



NEST for NEHR: **N**urturing **E**cological **S**ustainability and **T**ribal Livelihoods through **C**limate-Smart Fruit based **S**ystems in **NEHR** of India



Prashant Kisan Nimbolkar

19-11-2025

Altitude: 1,200 m



Nyingchi
Tibet, China

[View details](#)

6318



MEDOG COUNTY
墨脱县

Upper Siang

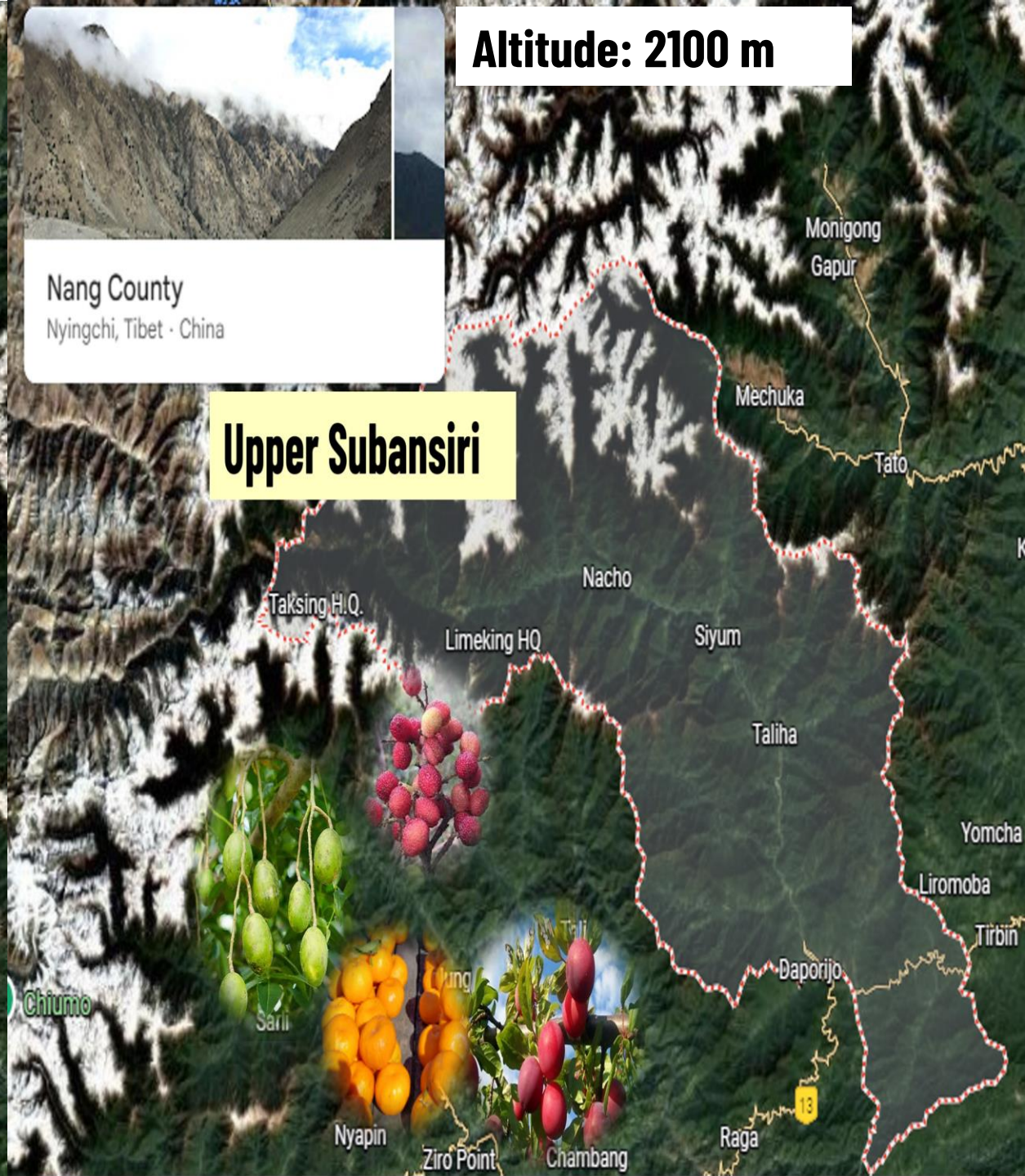


Altitude: 2100 m



Nang County
Nyingchi, Tibet · China

Upper Subansiri



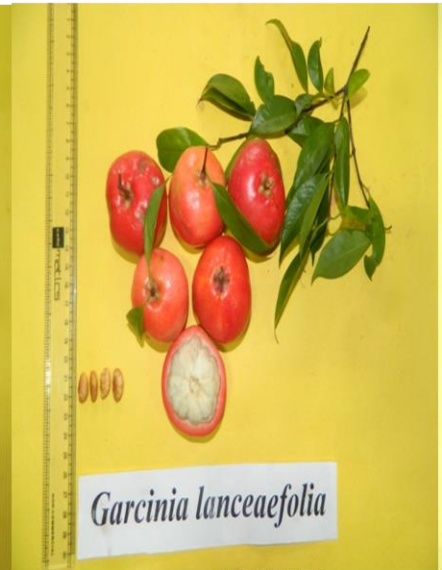
2. Project Objectives:

- 1.** To restore degraded and marginal landscapes through diversified fruit-based systems using nutrient-rich fruit species.
- 2.** To validate eco-friendly crop management practices for Khasi Mandarin through comparative trials of Natural, Organic, and INM-based approaches.
- 3.** To build entrepreneurship and skill capacity among tribal women and youths on QPM production, orchard management and value addition.

Landscape to be covered



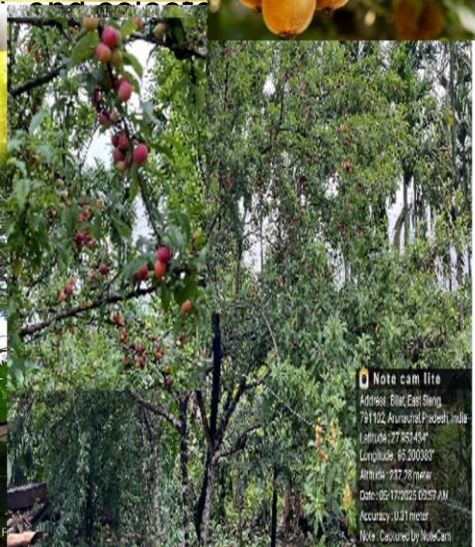
Docynia indica



Garcinia lanceaefolia



Flacourtia jangomas



Spondias pinnata



Phoebe cooperiana



Pyrus pashia



Passiflora edulis



Dillenia indica



Carambola

3. Methodology and implementation approach(2):

Objective: 02 To validate eco-friendly crop management practices for Khasi Mandarin through comparative trials of Natural, Organic, and INM-based approaches

Anjaw District: 1 acre= 160 plants
 Upper Siang: 1 acre= 160 plants
 Upper Subansiri: 1 acre= 160 plants
 Total no. of plants: 480 plants (>1 ha)

Module (treatment)	Content	Application methods/time
Natural farming	- Ghanajeevamrita @ 6 Kg/tree Jeevamrita @ 3.5 l/tree Neemastra @ 1.25 l/tree	(Basal dose) once in a year (Three time) at March, May & June (Foliar spray-Need based)
Organic farming	- Vermicompost @ 20 Kg/tree CAU Bioenhancer @ 5% Neem oil @ 5 ml/l	(Basal dose) once in a year (Thrice) March May & June (Need based)
Chemical farming	- N:P:K - 500:250:250 Arka Citrus Special @ 5 g/l Imidacloprid @ 1ml /l	(March and September) (March, April, and September, October) (Need based)
Farmers practices	- Mulching and growing of cover crops/green manure crops etc.	
Control	- Nil	

