



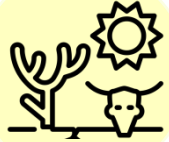
# Improving Rural Livelihoods through Collection, Domestication, and Establishment of Indigenous Fruit Trees in Arid Zone

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# 1. Introduction to project:



## Challenges in arid agro-ecosystems



- Low rainfall
- Degraded soils
- High temperature,
- Low soil fertility
- Ecological degradation
- Low farm-level resilience

## What is the need?

- Systematic documentation
- Characterization and domestication
- Selection, propagation, and on-farm evaluation of superior genotypes
- Participatory on-farm trials and value addition approaches



## Scope for systematic interventions

- A rich repository of indigenous fruit tree species
  - Ecological resilience
  - Nutritional richness
  - Cultural value,
- These species remain underutilized and poorly documented
- Traditional knowledge about their use and cultivation is gradually eroding
- Absence of standardized propagation methods.
- Limited research attention toward their nutritional, ecological, and economic roles has led to policy neglect.

## 2. Project Objectives:

01

### **Documentation and characterization**

To systematically collect, geo-tag and characterize drought-tolerant arid fruit species

02

### **Propagation standardization**

To develop efficient propagation techniques for mass multiplication of selected species.

03

### **On-farm establishment and participatory trials**

To implement farmer-participatory field trials for evaluating survival, growth, yield, and adaptability of selected species

04

### **Assessment of livelihood, nutritional, and ecological impacts**

To implement and evaluate the contribution of indigenous fruit trees to household income, dietary diversity, and ecosystem services



# 3. Methodology and implementation approach(1):

## Site selection

- Representative arid-zone districts using agro-ecological stratification
- Five villages per district for baseline and on-farm trials.

## Baseline survey, PRA & sampling protocol

1. Stratified random sampling
2. Ten households per village using systematic random sampling.
3. Target respondents per village include smallholder & marginal farm men and women
4. Participatory Rural Appraisal (PRA) tools
5. Document ethnobotanical uses, local names, management practices, processing methods, markets, constraints.
6. Record GPS coordinates of each sampled tree/accession.

## Germplasm collection and characterization

1. Collect accessions per species
2. Representative fruit samples, leaf samples and seed will be collected
3. Recording morphological and phenological traits
4. Observations:
  - Tree habit, height, crown diameter, trunk girth (GBH), leaf size/shape, fruit size (length, breadth), fruit weight rind/thickness, colour, taste scoring
  - Fruit quality and proximate analysis

## Propagation standardization

1. Seed propagation/ Vegetative methods
2. Experimental design (nursery)
  - Completely randomized design (CRD) or factorial CRD
  - Replication: 10 plants
3. Observation
  - Germination percentage, index, survival % etc
  - success rate (%),
  - days to root/graft union,
  - initial growth (height, root length)
  - Vigor index.

# 3. Methodology and implementation approach(2):

## On-farm participatory trials

### 1. Site & farmer selection

1. 5 pilot villages per stratum; 6–15 willing farmers per village representing different landholdings.
2. Farmer selection *via* PRA and consent process

### Experimental design (on-farm)

1. RCBD design of experiment
2. Treatments: selected superior accessions/propagation methods/management regimes (e.g., spacing, pit size, amendments).
3. Replication: 3–4 farmer replicates per treatment across farms (multi-environment trials).

### 2. Planting & management

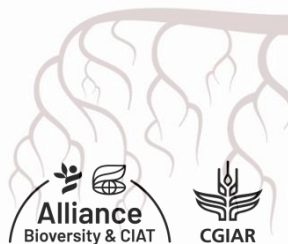
1. Pit preparation, initial irrigation, and mulching across farms with farmer-consultation.
2. Management inputs (labour, organic amendments, irrigation events) will be recorded.

