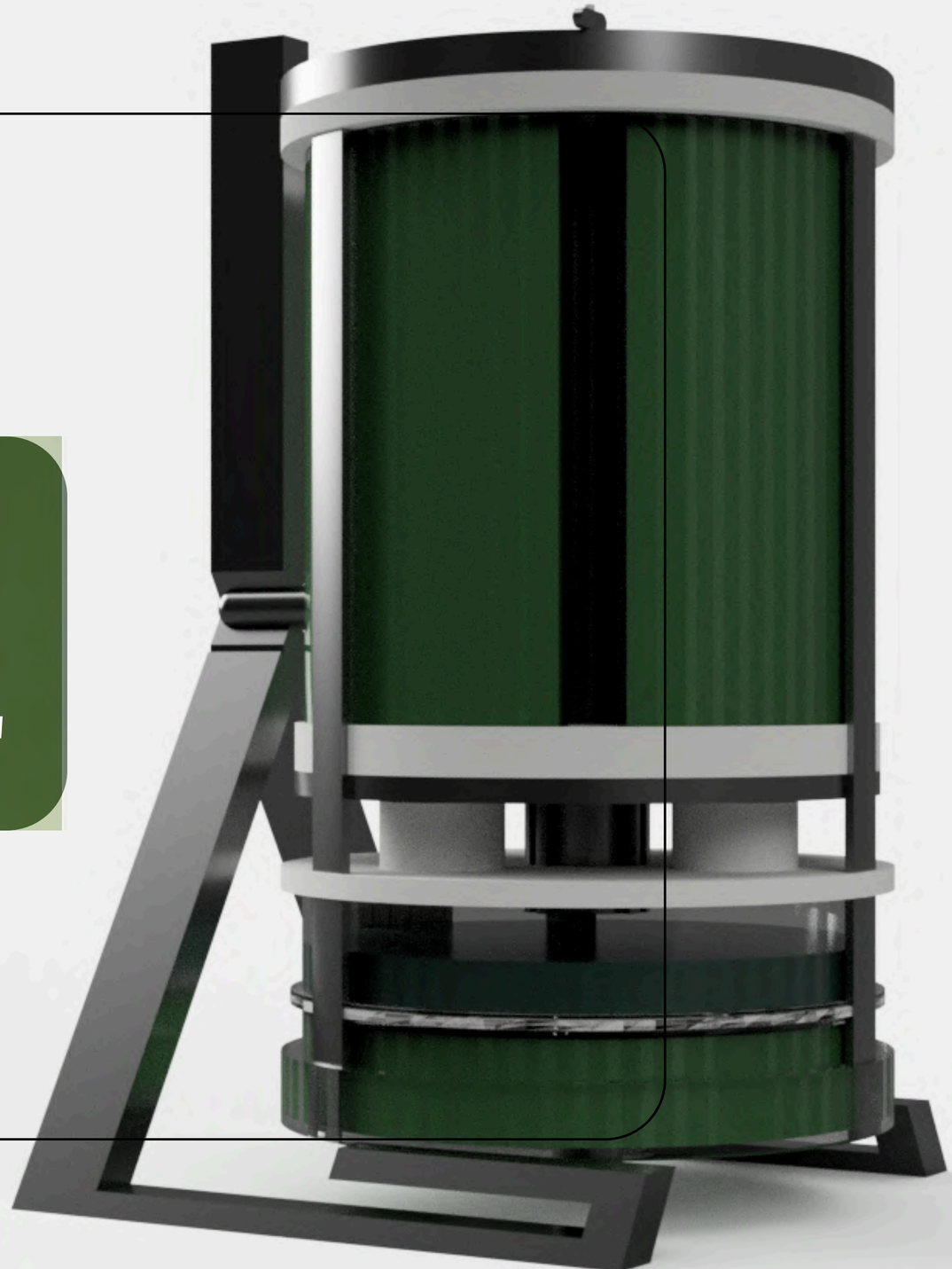
अंकुर

"अंकुर – हिरव्या भविष्यासाठी नवी सुरुवात"

Ankur

A new beginning for a green future

Vertical Algae Farming System



Problem Identification & Context

- **Land scarcity: 86**% of Indian farmers are small/marginal with <2 acres.
- **Current algae farming:** Pond-based → requires land + water, prone to contamination.
- **Gap:** Lack of compact, low-cost, low-maintenance algae farming systems. Need for a compact, portable, low-maintenance, scalable system for farmers.
- **Opportunity:** Provide farmers with income from algae farming without dependence on land.
- **Experiment:** Many farmers have no land or limited land to grow profitable crops.
- **Water scarcity:** Conventional ponds require large volumes of fresh water.
- **Current algae farming in India:** pond-based → contamination, high land use, labor intensive.

