






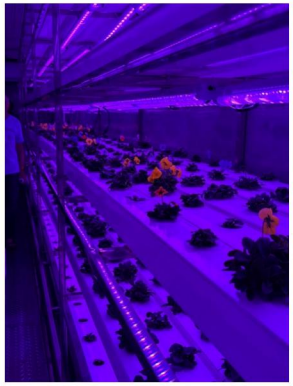




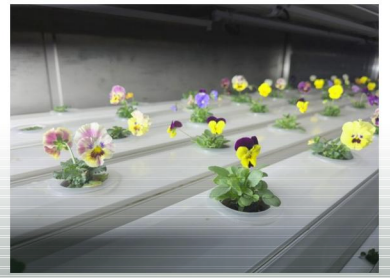
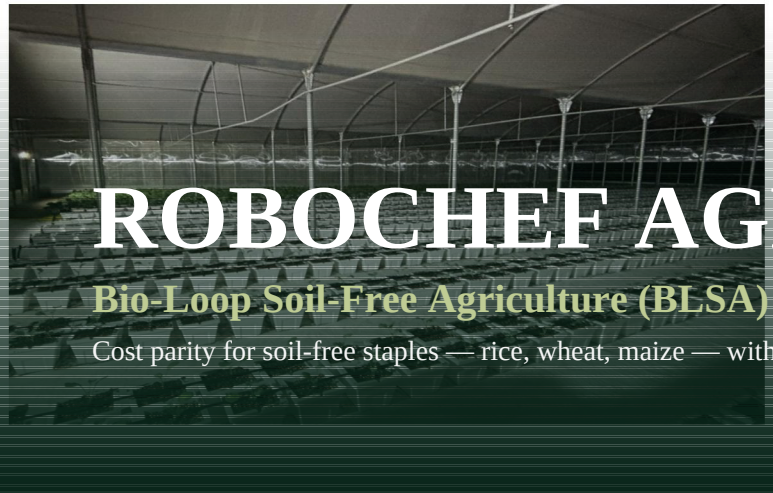

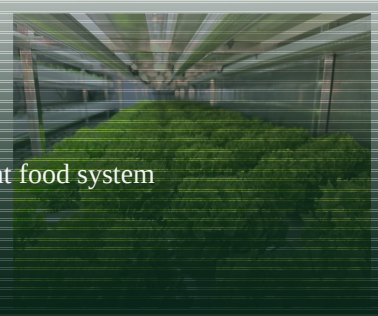


ROBOCHEF AGRITECH

Bio-Loop Soil-Free Agriculture (BLSA)

Cost parity for soil-free staples — rice, wheat, maize — with a resource-efficient, climate-resilient food system










AGRITECH – BIO-LOOP SOILFREE AGRICULTURE

BLSA (Bio-Loop Soil-Free Agriculture) is a next-generation farming model that transforms sunlight and air into food through a closed-loop, soil-free system, designed to achieve cost parity with conventional staple farming while drastically reducing environmental impact.

- 🌱 **Soil-Free Polyhouse Cultivation**

- Crops are grown in temperature-controlled polyhouses / Naturally Ventilated Net Houses without soil, using optimized sunlight, air, and minimal water for consistent, high-yield production.

- ♻️ **Carbon & CO_2 Loop**

- Biomass by-products are converted into reusable CO_2 to enhance photosynthesis, while soil-free rice cultivation eliminates methane emissions associated with flooded fields.

- 💧 **Closed-Loop Water Management**

- Water from plant systems, is recycled, and reused. Rainwater harvesting further minimizes freshwater consumption.

- ⚡ **Ultra-Low Energy Design**

- Passive / Geothermal cooling and advanced polyhouse architecture reduce energy consumption by up to 90%. Agrivoltaic solar systems generate power allowing it to be Off grid & self-sustaining.

Why BLSA Matters

- **Cost-Competitive Staple Production :** Soil-free rice, wheat, and maize produced at cost parity with conventional farming.
- **Food Security for Arid Countries :** Reliable local food production for water-scarce regions such as the UAE.
- **Near-Zero Waste Circular System :** Biomass residues converted into biochar, biofuels, and reusable CO_2.
- **Methane Elimination in Rice Farming :** Soil-free rice cultivation removes methane emissions from flooded fields.
- **Drastic Water Reduction :** Closed-loop recycling and rainwater harvesting minimize freshwater use.
- **Ultra-Low Energy Requirement :** Passive cooling and agrivoltaic solar systems reduce energy demand by up to 90%.
- **Scalable & Resilient Design :** Modular systems delivering consistent yields across extreme climates.

ENVIRONMENTAL IMPACT– BLSA RICE

ROBOCHEF AGRITECH
Bio- Loop Soilless Agriculture

Sustainability

- **Methane Emissions (Conventional Rice):** Flooded rice paddies create anaerobic conditions that generate methane, contributing approximately **8–12% of global agricultural methane emissions**.
- **Nitrous Oxide Emissions:** Intermittent flooding and nitrogen-based fertilizers in conventional rice systems can increase nitrous oxide emissions, further raising climate impact.
- **BLSA Advantage:** Soil-free rice cultivation **eliminates flooded field conditions**, significantly reducing methane emissions and lowering overall greenhouse gas intensity.

Resource Efficiency

- **Water Use Reduction:** Traditional Rice Cultivation uses around 3,000- 5,000 Liters of water for 1 Kg of Rice. BLSA rice systems reduce water consumption by **up to 90%** compared to traditional paddy farming.
- **Optimized Growing Conditions:** Precise control of temperature, lighting, CO_2, and nutrient delivery minimizes waste and improves overall resource efficiency.
- **Resource Optimization:** Water, nutrients, and energy are used more efficiently than in conventional paddy systems, enabling cultivation in water-scarce regions.

Productivity

- **Yield per Area:** Traditional rice yields are typically **~0.5–1.0 kg/m²/year**, while **BLSA systems can achieve ~3 kg/m²/year** under controlled conditions.
- **Multiple Harvest Cycles:** Controlled environments enable **3 harvest cycles per year**, improving annual productivity and consistency.
- **CO_2 Enrichment:** Elevated CO_2 levels (up to ~1,200 ppm) can support upto **~30–40% yield improvement**, increased biomass, and stronger panicle development.

Figures represent achievable ranges under optimized controlled-environment conditions. Actual performance varies by crop variety and system configuration.