### 3. Observations

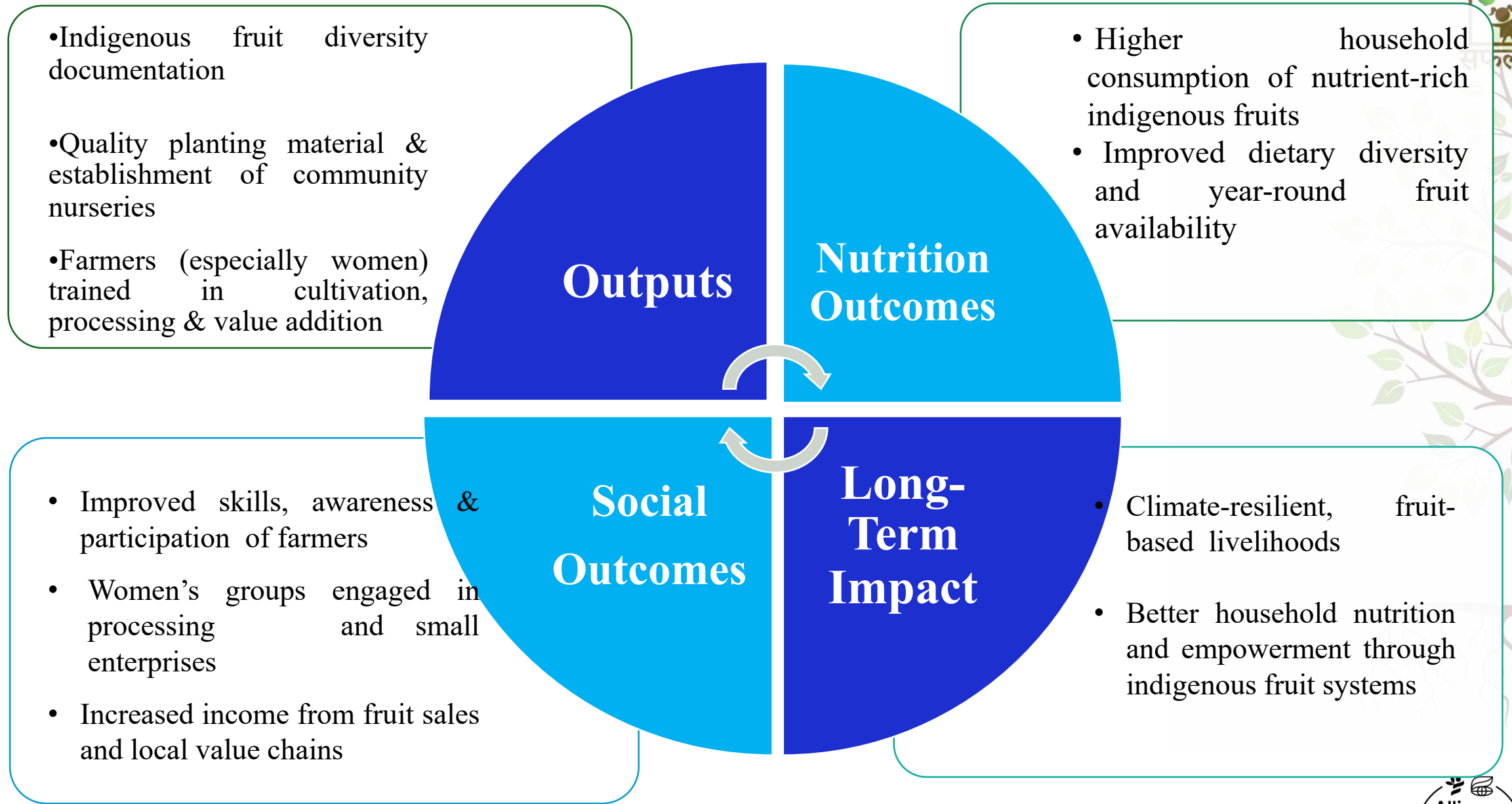
1. Survival%
2. Growth: height, collar diameter, crown spread
3. Yield: fruit number/weight per tree at maturity; harvest window and quality metrics.

### 4. Farmer feedback & participatory evaluation

1. Farmer scoring on preferences using participatory scoring matrices.
2. Midline and endline FGDs to capture perceptions, constraints and adoption intent will be conducted.



## 6. Social and nutrition impact pathway – Project outcomes/Impact:



# Slide 6. Environmental and climate advantages

## Enhances climate resilience

promoting drought-tolerant indigenous fruit trees adapted to extreme arid conditions.