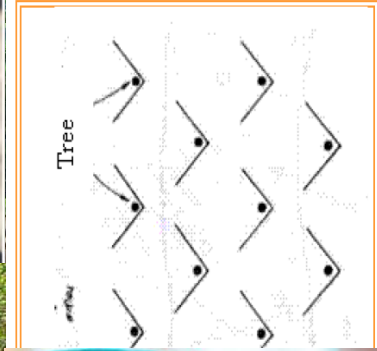
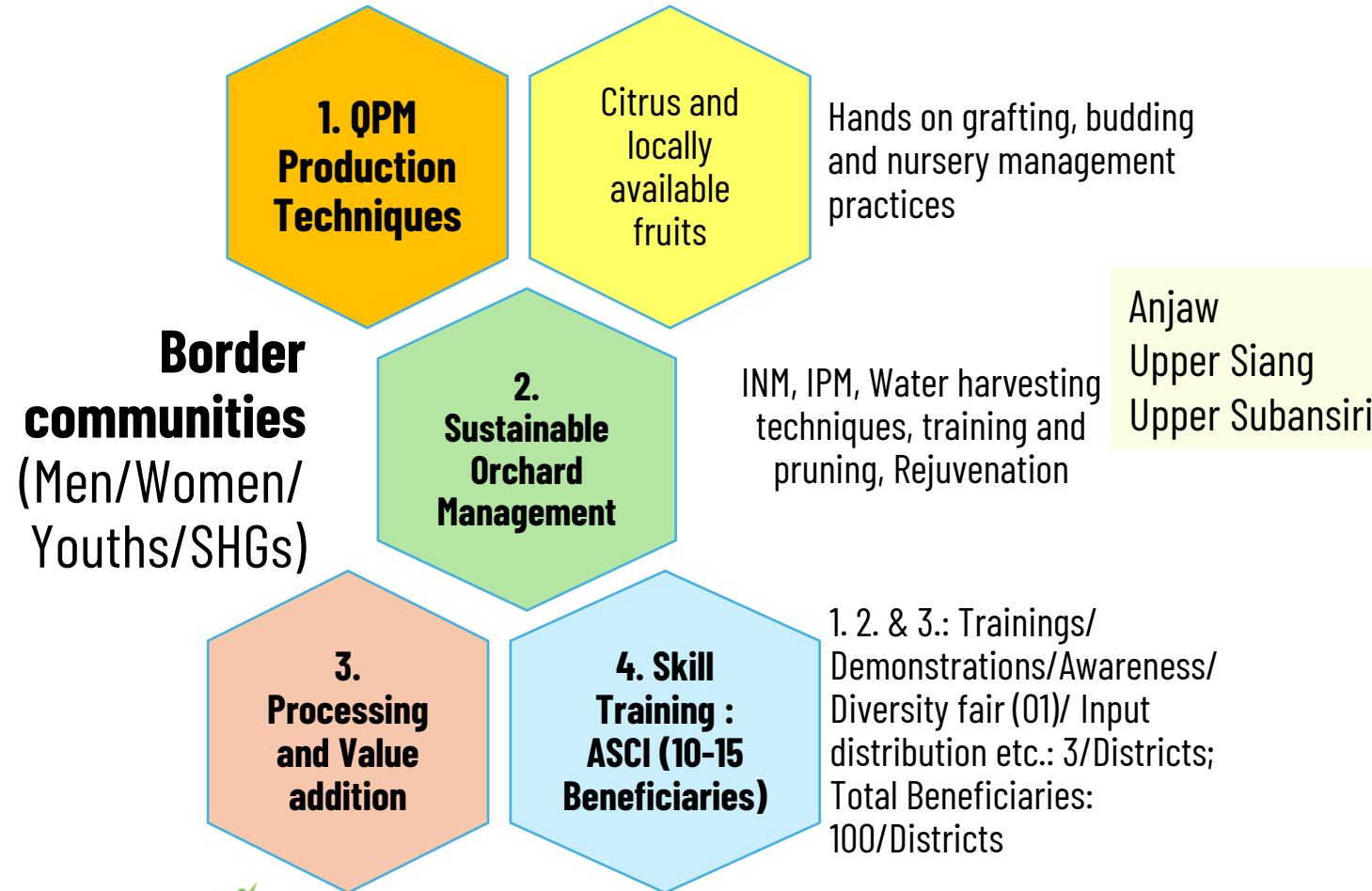


