Unlocking the Pineapple Value Chain for India

Insights from Secondary Research

SELCO Foundation

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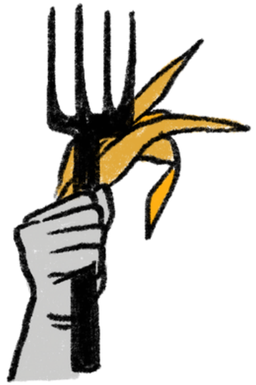
This deck synthesizes secondary research to identify systemic gaps and possibilities for decentralized interventions in pineapple value chains.

A SYSTEMS LENS ON THE PINEAPPLE VALUE CHAIN

At SELCO Foundation, we look at value chains not just as production-to-market pipelines, but as systems that need to work for both people and the planet. That means:



Enabling climate-resilient livelihoods

Unlocking economic potential equitably

Strengthening institutions, not just infrastructure

This deck synthesizes insights from secondary research to explore how such an **ecosystem approach can be applied to pineapple – a high-potential but under-leveraged crop especially in Northeast India.**

PINEAPPLE AS A FOCUS COMMODITY

Pineapple ranks among the TOP 5 TROPICAL FRUITS consumed worldwide.

It is produced on a massive scale –**29.96 million metric tonnes** globally (2023), with key producing countries including **Indonesia, the Philippines, and Costa Rica.**

While countries like Costa Rica have built integrated export-oriented systems, many re-export hubs in Europe (e.g., the Netherlands) capture much of the export value.

Pineapple requires relatively low water and is well adapted to tropical and hilly climates, making it a resilient option in the face of climate change.

Source: https://worldpopulationreview.com/country-rankings/pineapple-production-by-country

THE UNTAPPED POTENTIAL OF PINEAPPLE IN THE NORTH EAST REGION OF INDIA

NORTH-EAST INDIA contributes to over

50%

of India's pineapple production, with major clusters in **Assam, Meghalaya, Tripura and parts of Manipur & Mizoram.**

Despite this scale:

- **Value addition remains minimal**
- **Infrastructure (processing, storage) is underutilized**
- **Farmers face high post-harvest losses and low prices in peak season**
- **Institutional and market ecosystems remain fragmented**

These structural bottlenecks reinforce income insecurity and missed enterprise opportunities- **which is precisely where SELCO Foundation's ecosystem approach can add value.**

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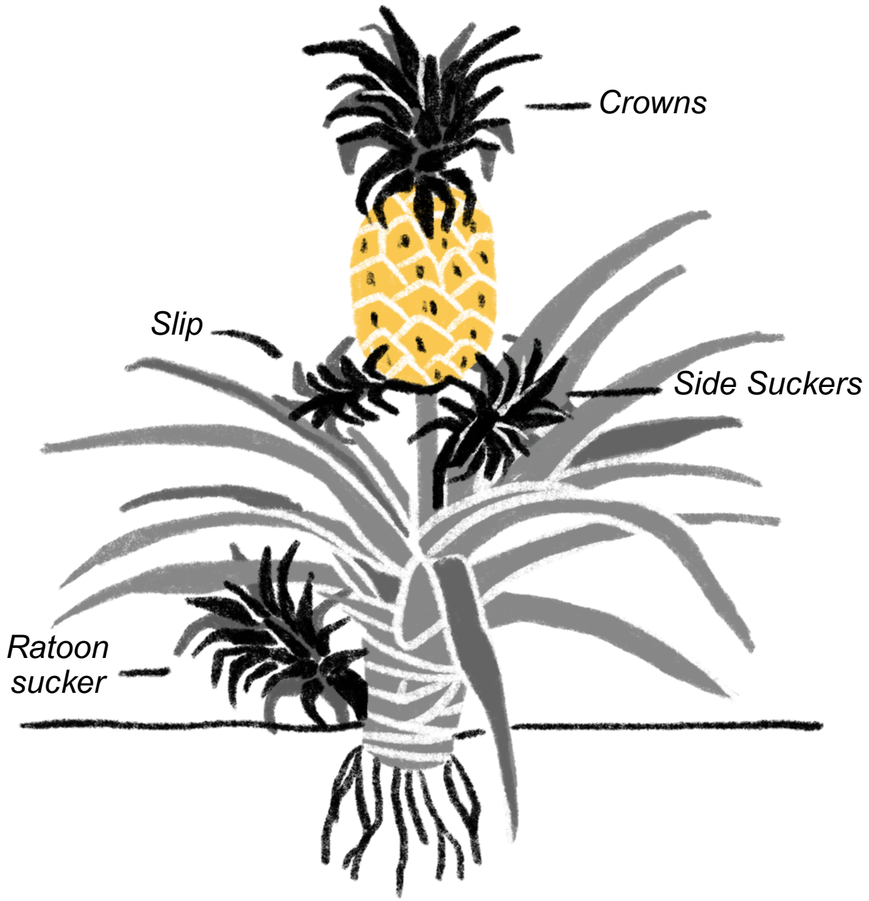
UNDERSTANDING THE CROP AND ITS CHARACTERISTICS

