



ADS ECO Bio-Industrial Cluster

Area approx. 8.0 ha

An integrated bio-industrial cluster for organic waste valorization, compost and fertilizer production, feed and bio-additives, greenhouse integration, agro-industrial processing, and ESG-controlled bioeconomy operations.



Organic
Recovery



Compost &
Fertilizer



Greenhouse



Agro
Processing



CIRCULAR BY DESIGN

Converting organic waste
into valuable resources.



ESG CONTROLLED

Monitoring, compliance and
traceability at every step.



VALUE CREATION

Multiple high-value outputs
from one integrated system.



SUSTAINABLE IMPACT

Supporting food security,
climate goals and communities.

1. Executive Technical Overview

A biological and agro-industrial value creation area within the **ADS ECO** Eco-Industrial Complex.

-  The Bio-Industrial Cluster converts organic and biological material streams into useful agricultural, greenhouse and agro-industrial outputs. It complements sorting, recycling and energy recovery by creating a dedicated platform for compost, organic fertilizers, feed-related biological products, controlled cultivation and downstream processing.
-  The cluster is designed as an integrated circular bioeconomy module. Organic fractions are not treated as a residual burden; they are received, controlled, prepared and transformed into products that support soil improvement, plant production, biological input markets, greenhouse operations and value-added agro-processing.




8.0 ha
 indicative cluster area


5+
 product families


24/7
 digital supervision


ESG
 traceable outputs



Strategic mission

Transform suitable organic inputs into compost, fertilizers, biological inputs, greenhouse products and agro-industrial outputs while reducing disposal and landfill pressure.



Operational role

Provide controlled reception, pre-treatment, biological conversion, hygienic processing, packaging, storage, digital traceability and environmental control.



Economic role

Create diversified revenue streams from practical products families connected to agriculture, landscaping, greenhouse, feed-input and processing markets.

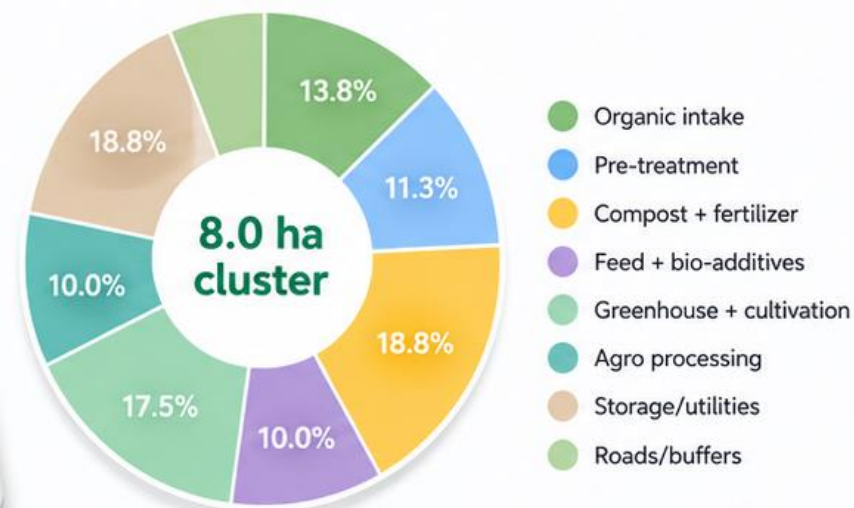


ESG role

Improve organic diversion, reduce methane-generating disposal, support local agriculture and create measurable circular bioeconomy outcomes.

2. Area Program and Functional Layout

Indicative 8.0 ha land-use structure with clean circulation, green buffer, controlled intake and separated production functions.



	Functional zone	Indicative area	Main purpose
	Organic intake and buffers	1.1 ha	covered reception, QC, temporary storage
	Pre-treatment and preparation	0.9 ha	screening, mixing, de-packaging, size reduction
	Compost and organic fertilizer lines	1.5 ha	biological conversion, curing, blending, packaging
	Feed and bio-additive units	0.8 ha	hygienic processing of suitable biological fractions
	Greenhouse and cultivation cluster	1.4 ha	controlled growing, nursery, crop trials, bio-input use
	Agro-processing and packaging	0.8 ha	washing, grading, drying, packing, product conditioning
	Storage, utilities, roads and buffers	1.5 ha	warehousing, water, odor, energy, safety and logistics

3. Input Streams, Reception and Pre-Control

First-level reception ensures input quality, process continuity, and biological performance for downstream production and upcycling.