Indicators: Plant height, canopy spread, trunk girth, soil OC, soil pH, NPK, bulk density, fruit yield, fruit quality, pest and disease incidence %, B:C ratio, adoption and perception

3. Methodology and implementation approach (3):



Objective 3: To build entrepreneurship and skill capacity among tribal women and youths on QPM production, orchard management and value addition



Category	Description	Target
Master Trainers	Technical officers / progressive farmers/SHGs/Youths	6-8
Primary Trainees	Rural tribal women & youth (18-35 yrs) in border clusters	300
Indirect Beneficiaries	Farmer households, SHGs, Youths, progressive farmers, NGOs	1,500-2,000



ABOUT US PARTNERS

Amenity Horticulture & Landscaping

Awarding Body recognized by National Council of Vocational Education & Training (NCVET)

Qualification Title	Qualification Code	NSQF Level	Version	QP/NOS/MCr	Min Notional Hours	CCN
Plant Nursery Associate	AGR/Q0807	3	4	QP	270	II



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



Restoration of degraded lands: At least 15–20 ha of marginal and community **land will be rehabilitated** through climate-resilient fruit crops

Diversified fruit village will lead to **nutritional security**, ecological sustainability, and livelihood enhancement, particularly in low-income families of tribal communities.

Validated packages: Clear recommendations for **Natural, Organic or INM modules** appropriate to site types (which treatments work best under which soil / pest regimes).

Demonstration of GAP in the existing declining citrus orchards will help to restore the **landscape and economic return** of the small-scale farmers.

Skilled Human Capital: Entrepreneurship and ownership skill-based training under ASCI will **professionalize local horticultural** activities, increase incomes, and create pathways for self-employment.

Ecological benefits: Improved soil fertility, reduced erosion, and **enhanced biodiversity** in restored landscapes.

Potential pathway for region specific underutilized fruits: Through nutritional profiling the Nutri rich fruits will be promoted among the low-income families by enhancing food security and creating employment through value addition

Slide 6. Environmental and climate advantages



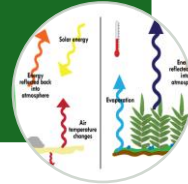
- A diversified fruit-based orchard supports richer habitats (birds, pollinators, beneficial insects) compared to monocultures

Biodiversity enhancement



- Stable microclimate increases resilience of the system to climatic extremes (droughts, heat) because perennial woody systems buffer environmental fluctuations

Climate resilience



- Viable returns from orchards and value-added products reduces the incentive for clearing more forest land for low-value agriculture

Reduced deforestation or land degradation



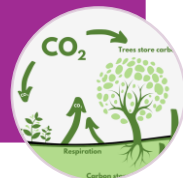
- Fruit orchards, especially when managed with ecological principles (e.g., cover crops, minimal chemical use), can provide ecosystem services beyond just fruit production: soil regeneration, pollination, pest control, etc.

Ecosystem services



- Fruit trees are perennial woody plants, which means they can sequester carbon in their biomass (trunks, branches, roots) and in soil organic matter.

Carbon sequestration



- Better soil structure (due to organic matter) improves water-holding capacity and buffering, making soils more resilient to climate stress.

Long-term soil fertility and resilience



- Healthier, biologically active soils also help crops better withstand abiotic stress because such soils are more buffered.

Adaptation to climate variability



7. Scaling, sustainability and cost efficiency:

Species selection

- Growing different fruit species in selected locations help to **sustain ecology and economy**
- Selection of fruit species adapted to marginal soils: e.g., those that are **nutrient-efficient**, drought tolerant, or pioneer species

Modular Adoption Packages: By developing a **ecofriendly standard module** for Khasi Mandarin orchards eg. Natural farming, organic farming, INM etc.