Pineapple is a perennial crop grown on undulating and hilly terrain – suitable for rain-fed farming.

Propagation is primarily through **suckers, slips, or crowns,** sourced from previous cycles or neighbours.



Cultivation is labour-intensive; planting to first harvest takes 18–24 months, after which farmers harvest twice a year– summer (sweeter, better prices) and winter (sourer, lower prices).

Key challenges include:

Labour-intensive weeding: 3 rounds/year, each taking 1–2 weeks of hard manual work.

Challenging Harvest Conditions: During the 6–10 week peak, farmers harvest up to 3 times/week as fruit matures unevenly. Manual harvesting with sickles adds to drudgery.

No viable storage: Farmers usually sell at farmgate the same day or keep in bamboo baskets overnight. Pineapples are highly perishable and unsuitable for conventional cold storage (<7–8°C causes chilling injury).

Lack of processing: Unsold or overripe fruit is diverted to home use (jam, juice), reducing potential income. Without nearby processing (pulp/slice) units, farmers cannot extend shelf life or add value; such infrastructure is only now emerging under government schemes.

UNDERSTANDING THE CROP AND ITS CHARACTERISTICS

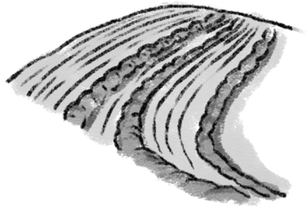
Variety	Region	Characteristics	Suitability
Queen	Meghalaya, Tripura	**Small, high sweetness (TSS ~16), spiny leaves**	Fresh market, fibre extraction
Kew	Assam, West Bengal	**Large fruit (~1.5–2.5 kg), cylindrical, juicy**	Canning, juice processing
Mauritius	Karnataka, Kerala	**Medium, early maturing**	Fresh, juice
MD2 (hybrid)	Global (Costa Rica, Philippines)	**Very sweet, long shelf life, uniform size**	Export quality, high-end retail

PACKAGE OF PRACTICES (AS PER MIDH, GOVT. OF INDIA) | CULTIVATION LIFECYCLE

Traces the journey from land preparation to replanting, covering 4 crop cycles over ~4 years

1 Land Preparation

Light tilling/clearing, bunding for slopes, drainage channels where needed.



2 Planting Material Selection & Treatment

a. Suckers, slips, or crowns
b. Trimmed, sun-cured, treated with fungicide/biological solutions.

3 Planting Systems (geography-specific)

a. Contour Planting (hilly areas): 30% higher density, reduces soil erosion.
b. Trench Planting (coastal areas): Conserves soil moisture, less water loss.
c. Flat Bed Planting (plains with good water availability):Simpler, used where water is not limiting.

4 Weeding & Mulching

a. Weeding ~3 times/year.
b. Mulching (plastic/organic) for moisture retention and weed suppression.

5 Nutrient Management

Organic manure at planting + NPK fertilizers in cycles. Lime application if soil is acidic.

6 Irrigation

Rain-fed; supplemental irrigation as needed

7 Pest & Disease Management

Monitoring + integrated practices(botanicals /approved sprays).

8 Flower Induction

Use of Ethrel/NAA ensures uniform flowering and planned harvests.

9 Harvesting

First harvest: 15–18 months after planting.
Subsequent harvests: Two per year (summer & winter).
Ratooning (regrowth cycle) can be done for 3 cycles i.e 6 harvests over 3 years

10 Field Rotation

After 4 years, field is replanted. Old biomass (leaves, stem, crown) → used for fibre, compost, or bio-products.