Why this is a great fit for rural India

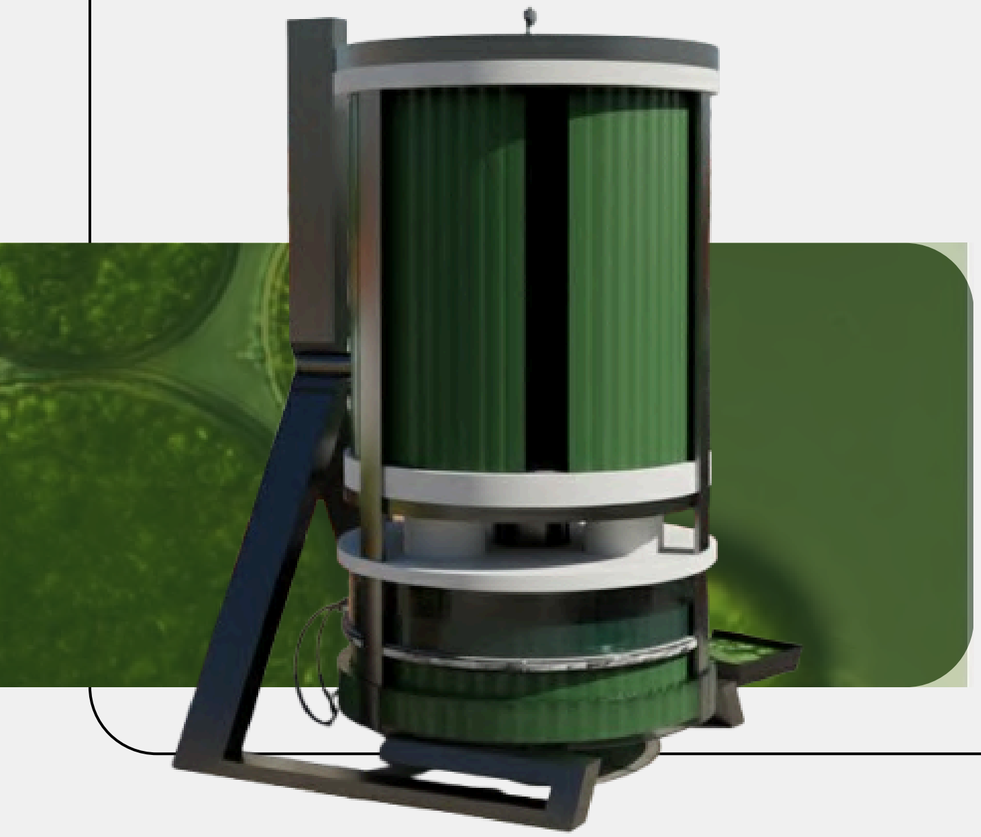
- **No fertile land required** — farmers can add algae units on sheds, unused corners, or small plots; it doesn't displace crops.
- **Supplementary income:** produces a high-value product (spirulina/chlorella) that can be sold locally or through co-ops/FPOs.

Low water footprint vs typical crops; can use marginal-quality water

- **Simple construction & local materials: f**rames, HDPE tanks, PVC piping, small pumps and solar panels are widely available and repairable in rural markets.
- **Climate resilience:** algae grow fast (days) so farmers get faster returns than seasonal crops.

Target Users & Challenges

- **Rural Farmers:** Limited land, want additional income sources.
- **Urban Growers/Entrepreneurs:** Lack land but have space for vertical units (balconies, terraces).
- **Farming Cooperatives:** Need scalable low-cost systems for collective algae production.
- **Challenges faced:** contamination, evaporation, high cost of photobioreactors, lack of accessibility.



Concept Description

Type: Product + Process + System.

- Form: Cylindrical vertical algae farming unit (~5–5.5ft tall, ~1m diameter).
- Capacity: ~650 liters of algae water.

Key features:

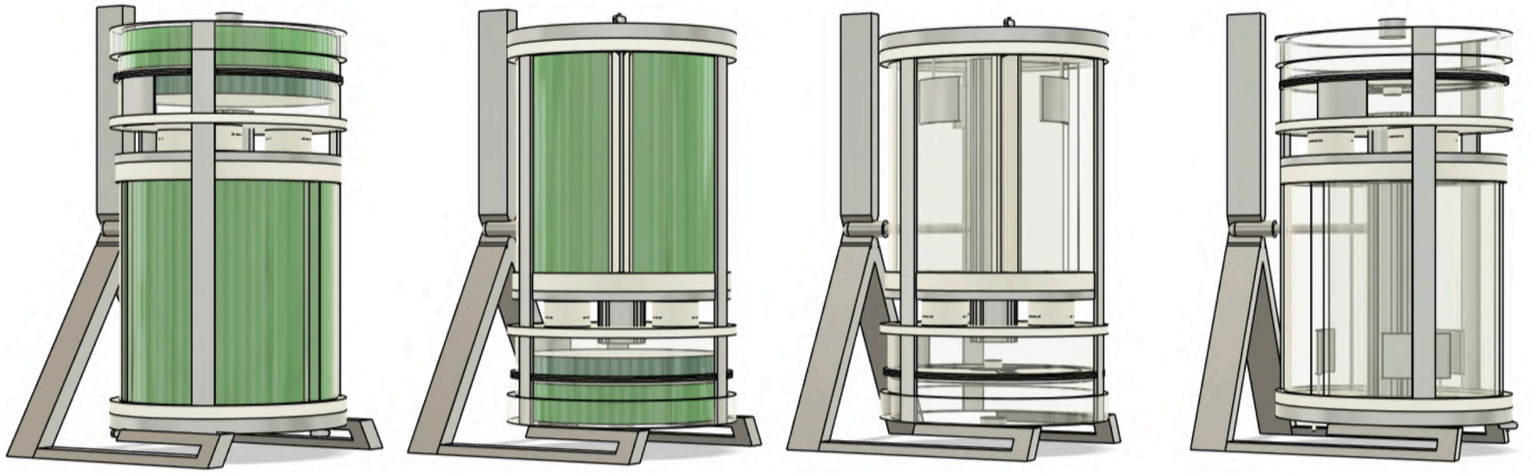
- Rotatable hourglass-like mechanism (gravity-based water transfer).
- Dual lids: Heavy metal + durable water-tank grade plastic.
- Built-in motor & blades for stirring and CO_2 mixing.
- 3 vertical tanks + filter mesh system for separating mature/immature algae.
- Solar-powered motors for energy independence.

Innovation & Differentiation

- Unlike pond farming → no land, minimal water loss, reduced contamination.
- Unlike expensive photobioreactors → low-cost, easily repairable, uses locally available materials.
- Blend of traditional pond culture + modern vertical farming.
- Self-contained, portable, and scalable → first of its kind in India.

