



PROPOSED PROJECT TITLE

Identification of suitable fruit crops for year-round nutrition through Nutri-garden in Bihar

Presented by:

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Introduction

Lead organisation: Bihar Agricultural University, Sabour, Bhagalpur

Target area: Agroclimatic zone III-A



- Nutritional insecurity remains a critical challenge in Bihar, where a significant proportion of the population suffers from malnutrition and poor dietary diversity.
- Nutri-gardens integrating diverse fruit crops offer a sustainable strategy to enhance household nutrition and food security.
- However, limited scientific evaluation exists on suitable fruit species for small-scale, resource-constrained conditions.
- This project aims to identify and assess nutrient-dense, high-yielding, and climate-resilient fruit crops adaptable to Bihar's agroclimatic zones.
- Through systematic evaluation of their establishment, productivity, and nutritional composition, the study will develop a year-round fruiting calendar and promote evidence-based Nutri-garden models for improved nutrition, self-reliance, and sustainable food systems in Bihar.

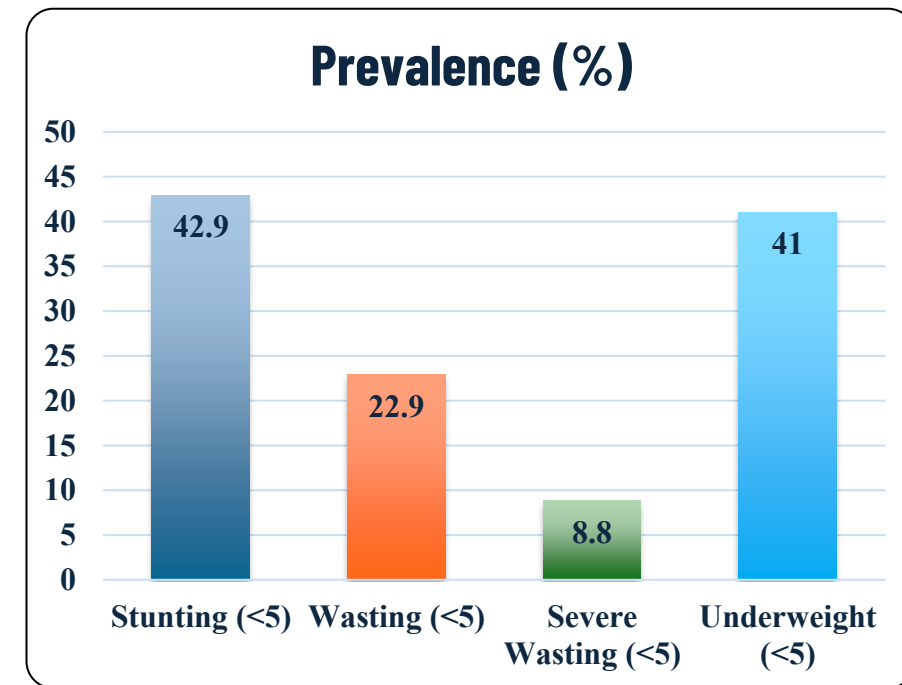


Fig 1. Malnutrition Indicators in Children Under 5 (Bihar, NFHS-5, 2019-20)