Accepted organic inputs

Source-separated food waste, green waste, agricultural residues, suitable process residues, market organics and screened biological fractions from the complex.



Restricted / excluded inputs

Hazardous waste, medical waste, heavily contaminated fines, chemically polluted organics and any stream that cannot meet product or safety specifications.



Quality control gates

Weighing, visual inspection, contamination sampling, moisture check, odor screening, batch registration and routing decision before processing.



Digital traceability

Every inbound load receives a batch code linked to source, time, weight, inspection notes and downstream process route.



1. Weighing + registration



2. Covered tipping



3. Inspection + sampling



4. Buffer storage



5. Routing to treatment

The reception architecture uses covered and washable surfaces, controlled drainage, leachate collection, ventilation and odor-control connections. Traffic should separate inbound organic loads, clean outbound product vehicles, maintenance access and pedestrian routes. This protects hygiene, reduces cross-contamination and improves operational safety.

Typical pre-control equipment may include weighbridge integration, RFID or QR batch registration, inspection platform, bag openers, de-packaging systems, trommel or disc screens, magnets for ferrous contamination, shredders, mixers, conveyors, moisture measurement, temperature probes, gas and odor sensors, and automated diverter gates.



Reception hall design

Negative-pressure option, air extraction to biofilter, sealed floor slab, wash-down system, wheel-wash, fire detection, CCTV and controlled access.



Buffer strategy

Short residence time, separated bays by source type, first-in first-out routing, contamination quarantine and clear emergency overflow rules.