Innovation & Differentiation

- **Material:** HDPE plastic (same as water tanks), mild steel frame.
- **Lid:** metal locking with 3 locks + secondary rotating lid.
- **Stirring system:** 3-blade agitator + fan blade at base.
- **Filters:** Mesh layers for separating mature algae.
- **Energy:** Small DC motor + optional solar panel.
- **Installation**: Simple assembly, no specialized tools, portable & modular.



How ANKUR Works – Step by Step

ANKUR is a 5–5.5 ft tall vertical tank that grows algae in a clean, closed, and reusable system.

Main Tanks (Top Section)

- The system starts with three main tanks at the top, holding about 650 liters of algae water.
- The tanks are sealed with a durable plastic lid that has:
  - A small motor with blades → keeps water moving so algae doesn't clump or dry.
  - A mesh opening → allows carbon dioxide to enter, which is food for algae.
- Above this sits a heavy metal lid with 3 locks, which keeps everything tightly sealed when the unit is rotated.

Harvesting Process – Container 1

- When algae is ready for harvest, a locking plate at the bottom of the main tanks is opened.
- Algae water flows into Container 1.
- Inside Container 1:
  - A fan blade stirs the water so algae doesn't stick.
  - A mesh filter separates the mature algae (ready to be collected) from the water.

Recycling Water – Container 2

- The filtered water, which still has immature algae, flows into Container 2.
- This water is kept safe for reuse.
- Since the algae in it is not yet grown, it will continue maturing once cycled back.

Rotation for Reuse

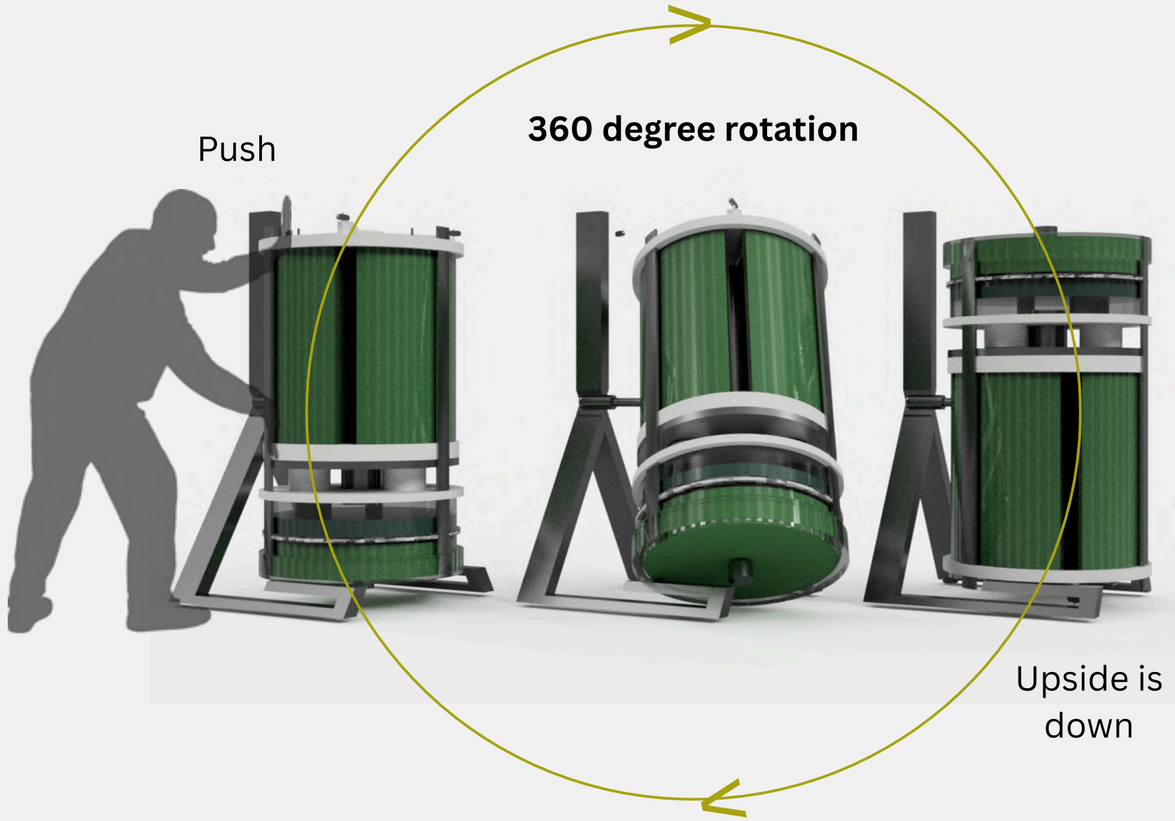
- After harvesting, the entire system is rotated 180° upside down.
- This allows the stored water from Container 2 to flow back into the main tanks.
- Now the same water is reused for the next cycle of algae growth.

Continuous Closed Loop

- This process can go on for years without changing water.
- Only minimal energy is needed to run the small motor, which can work on solar power.