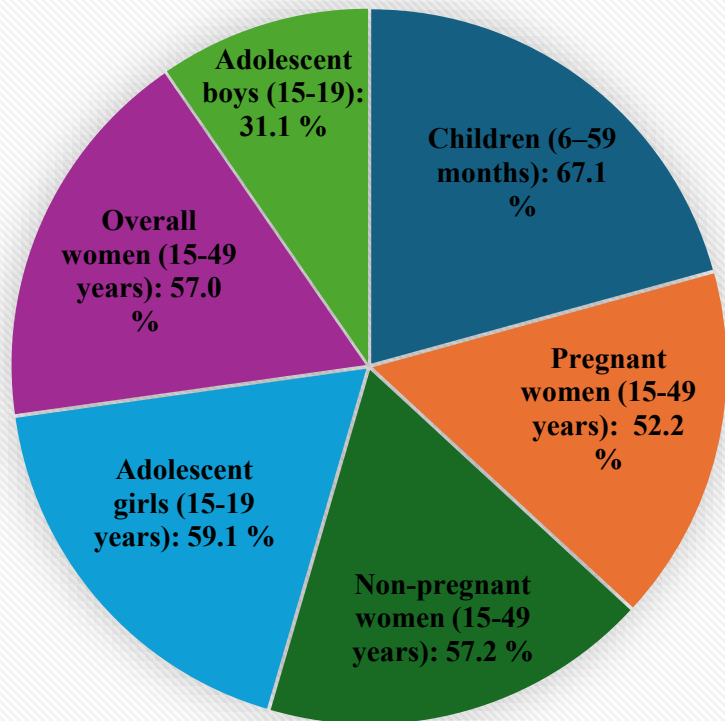


Fig. 2: Anemia Prevalence in India (NFHS-5, 2019-20)

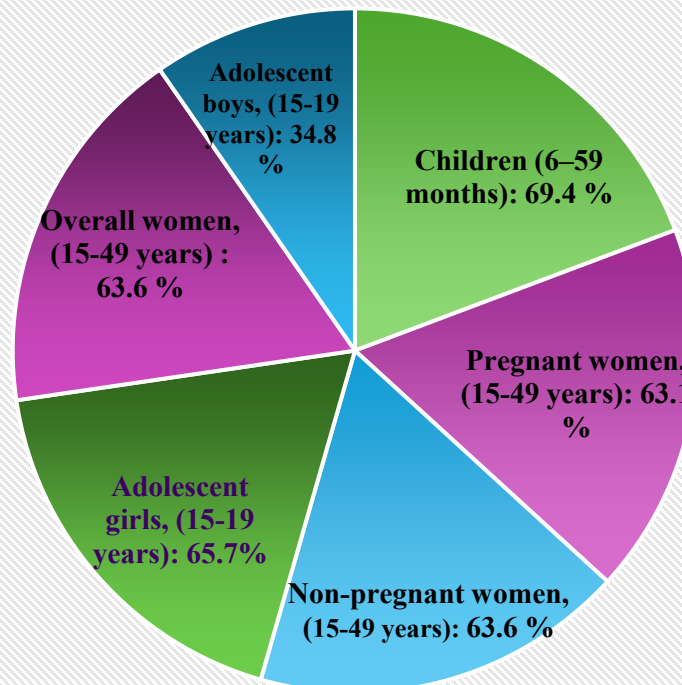


Fig. 3: Anemia Prevalence in Bihar (NFHS-5, 2019-20)

Recent Programs to Reduce Malnutrition & Anemia in Bihar

1. Poshan 2.0 & Anemia Mukht Bharat

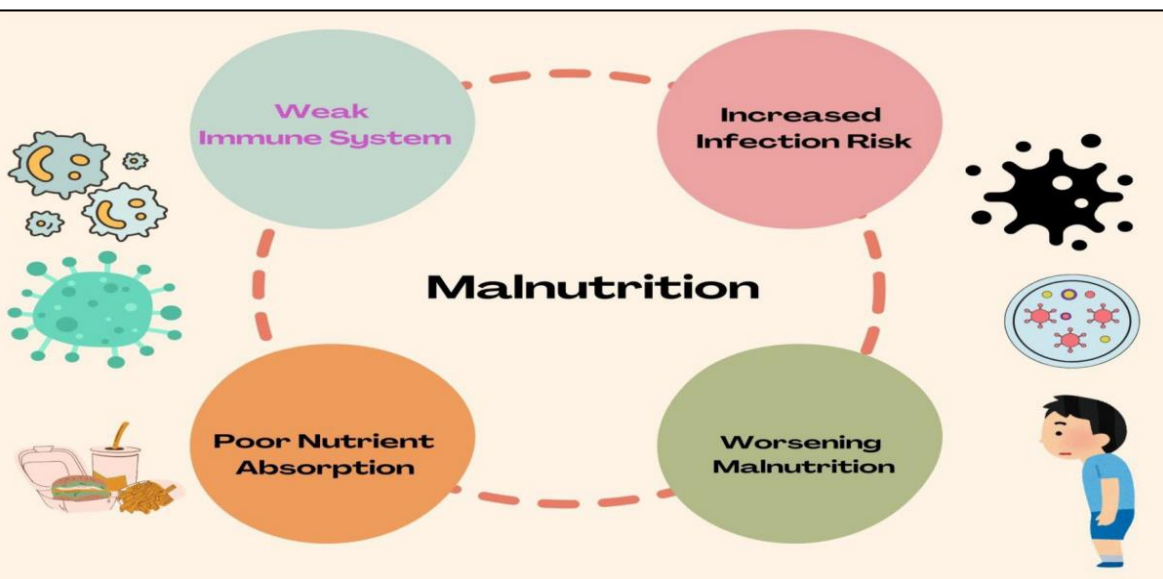
- Growth monitoring
- Supplementary nutrition
- IFA & deworming
- Anemia screening
- Strengthened Anganwadi services