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PROCESSING & PRODUCT STREAMS

FRESH FRUIT PATHWAY

Sorting, packing

Direct sale
(local/national/export)

PROCESSED FRUIT PATHWAYS

Slicing

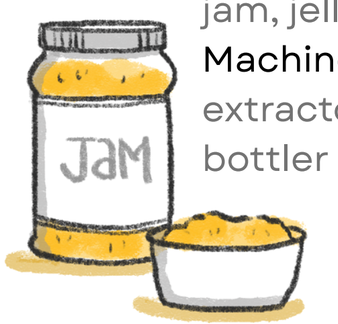
Dried pineapple, canned slices, fresh-cut retail packs

Machines: slicer, dehydrator, retort, sealing line

Chopping+Fermenting

Pickles, chutneys, sauces

Machines: chopper, fermenter, pasteurizer



Pulping

Juice, concentrate, jam, jelly, preserves

Machines: pulper, extractor, kettle, bottler

Crushing+Fermenting

Wine and vinegar

Machines: crusher, fermentation tank, bottling setup

BY-PRODUCT UTILIZATION

Plant Part	Main Uses	Tech Involved
Peel	Bioethanol, pectin, animal feed	Fermenter, dryer
Core	Candied snacks, vinegar	Slicer, juicer
Crown	Fibre extraction, compost	Pulper, extractor
Stem	Bromelain enzyme, compost	Crusher, filtration
Pomace	Feed, vinegar	Fermenter, drier
Leaves	Fibre for textiles/paper	Decorticator, chemical extractor

End-of-lifecycle biomass (especially leaves) offers fibre potential – especially during field rotation.

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MARKET CHANNELS

FARMER

FARMGATE

CONSUMER

(direct purchase at local market)

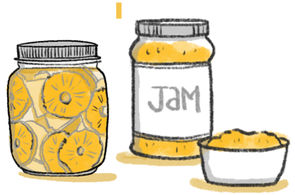
AGGREGATOR

(FPO/SHG/local entreprenuer)

TRADER

CONSUMER

(in distant market - cities/export market)



PROCESSING

CONSUMER

(direct purchase at local market)

Source: https://www.mofpi.gov.in/sites/default/files/study_on_infrastructure_gaps_-_pineapple.pdf

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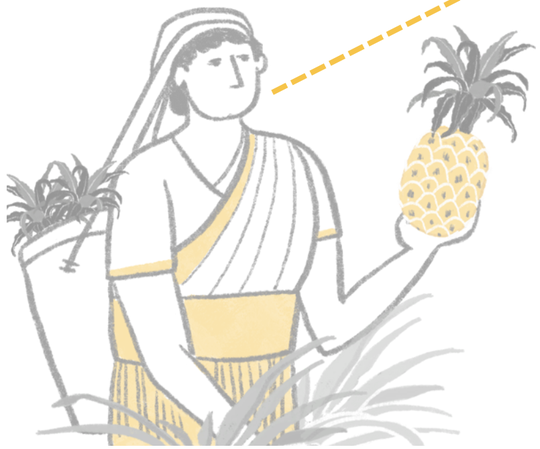
MARKET CHANNELS : COSTS AND WASTAGE INSIGHTS



FARMER

FARMGATE

₹5–20/per piece
(depending on season and grade)

Farmgate = 20–30%

Transit = 5–10%.

CONSUMER

Retail price in urban markets:
₹30–70 per piece
(depending on season and grade)

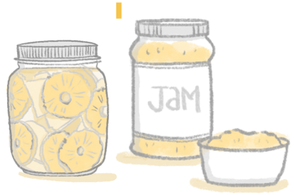
Market unsold = 10–15%

TRADER

CONSUMER

Export market:
₹95–140 per piece
(depending on season and grade)

AGGREGATOR



PROCESSING

Processing losses = 5–10%

CONSUMER

(direct purchase at local market)

Source: https://www.mofpi.gov.in/sites/default/files/study_on_infrastructure_gaps_-_pineapple.pdf

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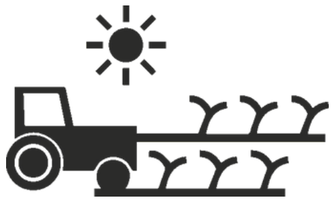
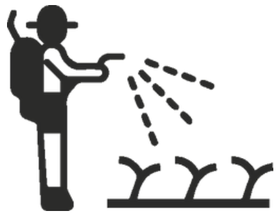
WHY THE VALUE CHAIN FAILS BEFORE IT EVEN BEGINS?