Why it's Different

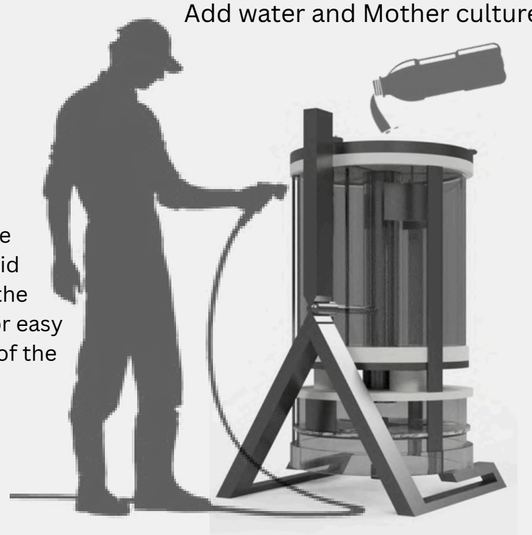
- Space-saving: Fits in a courtyard, terrace, or edge of a farm.
- Water-saving: Uses the same water again and again → up to 90% less water than ponds.
- Clean & safe: Fully enclosed, so no dust, insects, or contamination.
- Portable & scalable: Farmers can use one unit or multiple side by side.



shows the flow of water from upper chamber to lower container and vice versa

1 Add water and Mother culture

Remove the precision lid to expose the mesh lid for easy exchange of the co2 & air



2 Let the Spirulina mature, once done,

3 Open the knobs to harvest
Multi step process-Interaction

4 Scope out the matured algae

Easy- low effort scoping of drained spirulina

Demonstation to Put the immatured algae water back into the chambers once the harvesting is done

360 degree rotation

Push

Immature water flows back into the chamber

While rotating, fix the PrecisionLock Steel(upper lid)

Upside is down

Note- Only a few steps are shown for demonstation, the process has a lot of deeper steps involved

5 scope out the mature spirulina and let it dry
low cost Solar dryer for representational purpose

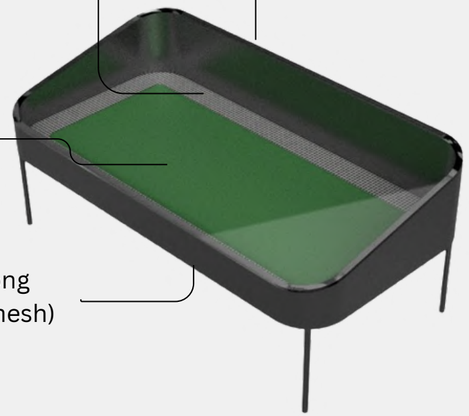
6 Spirulina powder ready

Glass for insulation and drying

Mesh to drain off the water

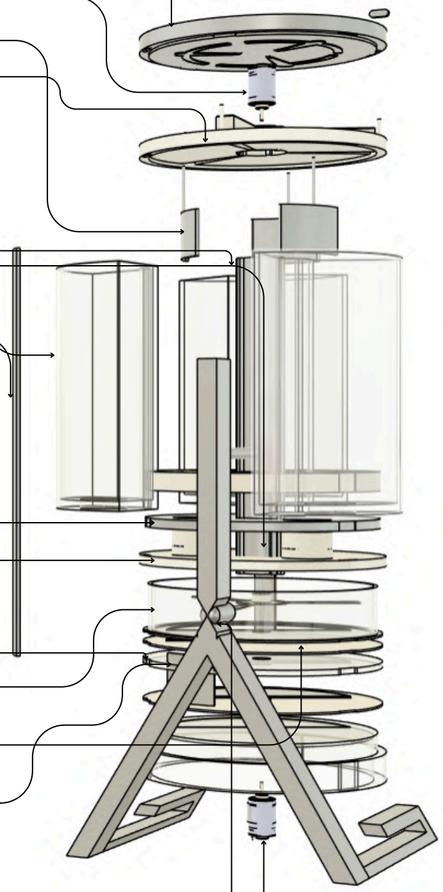
mature spirulina

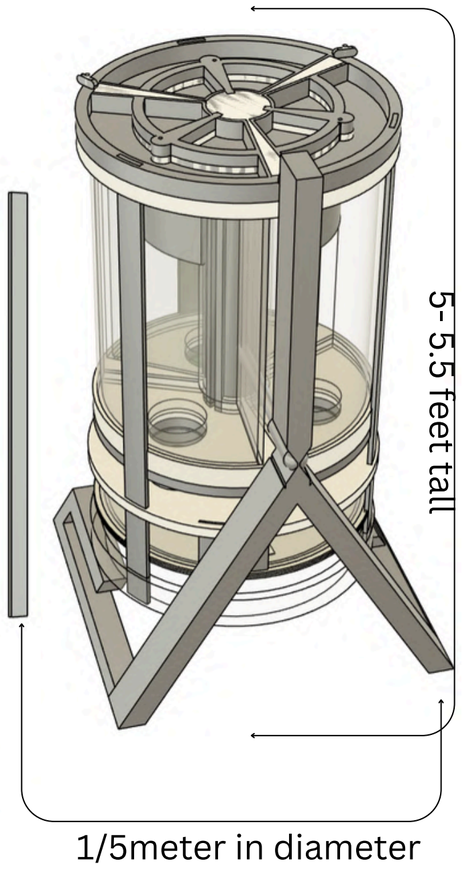
Protective insulationg metal casing(below mesh)