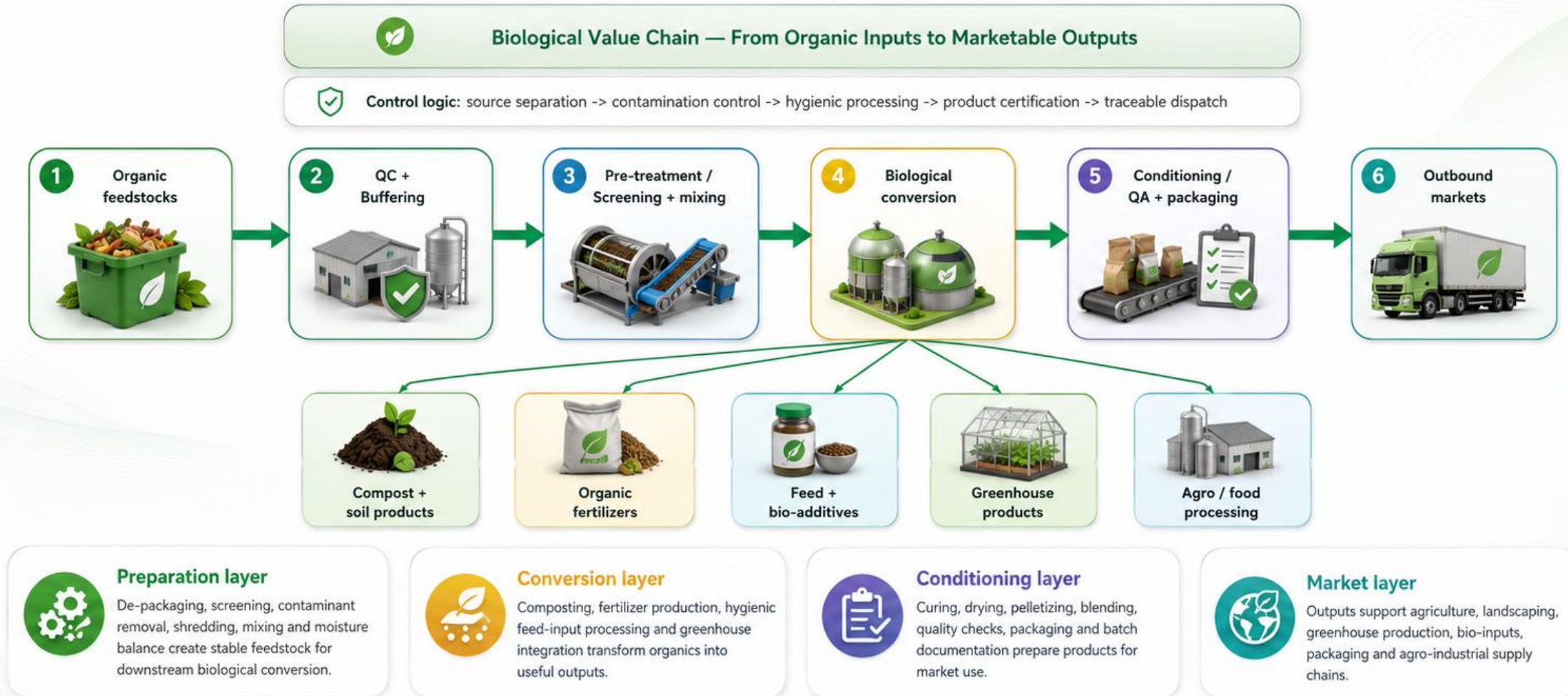
Routing decision

Materials are directed to composting, fertilizer blending, feed/bio-additive preparation, greenhouse use, agro-processing or rejected residue management.



4. Value Chain and Processing Logic

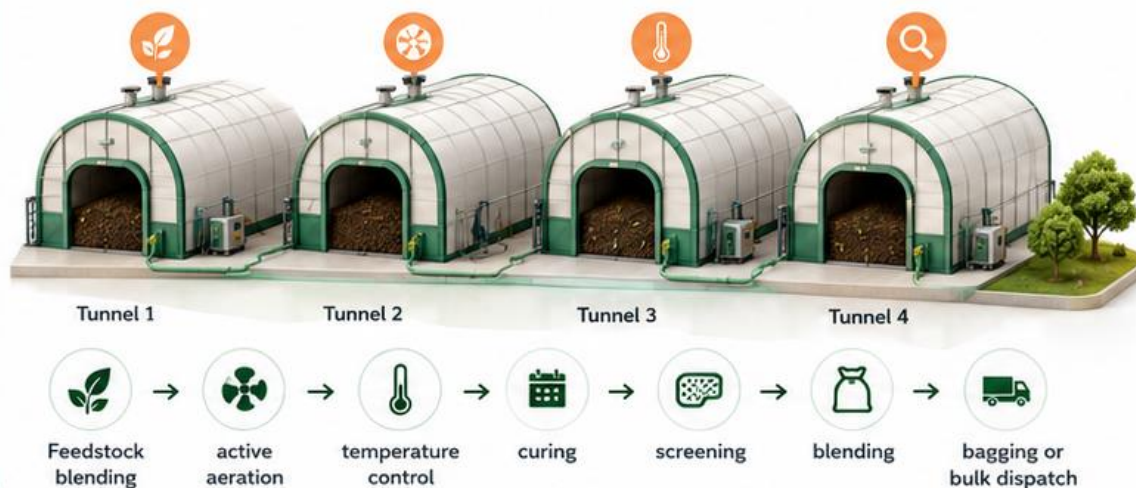
Progressive biological value creation from organic inputs to marketable outputs



5. Compost and Organic Fertilizer Production

A controlled biological conversion system designed for stable, marketable soil and nutrient products.

Aerated composting / tunnel or ASP concept



Composting converts suitable organic feedstocks into stabilized soil-improvement products. The selected technology can be implemented as enclosed tunnels, aerated static piles, covered windrows or a hybrid system depending on capacity, odor constraints, climate, automation level and product strategy.

- Carbon-to-nitrogen balancing through recipe management and feedstock blending.
- Moisture control through mixing, water addition, leachate recirculation and ventilation.
- Temperature monitoring to support pathogen reduction and process validation.
- Forced aeration with oxygen control to maintain aerobic conditions and reduce odor.
- Curing and maturation area for stable product development before final screening.

Process stage	Indicative technology detail	Control focus
Pre-mix	shredder, mixer, moisture dosing, recipe logic	homogeneity, C:N, moisture
Active composting	tunnels, ASP or covered windrow with aeration	temperature, oxygen, odor
Curing	covered maturation bays and turning equipment	stability, maturity, moisture
Finishing	screening, blending, granulation or bagging	particle size, QA, labeling
Fertilizer line	nutrient blending, pelletizing, drying, packaging	composition, moisture, traceability



6. Feed and Bio-Additive Production Unit

A specialized module for suitable biological fractions only, designed with strict hygiene, QA and traceability controls.