2. State-Level Community Nutrition Initiatives

- Malnutrition Eradication Programme (MEP)
- Nutri-gardens
- Fortified foods
- Community awareness drives
- Nutrition-sensitive agriculture

Key drivers in Bihar:

- Poverty and food insecurity,
- Low maternal nutrition and education,
- Poor infant & young-child feeding practices,
- High infection burden (diarrhea, ARI),
- Limited access to diverse diets and sanitation.



Objectives



- To identify nutrient-rich fruit crops by evaluating yield potential and adaptability under Nutri-garden conditions in Bihar.
- To analyse the nutritional composition of fruit crops suitable for Nutri-garden.
- To recommend suitable fruit crops that ensure year-round availability of nutrition for Nutri-garden in Bihar.

Methodology and Implementation Approach



Total Duration:
36 months

Start: June, 2026

End: May, 2029

Year- 1 (June 2026- July 2027): Establishment & Baseline

Site survey, soil testing, and procure planting material, record layouts and planting details, and monitor early growth, intercultural operations, and pest or disease incidence.

Year- 2 (June 2027 - May 2028): Growth & Preliminary Assessment

Record vegetative growth and orchard management, assess the yield of early-bearing fruits and collect samples for laboratory analysis of their physicochemical properties.

Year- 3 (June 2028 - May 2029): Validation & Recommendation of Best Nutri-Garden

Monitor multi-season growth and yield, validate nutritional quality through analysis, and identify optimal nutri-garden crop combinations for Bihar conditions.

Prepare the final report along with extension materials and training or demonstration programs for farmers and extension workers.

Methodology and Implementation Approach



1. Selection and Establishment of Fruit Crops

- Identify and collect promising fruit crops of Bihar, establish Nutri-garden trials in research and farmers' fields and standardise cultivation practices for growth.

2. Field Evaluation of the Plant for Growth and Yield Performance

- Monitor growth parameters, phenology, and adaptability; record yield traits such as fruit set, number, weight, and productivity; and assess pest, disease, and stress tolerance to evaluate suitability for small-scale nutri gardens.

3. Nutritional and Biochemical Analysis

- Collection of fruit samples throughout the seasons and to conduct laboratory analysis to evaluate key nutritional traits, including vitamins, minerals, total phenols and total antioxidant capacity.

4. Data Analysis and Identification of Superior Crops

- Perform statistical analyses to identify nutrient-rich, high-yielding crops, develop a year-round fruit availability calendar, and validate promising crop combinations for practical adoption in Nutri-gardens.

5. Recommendation and Dissemination

- Develop Nutri-crop packages and extension materials, and disseminate findings through trainings, workshops, and demonstrations.

Social and Nutrition Impact Pathway: Project outcomes/ Impact



❑ **Enhanced Nutritional Security:**

Year-round availability of diverse, nutrient-rich fruits improves household dietary diversity and helps combat malnutrition and micronutrient deficiencies.

❑ **Empowerment of Rural Families and Women:**

Involving women and smallholder farmers in Nutri-garden activities would strengthen household food autonomy, decision-making, and resilience in their livelihoods through awareness generation and active participation.

❑ **Improved Community Health and Awareness:**

Promote nutrition literacy, healthy eating habits, and awareness about the importance of fruits in balanced diets across rural communities.