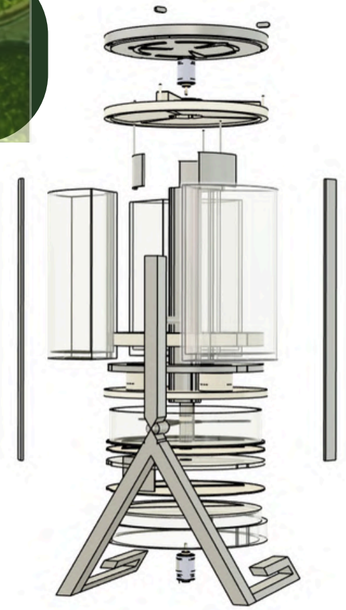


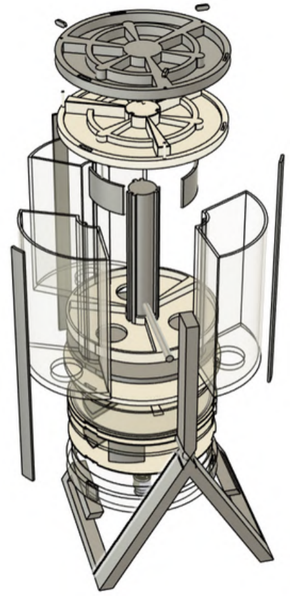
Technical Components

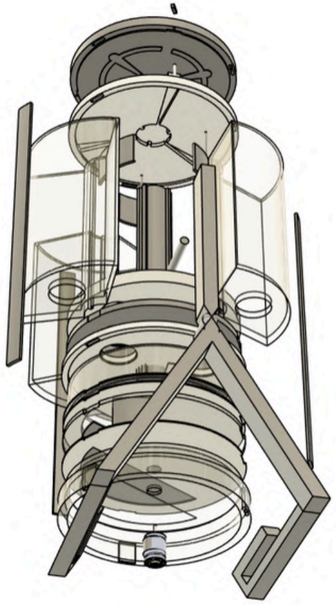
PrecisionLock Steel
BarrelSeal Lid-Steel
Motor - wiring and protection
Sealed HDPE Access Lid with Gasket
Agitator Blades
Steel Foundation Frame
High-Density Polyethylene (HDPE) Culture Chamber
reflective liners
Reinforced Steel Structural Support
Sealed HDPE Access Lid with Gasket
Primary Stainless-Steel Locking Plate
Tri-Point Locking System
Upper Algae Culture Chamber (HDPE)
Plastic Blades
Filtration Mesh & Securing Cap
Metal Locking Plate mechanism 2
Lower Algae Culture Chamber (HDPE)
Encased DC Motor with Wiring & Protective Housing
Central Rotational Support Shaft with Bearing System

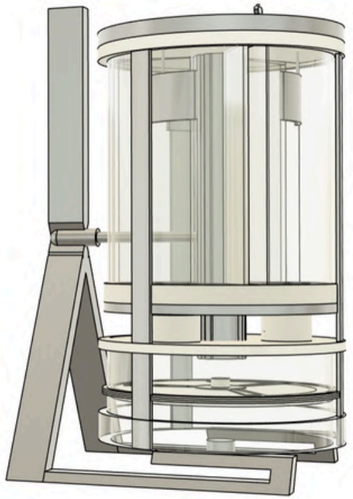













SINTEX

Benefits for Rural & Urban India

Rural:

- Side income for marginal /landless farmers.
- Low maintenance, can run unsupervised.
- Women and youth seeking micro-entrepreneurship.
- Farmer cooperatives for collective production-Repairable with local parts.

Urban:

- Terrace/balcony farming.
- Supports food startups, nutrition brands, biofertilizer companies.
- Infrastructure: Fits into smart city urban farming models.
- Impact: Democratizes algae farming → anyone, anywhere can grow.

Sustainability & Feasibility

- Materials: Locally available HDPE plastic, mild steel, mesh → easy repairs.
- Manufacturing: Can be made in existing water-tank factories.
- Power: Solar + battery → off-grid use.
- Longevity: Water reusable for years → closed-loop system.
- Cost: cheaper than commercial photobioreactors.

Conclusion & Call to Action

ANKUR = Landless farming revolution.
Brings algae farming to villages & cities → scalable, sustainable, profitable.
Farmers gain new income without needing land.
Future vision: Farmer cooperatives, urban algae clusters, exports.

Traditional

Drawbacks of Traditional Algae Farming

- Pond-Based Farming (common in India)
- Requires large land area → not possible for marginal/landless farmers.
- High water use (thousands of liters per pond).
- Contamination risk → open to dust, insects, bacteria, and pollutants.
- Evaporation losses → constant need to refill water.
- Uneven growth → algae dries or clumps without proper stirring.
- Labor-intensive → manual harvesting, cleaning ponds.
- Weather dependent → seasonal growth fluctuations.
- Low scalability in urban areas (requires open land).

Photobioreactors (modern, but costly)

- Very expensive (lakhs of rupees per setup).
- Require specialized materials (glass/acrylic tubes).
- Complex to maintain and repair → not practical for rural India.
- High energy use for pumps and aeration.
- Often imported, not made locally.

Smart - Modern

Pros of ANKUR – Vertical Algae Farming System

- Landless Farming → Works on terrace, balcony, or courtyard.
- Low Water, Closed Loop → ~650 L reused for years, saves 90% water.
- Contamination-Free → Enclosed HDPE + steel, mesh filtration.
- Climate Flexible → Insulated design, stirring prevents clumping/drying.
- Energy Efficient → Small DC motor, optional solar, off-grid ready.
- Portable & Scalable → Modular vertical units, easy to set up/expand.
- Easy Maintenance → Locally available HDPE + steel parts, quick cleaning.
- Cost Effective → ~70% cheaper than photobioreactors, farmer-friendly.
- Efficient Harvesting → Gravity-based rotation, quick algae separation.
- Rural + Urban Use → Supports farmers, terrace farming, food & startup sectors.

Impact Potential – Rural India

Economic:

- Spirulina sells ₹600–₹1200/kg in India; up to $30/kg abroad.
- Farmers can earn steady income with minimal land.

Social:

- Employment for women and youth.
- Independence from land ownership.

Environmental:

- Each unit absorbs CO_2 → helps fight climate change.
- Uses fraction of water compared to traditional ponds.