Design note: feed-related products require clear feedstock eligibility rules, sanitary separation, testing, regulatory approval, and product-specific quality standards. Unsuitable or contaminated biological materials must be excluded from this pathway.



Hygienization

Thermal pasteurization or equivalent validated treatment can reduce microbiological risk before drying, formulation or additive preparation.



Dehydration

Belt dryers, low-temperature dryers or heat-recovery dryers can reduce moisture and improve storage stability for selected inputs.



Formulation

Milling, blending, nutrient adjustment, binders and process recipes can produce defined feed inputs or bio-based additives.



QA release

Finished batches require moisture, microbiological, contaminant and label checks before storage or distribution.



Core equipment may include segregated intake hoppers, screw conveyors, pasteurization vessel, dryer, mill, mixer, dosing system, extruder or pelletizer, cooler, sieve, packaging line, laboratory sampling points and clean/dirty zone separation.



The module can also support biological additives, soil enhancers, fermentation-based inputs or other bio-based products when a partner technology and market pathway is selected. Clean design, product traceability and QA documentation are essential.

7. Greenhouse, Cultivation and Bio-Input Integration

Recovered organics can support controlled cultivation, crop trials and local agricultural value creation.

CONTROLLED GREENHOUSE / NURSERY / CROP TRIALS

Using recovered soil products and bio-inputs





Nursery Production



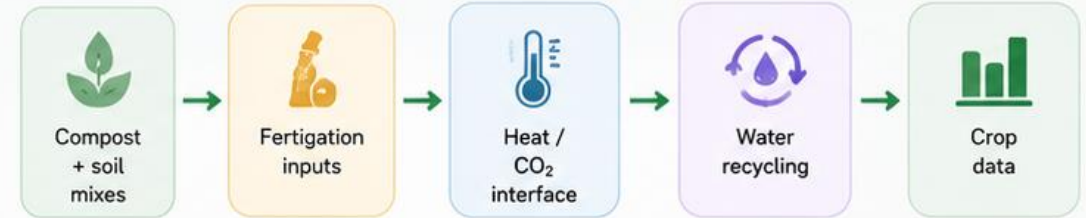
Crop Trials



Substrate Testing



Demonstration Plots



The greenhouse and cultivation component demonstrates the productive use of recovered organic resources. It can include nursery functions, seedling production, herbs, vegetables, demonstration plots, substrate trials and controlled-environment agriculture programs.

- ✓ Use compost and soil products as controlled amendments after QA approval.
- ✓ Integrate irrigation, fertigation and climate control with digital monitoring.
- ✓ Connect to energy cluster heat, CO₂ or renewable power where feasible.
- ✓ Use crop trials to validate product quality and develop local market confidence.

CULTIVATION PLATFORM

Greenhouse areas may be phased from pilot/demo scale to commercial blocks depending on water, energy, market and partnership strategy.



AGRONOMIC FEEDBACK LOOP

Crop performance data can improve compost recipes, fertilizer blends and product certifications over time.



PUBLIC VISIBILITY

The cluster can visibly demonstrate how waste resources become agricultural and food-related value.



