ANCHOR

##### India Parallel Pilot

India is identified as the parallel pilot site. GOBARdhan has 979 operational biogas plants across 51 percent of Indian districts as of January 2026, but no community access governance standards exist for any of them. ICAR serves as the institutional research partner equivalent to Kenya's KALRO. The Asian Development Bank provides the equivalent financing conditionality mechanism for the region. India's National Cooperative Development Corporation (NCDC), which operates in collaboration with NABARD, provides financing and development support for cooperatives involved in agricultural input supply and distribution across India, serving a broadly analogous role to KENAFF in coordinating cooperative agricultural infrastructure, though NCDC is a financing institution rather than a cooperative federation.

#### CONTINENTAL LEVERS

##### AU CCEAP and ASEAN BCG Network

AU Continental Circular Economy Action Plan 2024 through 2034 engagement through IITA's AU Commission technical pathway. ASEAN BCG Network via GIZ Southeast Asia. Target: Open Protocol Library officially adopted by the AU as the reference implementation framework; AfDB requires CTVCFS governance protocol compliance as a condition of financing any SSA circular food hub.

#### WORKING NOW — PHASE 0 PRIORITIES

- **AfDB Feed Africa 2.0 concept note** with co-submitting statutory research institution; flagship designation target
- **Working Paper 1: Guaranteed Waste Supply Protocol** co-authored with statutory agricultural research institution and national research university; target publication August to September 2026
- **Phase 0 MOU negotiations** Waste supply, cooperative off-take, certification co-design, technical support anchor
- **KEBS organic compost certification co-design** establishing CTVCFS hub compost as the Kenya quality reference standard before commercial organic fertiliser companies intensify engagement
- **Fellowship applications** Echoing Green and DRK Foundation; active now
- **GIZ Kenya and SWITCH-2-CE technical cooperation conversations** Open Protocol Library policy framework contribution and Horizon Europe 2027 consortium

#### WHAT DIFFERENTIATES CTVCFS

Three differentiators are absent from most commercial pilots and scale programmes. Together they constitute a governance architecture, not a project implementation plan.

##### Preemptive Open Governance Library

Nine governance standards published as public standards before commercial entry, filling the governance vacuum across 165 countries' NDC cycles. No other initiative mandates community access or buyer-of-last-resort provisions in an open standard.

##### Development-Mandate Lock-in

Cost-plus pricing, 50%+ women in employment, and cooperative ownership are enforceable protocol provisions, not optional CSR. From Year 5, cooperatives may acquire 15 to 25 percent equity stake, converting the development mandate into a legally enforceable property right held by the communities. Prevents waste picker displacement and treats gender equity as constitutional rather than aspirational.

##### Satellite Replication Blueprint

Hub to spoke to satellite deploys via county extension officers using hub digestate as a microbial inoculant, requiring no new capital expenditure per replication step. Uniquely low-capex for 50 or more SSA cities versus hub-only models. A county government can deploy satellite units through existing extension infrastructure.

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## ADVISORY BOARD

Ruby Guillen, MSW: White House President's Lifetime Achievement Award recipient; Co-Chair, United Nations Association USA, Human Rights Affinity Group. Global board development is an active priority: development finance, Kenyan institutional, gender equity, and climate governance expertise being recruited now.

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## WHAT WE ARE STILL BUILDING

*A governance institution that asks others to be transparent must be transparent about its own gaps.*

- **Global board:** Active recruitment for development finance, Kenyan institutional, gender equity, and climate governance expertise.
- **MEL framework:** Monitoring, evaluation, and learning framework is a Phase 0 deliverable, not a completed document.
- **AfDB and GIZ relationships:** Target institutional relationships, not confirmed ones. Concept note submission is a Phase 0 action.

## HOW TO ENGAGE

Three engagement pathways are open. Each addresses a different kind of partner. Each is a founding relationship, not a transactional one.

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<b>TIER 1</b> \$250K– \$500K	<b>Governance Founding Partner</b> Maximum 2 partners. Named in the Open Protocol Library in perpetuity; Protocol Advisory Group seat; named on AfDB Feed Africa 2.0 concept note as co-financier. Primary institutional point of contact for all AfDB and AU governance standard engagement; recognition across all CTVCFS institutional communications for the life of the programme.
<b>TIER 2</b> \$50K– \$249K	<b>Protocol Founding Partner</b> 3 to 5 partners. A named protocol carrying the partner's name is embedded across AfDB and AU governance channels in SSA and 135+ LMIC countries in perpetuity. Annual impact reporting and recognition across HUMANDREAM institutional communications.
<b>TIER 3</b> \$15K– \$49K	<b>Open</b> Named as Community Founding Partner in the Open Protocol Library; annual impact