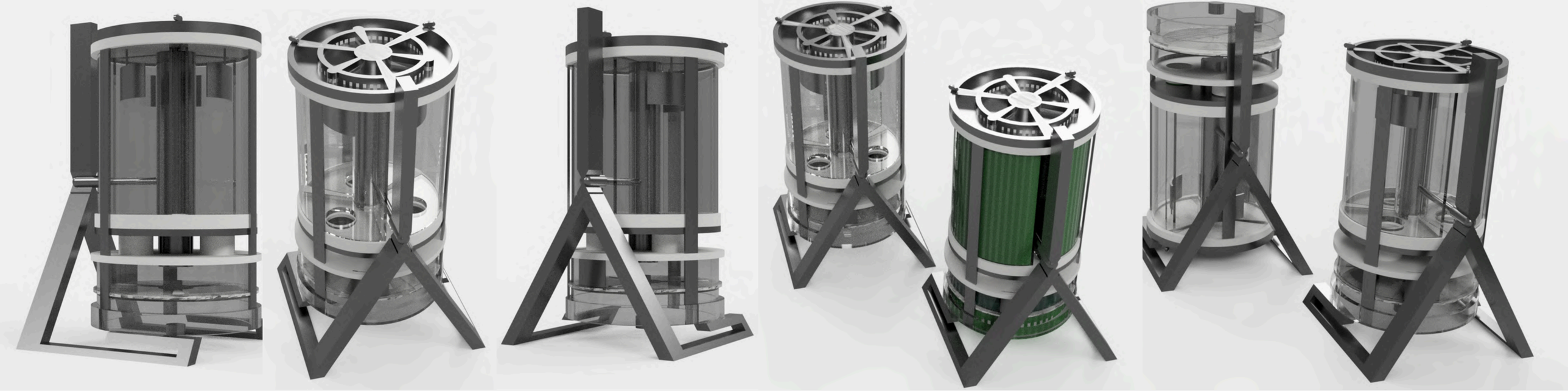
Scalability & Future Vision

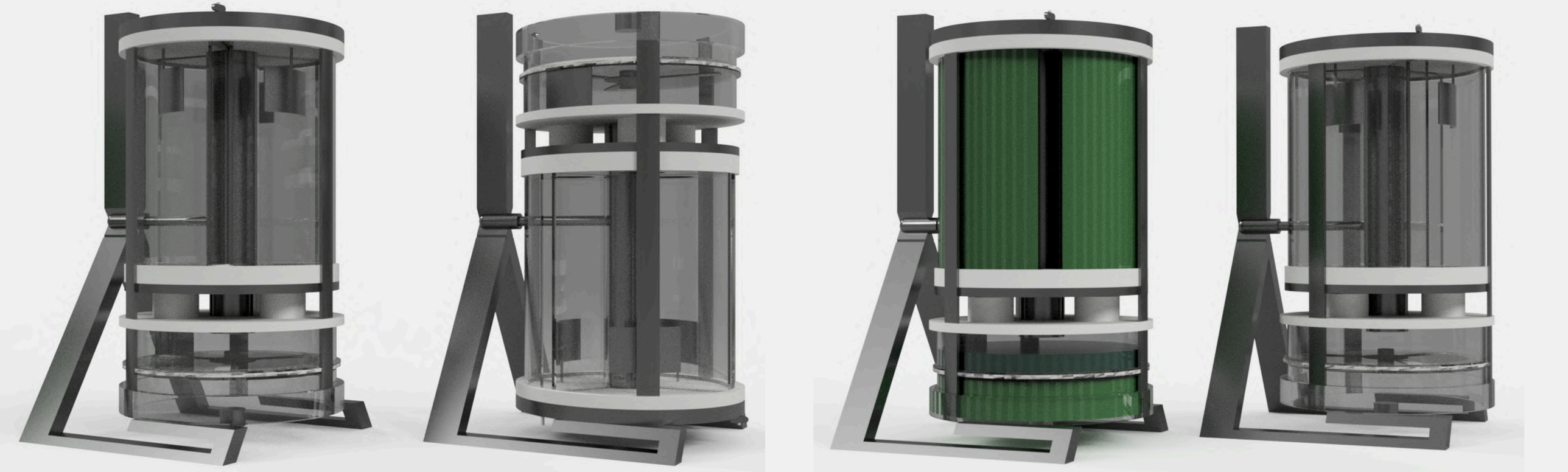
Village Cooperatives: Multiple units connected → collective algae farms.
Urban Farming Networks: Rooftop algae clusters supplying local markets.
National Impact: Reduce India's dependency on imports, boost exports.
Global Vision: Position ANKUR as India's low-cost, sustainable algae farming model for the world.

Conclusion & Jury Call

ANKUR = The Landless Farming Revolution.
Empowers every Indian farmer to farm without land.
Portable, scalable, affordable, sustainable.
Bridges rural & urban India through a common farming innovation.

Call to Jury: "Support ANKUR – empower every farmer, rural or urban, to farm the future."





Thank you

I have added more slide for deeper understanding of the topic, Please refere to this given information