❑ **Strengthened Social Cohesion and Knowledge Sharing:**

Encourage community participation, peer learning, and collective adoption of sustainable Nutri-garden practices.

❑ **Improved Child and Maternal Health Outcomes:**

Regular access to vitamin- and mineral-rich fruits supports improved growth, immunity, and overall well-being of children and mothers, reducing malnutrition-related health risks.

❑ **Nutritional profiling**

Nutritional profiling of each fruit crop will be done to ensure the qualitative and quantitative availability of nutrition..

❑ **Identification of best-performing, nutrient-rich fruit** suited for nutri-gardening.

Environmental and Climate Advantages



- **Enhanced Soil Fertility and Structure:**
Diverse fruit crops improve soil organic matter, microbial activity, and nutrient cycling, leading to healthier and more sustainable soils.
- **Conservation of On-Farm Biodiversity:**
Cultivating multiple fruit species supports pollinators, beneficial insects, and local flora and fauna, enhancing on-farm biodiversity.
- **Reduced Environmental Pollution:**
Use of locally adapted, low-input fruit crops minimizes dependence on chemical fertilizers and pesticides, reducing soil and water contamination.
- **Climate Change Mitigation and Adaptation:**
Increased tree cover and perennial fruit plants enhance carbon sequestration, lower greenhouse gas emissions, and contribute to a cooler microclimate.
- **Year-Round Nutritional Security:**
Ensures continuous availability of vitamins, minerals, and antioxidants from seasonal fruits throughout the year.
- **Improved Health and Immunity:**
Regular consumption of diverse fruits enhances dietary quality, boosts immunity, and helps prevent micronutrient deficiencies.
- **Economic Empowerment and Livelihood Enhancement:**
Reduces expenditure on market-bought fruits and provides opportunities for surplus sale, improving family income.
- **Promotion of Sustainable and Self-Reliant Food Systems:**
Promotes local, eco-friendly fruit production with minimal inputs, fostering self-sufficiency and environmental sustainability.

Scaling, Sustainability and Cost Efficiency:



Scaling

- The project will develop a scientifically validated model of fruit-based Nutri-gardens suited to Bihar's agro-climatic conditions.
- Successful models will be scaled up across households, schools, and community institutions through capacity building, extension training, and demonstrations, with support from KVKs, NGOs, and government programs like **Poshan Abhiyan** and **MIDH** for wider state-level adoption.

Sustainability

- **Environmental sustainability:** Locally adapted perennial fruit crops improve soil health, enhance biodiversity, and reduce chemical dependence.
- **Economic sustainability:** Low-input, high-yield crops lower costs and provide a steady income from surplus produce.
- **Social sustainability:** Farmer training, women's participation, and community involvement to ensure long-term ownership and continuity.
- **Institutional sustainability:** Linkages with government programs to maintain ongoing support and resource flow.

