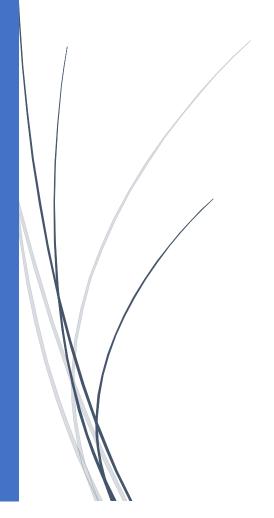




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# Short-Term Demonstrators for Sustainable Farm Development



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#### **Alternative Analysis of Demonstrators**

## 1. Mini Composting System

- Current Expected Outcome: Improves soil fertility and reduces waste by 30%.
- Alternative Strategy: Adding bio-accelerators (e.g., bacteria cultures, Effective Microorganisms (EM) solutions) to speed up decomposition.
- Improved Outcome: Soil fertility improvement +10%, faster composting cycle.
- Cost/Trade-offs: Additional cost increase of 5%.
- **Justification:** Enhancing composting with bio-accelerators ensures quicker decomposition, making nutrients available to crops more rapidly.

#### 2. Mini Rainwater Harvesting System

- Current Expected Outcome: Collects 70% of available rainwater, enough for irrigation.
- **Alternative Strategy:** Adding first-flush diverters & UV filtration for better water quality.
- Improved Outcome: +20% increase in usable water, safer for crops & livestock.
- Cost/Trade-offs: 8% cost increase for better filtration.
- **Justification:** Ensuring cleaner water reduces contamination risks and enhances irrigation effectiveness.

#### 3. Sustainable Micro-Garden with Mulching

- Current Expected Outcome: Reduces water loss by 40%, improves soil health.
- Alternative Strategy: Using compost-enriched mulch for extra nutrients.
- Improved Outcome: +15% plant growth, improved soil structure.
- Cost/Trade-offs: 3% cost increase for compost materials.
- **Justification:** Enriched mulch enhances moisture retention while supplying nutrients for healthier crops.

### 4. Hybrid Energy System (Solar + Public Grid)

- Current Expected Outcome: Powers basic farm lighting, extends working hours.
- **Alternative Strategy**: Implementing a hybrid solar + public grid system with smart switching for cost and energy efficiency.

- Improved Outcome: 30% reduction in energy costs during off-peak hours, ensures 24/7 power availability.
- Cost/Trade-offs: 4% increase in setup cost, but long-term savings on electricity.
- **Justification**: Hybrid systems balance sustainability with reliability, reducing dependency on solar power alone while optimizing energy use.

# Summary table

Demonstrato r	Current Expected Outcome	Alternative Strategy	Improved Outcome	Cost/Trade -offs	Best Choice & Justification
Mini Composting System	Improves soil fertility and reduces waste by 30%.	Adding bio- accelerators (e.g., bacteria cultures, Effective Microorganism s (EM) solutions) to speed up decomposition.	Soil fertility improvemen t +10%, faster composting cycle.	Additional cost increase of 5%.	Adding bio-accelerators – Ensures quicker composting, making nutrients available faster for plant growth. The cost increase is minimal compared to long-term benefits.
Mini Rainwater Harvesting System	Collects 70% of available rainwater , enough for irrigation.	Adding first- flush diverters & UV filtration for better water quality.	+20% increase in usable water, safer for crops & livestock.	8% cost increase for better filtration.	Adding filtration & diverters – Ensures cleaner water, reducing risks of contaminatio n while improving irrigation effectiveness.

Sustainable Micro- Garden with Mulching	Reduces water loss by 40%, improves soil health.	Using compost- enriched mulch for extra nutrients.	+15% plant growth, improved soil structure.	3% cost increase for compost materials.	Compost- enriched mulch — Enhances moisture retention while adding nutrients, leading to healthier plants with minimal additional cost.
Hybrid Energy System (Solar + Public Grid)	Powers basic farm lighting, extends working hours.	Implementing a hybrid solar + public grid system with smart switching for cost and energy efficiency.	30% reduction in energy costs during off-peak hours, ensures 24/7 power availability.	4% increase in setup cost, but long- term savings on electricity.	Hybrid solar + public grid - Balances sustainability with reliability, reducing dependency on solar power alone while optimizing cost savings.