Hygiene & Cleanliness

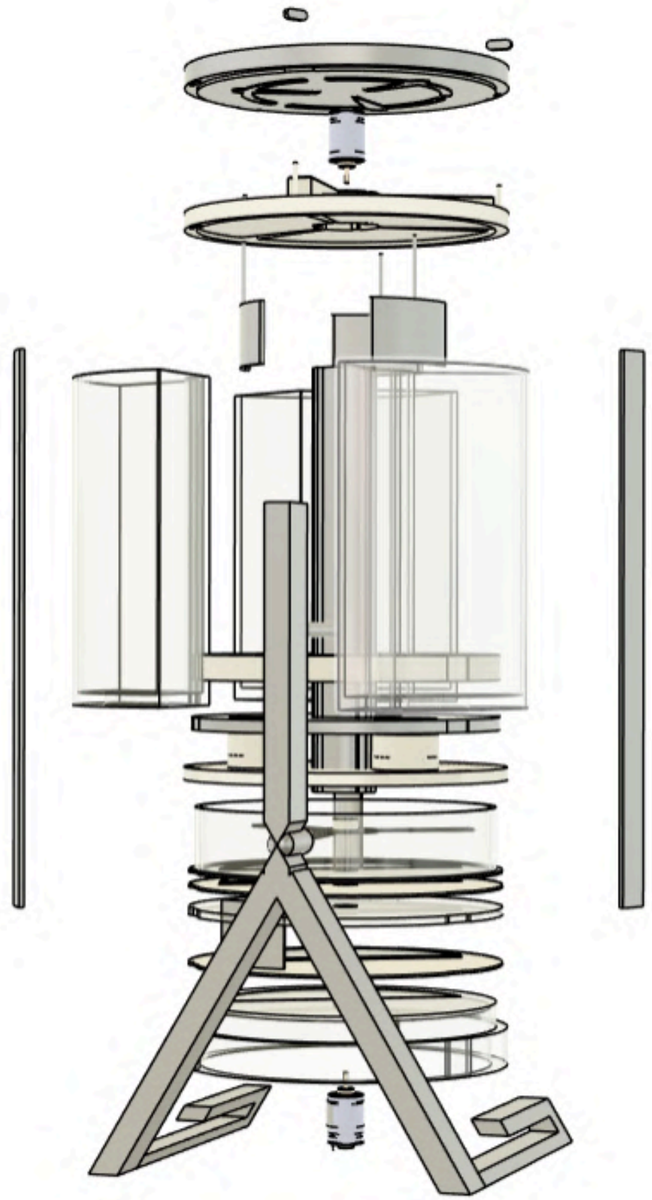
- Enclosed HDPE body + steel frame → algae is grown in a closed environment, away from dust, insects, and open-air pollutants.
- Smooth HDPE surfaces → easy to scrub, wash, or disinfect (same plastic as household water tanks).
- Modular design → each lid, lock, and container can be opened separately, making parts accessible for cleaning.

Ease of Maintenance

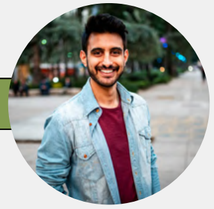
- Simple components → motors, blades, and mesh can be removed and cleaned with water or mild disinfectant.
- Local availability → HDPE, steel, and mesh are widely available in India, so replacements/repairs are easy.
- Solar-powered motor → minimal wiring, less chance of breakdown.

Contamination Prevention

- Enclosed system → unlike open ponds, algae isn't exposed to dust, insects, bird droppings, or pathogens.
- Mesh with CO_2 entry → allows gas exchange but prevents outside particles from entering.
- Stirring blades + agitation → keeps water moving, preventing stagnation where bacteria/fungi might grow.
- Closed-loop water reuse → filtered water is recycled, reducing exposure to external contaminants.



Business model canvas



Poor farmers and Farming community
(rural, land-constrained, low-income, need extra income without big landholding)

Urban individuals/ community
rooftop farmers
(entrepreneurs, startups, wellness industry enthusiasts).

Products from algae can be sold in multiple forms to various users

- Animal Feed – Poultry, aquaculture, cattle feed.
- Food & Nutrition – Spirulina powder, supplements, protein additives.
- Fertilizer / Bio-stimulants – Algae-based organic fertilizer for soil.
- Biofuel (future market) – Requires aggregation & processing at scale.

Via various channels

- Local Co-operatives / FPOs (Farmer Producer Organizations):
- Government Procurement / Subsidy Programs: e.g., National Rural Livelihood Mission (NRLM), NABARD.
- Direct to Local Businesses: Poultry farms, fish farms, organic farms (they need algae as feed & fertilizer).

Do portals exist already?

- Domestic: AgriBazaar, DeHaat, BigHaat
  APEDA portal (Agricultural & Processed Food Products Export Development Authority).
- B2B marketplaces like IndiaMART, TradeIndia.

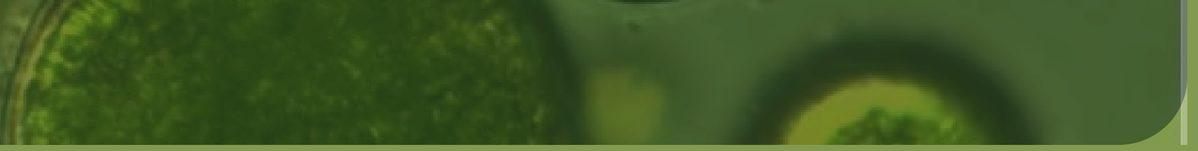
- E-commerce & Direct-to-Consumer: Algae powders, capsules, smoothies, skincare. Sell via Amazon, Flipkart, own Shopify site.
- B2B Partnerships: Health food cafes, gyms, pharma companies, cosmetic brands.
- Export Markets: Spirulina & chlorella sell high abroad ($15–$30/kg dry powder).

Money Flow (Poor Farmer):
Farmer → Local Co-op / Aggregator → Buyers (poultry, fertilizer companies, govt nutrition programs).

- Farmer earns per kg of dry algae.
- Less hassle with export (too complex for small farmer individually).

Money Flow (Urban Farmer):
Urban grower → Processing → Online/Direct → Consumer or Export.

- Higher margin than poor farmer.
- Needs branding, certification, packaging.



Short-Term Markets (For Poor Farmers)

- Local Co-operatives / FPOs → Pool harvest, bulk selling, better price, community support.
- Government Procurement / Subsidy Programs → NRLM, NABARD, NFSM; algae for fertilizer, biofuel pilots, nutrition schemes; assured buy-back possible.
- Direct to Local Businesses → Fish farms, poultry, dairies, organic farms; use algae for feed, pond health, fertilizer; fast cash flow.
- NGOs & CSR Initiatives → Supply Spirulina for nutrition programs (school meals, women SHGs); NGOs also provide training + buy produce.
- Agri-Universities & Research Institutes → Sell small volumes for R&D trials; easy entry for nearby rural farmers.