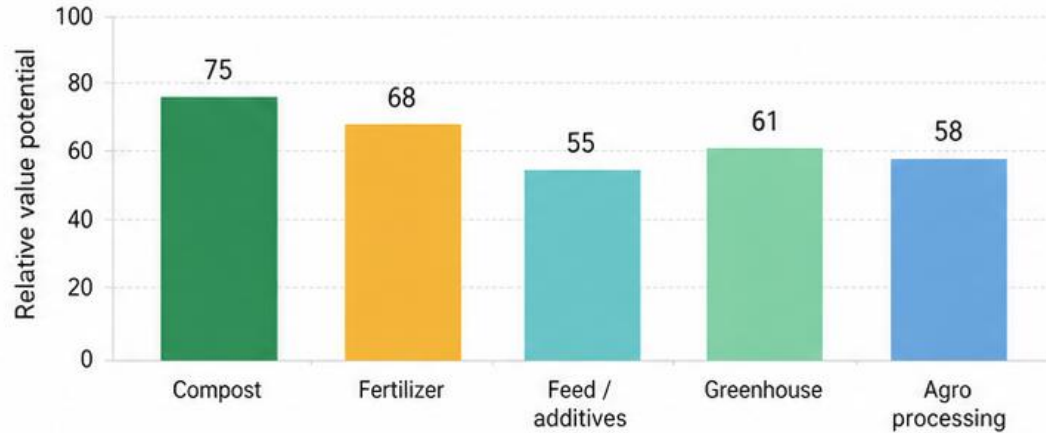


8. Agro-Industrial Processing and Product Handling

Downstream processing turns cultivation and bio-based outputs into standardized, stored and market-ready products.



Diversified product pathways



The agro-processing unit may include washing, sorting, grading, cutting, drying, cooling, freezing, packaging, labeling and temporary storage. Clean process zoning is required when food-related activities are included.



Product families

Compost, soil blends, fertilizer, biological additives, greenhouse crops, dried herbs, packaged produce and agro-industrial inputs.



Market channels

Agriculture, landscaping, greenhouse operators, municipal greening, nurseries, industrial agriculture and selected food processors.



Storage logic

Separate bulk, bagged, cold, dry and quarantine areas to protect product quality and simplify dispatch.

01



Washing + grading



02



Drying / cooling



03



Packing / labeling



04



Cold storage



05



Dispatch



HACCP-ready planning, washable materials, pest control, cold-chain management and QA laboratories should be considered where applicable.





9 Utilities, Environmental Controls and Safety

Environmental engineering converts a biological operation into a clean, **controlled and community-compatible** industrial cluster.



Odor control: enclosed high-odor areas, negative pressure, biofilters, activated carbon polishing or chemical scrubbers where required.



Water management: washable floors, trench drains, leachate tank, process-water reuse, stormwater separation and wastewater pre-treatment.



Air and dust control: extraction points, misting or filtration for dry product handling, enclosed transfer conveyors and housekeeping protocols.



Fire and process safety: heat detection, hydrant coverage, extinguishers, battery-safe electrical design, emergency access and combustible-dust assessment.



Utilities: low-voltage distribution, process heat interface, compressed air, clean water, irrigation water, refrigeration and backup power for critical controls.



Environmental permit logic

Monitoring points should be designed for air, odor, wastewater, noise, product quality, batch traceability and incident reporting.



Odor strategy

Highest priority for intake, pre-treatment and active composting. Air must move from clean zones toward dirty zones and then to treatment.



Water strategy

Separate clean stormwater from process water. Reuse treated process water where safe and technically practical.



10. Digital Control, ESG Monitoring and KPIs

A traceable platform for operational control, quality assurance and circular-economy reporting.



Bio-Industrial Performance Dashboard



Organic diversion



92%



Product QA pass rate



95%



Water reuse target



70%



Odor control uptime



98%



Traceable batches



100%



Landfill avoidance



88%



ESG
Score



SCADA / BMS

Central oversight of equipment status, utilities, alarms and process performance.



IoT sensors

Temperature, oxygen, humidity, moisture, odor, energy and water data streams.



Batch traceability

Source, recipe, conversion route, QA result, storage location and dispatch history.



ESG dashboard

Diversion, emissions, water reuse, product volumes and compliance indicators.

Digital monitoring allows the Bio-Industrial Cluster to operate as a transparent production platform rather than a simple waste treatment area. Each batch can be linked to incoming source data, processing recipe, quality tests, final product family and market route.

KPI		Indicative target / control logic
	Organic diversion rate	maximize suitable organics routed away from disposal
	Product QA pass rate	high release rate after stability, moisture and contaminant checks
	Odor compliance	no persistent off-site odor impact under normal operations
	Water reuse	reuse treated process water for washing or irrigation where permitted
	Traceable batches	100% batch registration from inbound to outbound product
	CO2 reduction impact	measured through avoided disposal and product substitution logic



11. Implementation Phasing and Strategic Value

The cluster can be developed in modular phases, reducing risk while creating visible circular bioeconomy value.



Key Takeaway

The Bio-Industrial Cluster transforms organic and biological streams into agricultural, greenhouse and agro-industrial value. It makes ADS ECO a more diversified, resilient and ESG-aligned circular platform by connecting waste recovery with productive bioeconomy outputs.