## Improves soil health

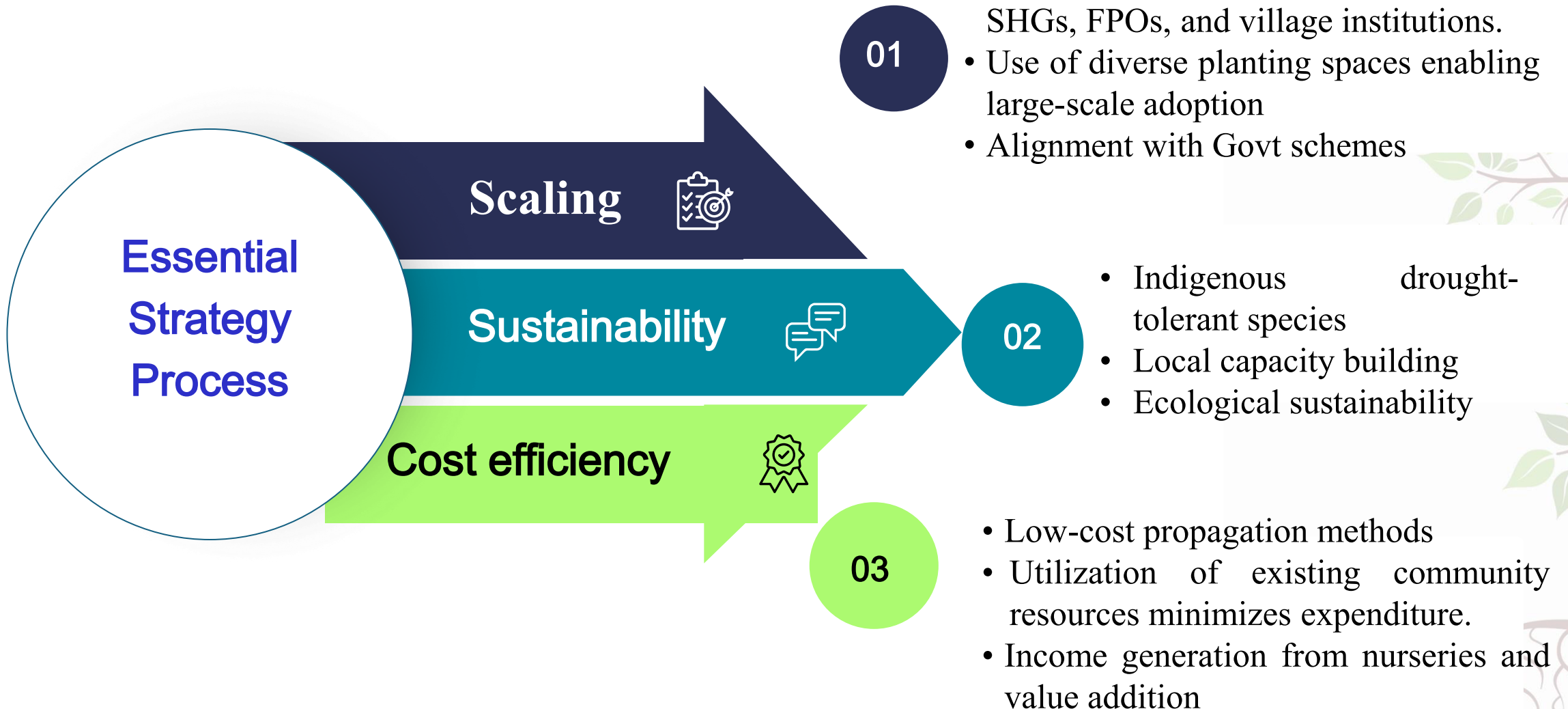
increased organic matter, better nutrient cycling, and reduced erosion.

## Strengthens ecosystem services

biodiversity conservation, microclimate moderation, and carbon sequestration



# 7. Scaling, sustainability and cost efficiency:



# 8. Budget summary and risk and mitigation strategy:



## Budget:

Budget Component	Amount (₹ Lakhs)
1. Human Resources (RA, field assistant, enumerators)	8.00
2. Field Implementation & Farmer Support (on-farm trials, fencing, planting materials, irrigation)	17.00
3. Nursery Development & Infrastructure (shade nets, propagation units, tools, water storage)	8.00
4. Travel, Training & Capacity Building (workshops, field visits, exposure visits)	8.00
5. Monitoring, Evaluation & Data Analysis (soil/plant analysis, field assessments)	3.00
6. Dissemination & Knowledge Products (manuals, leaflets, stakeholder consultations)	3.00
7. Contingency & Administrative Overheads	3.00
<b>Total Project Cost (3 Years)</b>	<b>50.00</b>

## Risk and Mitigation Strategy:

- 1. Low survival due to harsh arid conditions** – Mitigated through selection of drought-tolerant genotypes, micro-site improvement (mulching, soil pits), and optimized planting windows.
- 2. Farmer adoption risks** (labour, perception, delayed returns) – Addressed through participatory trials, continuous training, and demonstration of short-term benefits via nursery income and early-bearing species.
- 3. Propagation and nursery failure risks** – Minimized by standardizing protocols, establishing quality-controlled mother blocks, and providing regular technical supervision and monitoring.



**Thank you**