Medium / Emerging Opportunities (With Support)

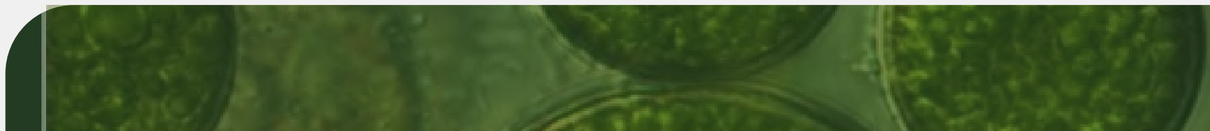
- Contract Farming with Private Companies → Nutraceutical/cosmetic firms partner with farmers under buy-back agreements; reduces risk.
- Local Retail & Health Stores → Sell dried/powdered Spirulina in ayurvedic shops & rural health outlets; requires small processing/packaging setup.

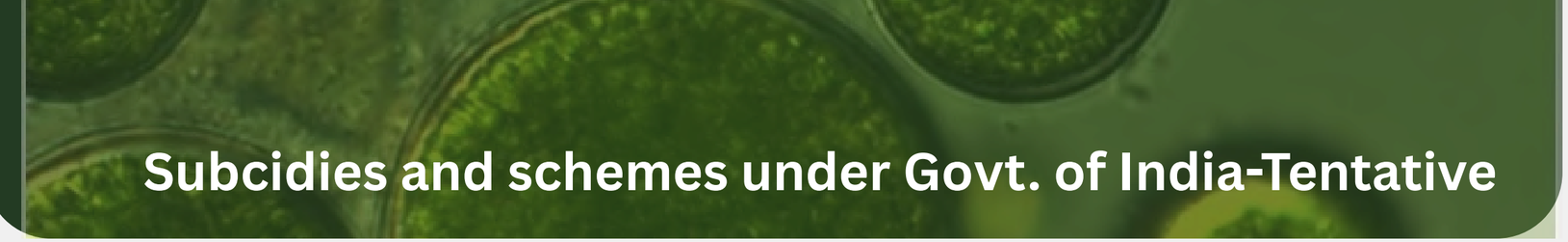
Best Channels for Urban Farmers

- E-commerce & Direct-to-Consumer (D2C)
  - Sell algae powders, capsules, smoothies, skincare.
  - Platforms: Amazon, Flipkart, BigBasket, JioMart, Shopify, Instagram.
  - Benefit: Higher margins, brand building, direct customer feedback.
- B2B Partnerships (Local Urban Businesses)
  - Supply to health food cafés, gyms, yoga studios, vegan restaurants, organic stores.
  - Tie-ups with pharma & cosmetic brands for algae-based ingredients.
  - Medium volume, steady demand, stable pricing.

Medium / Emerging Opportunities (With Scale)

- Export Markets (Premium Algae Products)
  - Spirulina & chlorella: $15–$30/kg (dry powder).
  - Requirements:
    - FSSAI License (domestic compliance).
    - DGFT IEC Code (export license).
    - Certifications: Organic, ISO, WHO-GMP, HACCP.
  - Export via APEDA, export houses, or direct buyers.
- Own Brand Development
  - Create branded algae products → supplements, protein bars, cosmetic serums.
  - Needs: Marketing, premium packaging, influencer tie-ups.





Subcidies and schemes under Govt. of India-Tentative

ANKUR component	Likely funding route
Solar panels + inverter + battery + motor package	**MNRE Rooftop (if rooftop)** or **PM-KUSUM / State agricultural solar** (if classified as agri-allied). Subsidy covers PV/inverter; sometimes battery not covered. (Cite MNRE/PM-KUSUM). (PMS Surya Ghar)
Motors (if not under PV vendor package)	Often included in the solar package if procured via empanelled vendor; otherwise finance via Mudra/KCC.
HDPE tanks, frames, lids	Generally **not** subsidised — farmer pays or finance via Mudra / FPO bulk purchase discounts.
Central dryer / QA lab serving many units	**Agriculture Infrastructure Fund (AIF)** or bank loan with interest subvention. (agriinfra.dac.gov.in)
Mukhyamantri Saur Krushi Pump Yojana	
Formation & capacity building (training)	**SFAC / NABARD / NRLM** grants and programs for FPO/SHG capacity building. (SFAC India)

Payback strategy for farmers

1. Estimated Cost of Single ANKUR Unit (Current, Prototype Scale)
Money Flow Example - Estimated

Cost per Unit (Prototype): ₹10,000–12,000k
Bulk Order (10+ Units): ₹8,000-10,000k
With Solar Subsidy: almost 40-50% off

Payback Period:
1-1.5yrs (with subsidy/bulk)

Spirulina rate

In India, the price of spirulina powder typically ranges from ₹1000 to ₹2000per kilogram for wholesale or bulk purchases.

For smaller, consumer-sized packets or specific brands, the price can be higher, reaching up to ₹2,000 to ₹2,900 per kilogram for premium or organic products.

- Organic/High-Quality (per kg): ₹1,500 - ₹2,850+
- Blue Spirulina (Phycocyanin) (per kg): A much more expensive product, prices can be as high as ₹16,500 to ₹25,000.

End outcome

Monthly Revenue:1 kg/month×₹1000/kg=₹1000/month

Annual Revenue:₹1000/month×12 months/year=₹12,000

-With just 1 unit, imagine the yeild with multiple such units