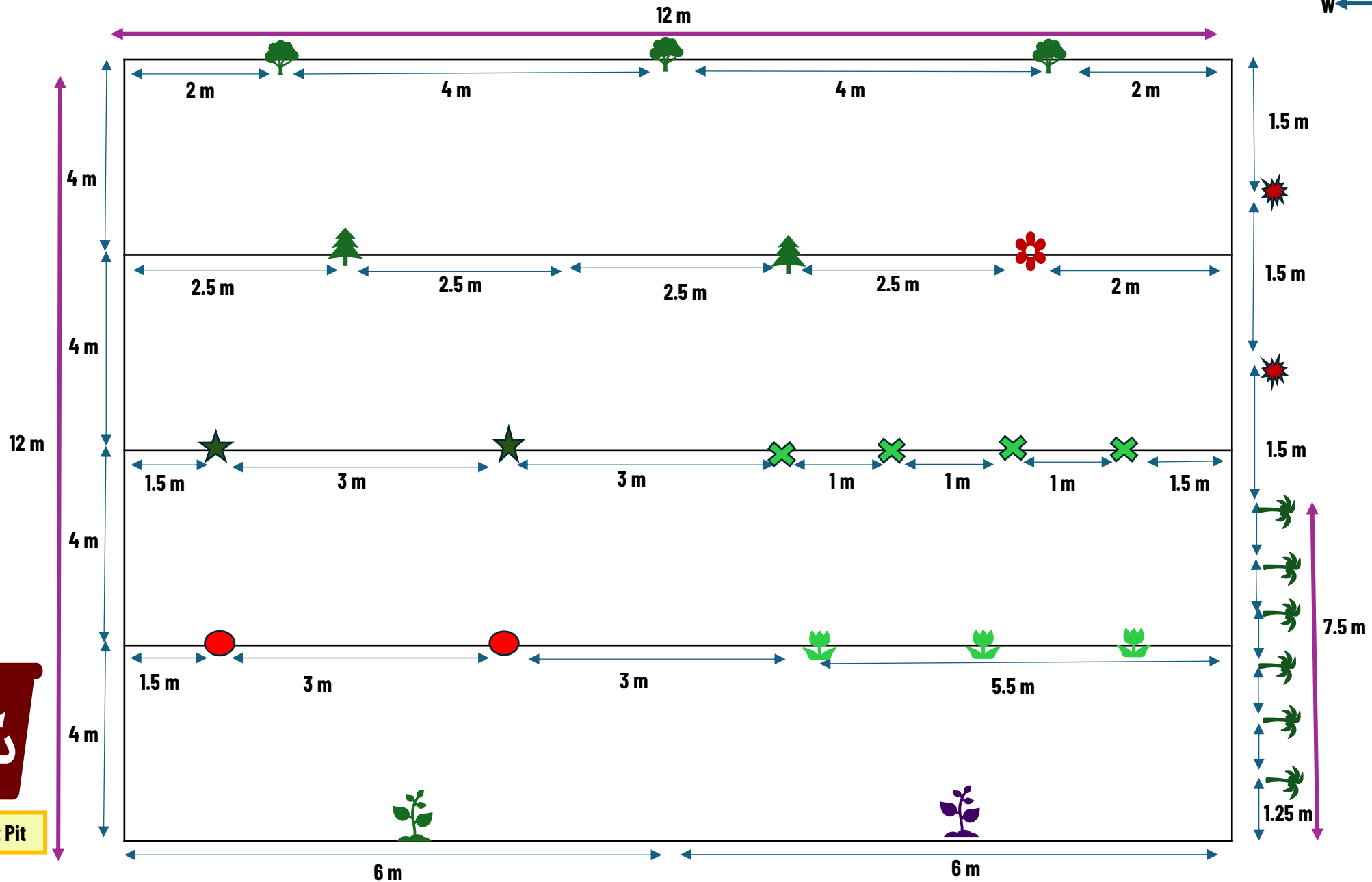
Cost efficiency

- **Use of local resources:** Locally available planting materials, organic manures, and traditional knowledge reduce input costs.
- **Training and demonstrations:** Practical extension methods would lower expenses and enhance knowledge sharing.
- **Efficient irrigation:** Adoption of low-cost, water-saving technologies like drip irrigation to benefit small farmers.
- **High economic returns:** Cultivation of profitable fruit crops ensures better yield and favourable benefit-cost ratios.

Budget Summary and Risk and Mitigation Strategy

S. No	Head of Project cost (US\$)	Year-1 (US\$)	Year-2 (US\$)	Year-3 (US\$)	Total (US\$)
A	NON RECURRING COST	4894	3642	3642	12178
B	RECURRING COSTS	4553	3984	4211	12748
Sub-Total (A+B)		9447	7626	7853	24926
Over Head costs (20 % for Academic Institutions)		1889.40	1525.20	1570	4985
Grand Total (A+B)		11336	9151	9423	29911
<p>Grand Total (in words) - Twenty- Nine Thousand Nine Hundred Eleven US Dollars only</p>					

Layout plan for Fruit Nutri-garden



Icon	Name of fruit trees
	Jackfruit
	Avocado
	Pomegranate
	Pear
	Guava
	Peach
	Strawberry
	Citrus
	Jamun
	Papaya
	Karonda



Compost Pit



Thanks