Value Addition and Product Diversification

- Develop diversified products: e.g., Khasi Mandarin marmalade, jam, jelly, pickles from locally available fruits.
- Branding: Build local / tribal / organic / heritage **brand** identity to market products in niche / regional markets.

Institutional & Community engagement: Build local institutions or **farmer groups to manage orchards** collectively; enables cost-sharing, knowledge exchange, and risk reduction

Cost Efficiency Measures

- Reduction in use of **synthetic fertilizers** to improve soil health.
- Use of **organic manure locally** to reduce transport cost.
- Use of biofertilizer to minimize recurring input costs through locally available resources
- **Natural farming** maximize ecological management, e.g., pest control via biological controls, mechanical weeding, mulches, reducing chemical input.

8. Budget summary and risk and mitigation strategy:

Budget Head / Component	Description of Activities / Items	1 Yr	2 Yr	3 Yr	Total ₹ Lakh
A. Capital Expenses (Non-Recurring)					
1. Equipment & Infrastructure	Fruit harvesters, Juice extractors/grinder, altimeter, minor lab instruments (soil testing kit, moisture meter, pH meter etc.), farm equipment's, AIDs, PA system and other IT items, etc.	3.00	2.00	1.00	06.00
B. Recurring Expenses					
2. Manpower	01 YP-1 – 25,000/month x 36 months = 9.00 lakh 01 Field coordinator – 15,000/month x 36 months = 5.4 lakh	4.80	4.80	4.80	14.40
3. Research Inputs & Field operations	QPM, Seeds, rootstocks; polybags, potting materials, farm tools, organic/natural/INM, shade nets, polyethylene sheet, chemicals, glassware's, outsourcing for nutrient profiling etc.	4.00	3.00	3.00	10.00
4. Training, Demonstrations/workshop & Capacity Building	Farmers/SHG/Youth trainings, exposure visits, master trainer/primary trainer course, field demonstrations; Travel, POL TA/DA for staff and trainees, Food & accommodation, honorarium for experts/resource persons; registration kits, labour etc.	3.60	5.00	4.00	12.60
5. Stationery, Printing etc.	Office consumables, documentation, report printing, banners, communication, internet expenses etc.	0.40	0.40	0.20	1.00
6. Misc. & Contingency	Minor repairs, vehicle hiring for field supervision, maintenance of demo plots, logistics for workshops, and unforeseen expenses.	0.30	0.30	0.85	1.45
C. University overhead charges (10%)					4.545
Grand Total (A+B+C)		16.10	15.50	13.85	49.995

Risk

Difficult terrain and steep slopes: Selected regions are hilly and mountainous, increasing risk of soil erosion, landslides, and making mechanized work difficult.

Water management challenges: Remote highland areas lack infrastructure for reliable irrigation; rainwater harvesting and water retention can be difficult

High rainfall and extreme weather: Heavy monsoons can exacerbate erosion, degrade soil, and damage young orchards.

Shifting cultivation (“jhum”) practices: In many border and tribal areas, jhum is still practiced, causing soil fertility decline, deforestation, and environmental degradation

Poor accessibility: Border-area villages have weak road connectivity or no motorable roads, making transport of seedlings, inputs and other transportation difficult.

Monitoring difficulty: Collecting data for trials or restoration may be difficult in remote areas; cost and logistics.

Mitigation strategy

Use **site-appropriate species:** Selection of native or well adopted nutrient-rich fruit species to reduce ecological disruption.

Implementation of **water-harvesting techniques** eg. Contour bunds, half moon terrace, micro catchment methods, small ponds etc.

Participatory planning: Involve tribal communities for species selection, choose orchard layouts, and integration with their traditional systems

Develop **value-addition locally:** Encourage small-scale processing units in local villages to reduce need for transporting raw fruit long distances

Producing QPM of region specific and adoptable exotic and underutilized fruit crops

Hands on training, awareness programs, workshops, field demonstrations will be conducted to improve cultivation practices and awareness about nutritionally rich fruit species





Thanks