Most pineapple value chain interventions focus on processing, marketing, or export readiness.
But unless upstream issues are addressed – from how the fruit is planted, harvested, and handled – downstream solutions will remain underutilized.

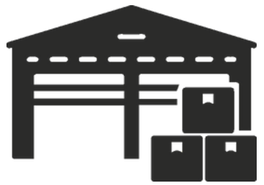
Upstream Production Barriers Undermining the Value Chain:



Low-density planting →
lower yield per acre
=
not enough volume for aggregation



Manual harvest & weeding →
high drudgery, delays
=
over ripeness



No sorting or storage →
poor shelf life
=
buyers reject fruit

Seasonal oversupply →
no scheduling
=
price crashes

To truly strengthen the base, efforts need to combine input support with effective PoPs, timely practices, technology, and market intelligence.

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ECOSYSTEM MAPPING – WHO HOLDS THE CHAIN TOGETHER?

Backward & Forward Linkages

Traders, Farmer Producer Companies, exporters, institutional buyers

Finance

Banks, Self Help Groups, FPO-level credit access

Skill & Capacity Building

Agricultural Technology Management Agency (ATMA), NGOs, private processors, KVKs

Policy & Schemes

Mission Organic Value Chain Development for North Eastern Region **(MOVCD-NER)**, Mission for Integrated Development of Horticulture **(MIDH)**, Agricultural and Processed Food Products Export Development Authority **(APEDA)**, Agri Infrastructure Fund

Innovation

Krishi Vigyan Kendras, Horticulture Research Stations, Indian Council of Agricultural Research, input dealers

End User & Sectoral Needs

Small holder farmers, landless labourers, women workers

For pineapple to evolve into a robust livelihood ecosystem, **six interconnected pillars must work in coordination.**

Today, these actors exist – but are siloed, under-equipped, or misaligned with each other's needs.

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FROM FIELD TO MARKET: WHAT'S MISSING ACROSS THE PINEAPPLE VALUE CHAIN?

	Stage	Recommended Practice (PoP)	What's Happening	Gaps / Bottlenecks
1.	**Input & Land Prep**	Proper field sanitation, raised beds, soil testing, manure application, sucker treatment	Farmers rely on traditional prep; no testing; suckers sourced from own field or neighbours, untreated	**Poor planting material → lower yield; pest/disease risks; soil fatigue**
2.	**Planting & Crop Management**	High-density spacing (double-row), mulching, scheduled weeding (3x), bio inputs	Irregular spacing; no mulching (costly); manual weeding only	**Low productivity; high labour drudgery; few adopt PoP**
3.	**Irrigation & Flower Induction**	Drip irrigation where possible; ethrel-based induction at 7–9 months	Entirely rain-fed; induction done inconsistently	**Seasonal uncertainty; irregular fruiting cycles**
4.	**Harvesting**	Timed harvest for optimal sweetness and market alignment; harvesting tools	Manual (3/week); summer = sweeter, winter = sourer and less valued	**Harvesting drudgery; no grade sorting; 30% wastage in glut**
5.	**Post-Harvest Handling**	Sorting, grading, packaging, pre-cooling	Minimal; packed in bamboo baskets or plastic sacks	**Poor shelf life; loss in transit; inconsistent quality**
6.	**Processing / Value Addition**	Pulps, jams, slices, candy, juice, vinegar, fibre (leaves)	Machines present but underutilized; slicing & canning infra absent	**Power issues, skill gaps, lack of product-market fit**
7.	**By-product Utilization**	Peel, stem, crown, pomace → fibre, feed, vinegar, bromelain, biochar	Some awareness, but no commercial by-product ecosystem	**Untapped revenue stream; high organic waste load**

The gap is not lack of recommendations, but the **disconnect between knowledge, resources, and coordination –** processing infra exists but isn't used; PoPs exist but are not followed.

Interventions must bridge these divides, not just replicate them.

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LEARNINGS FROM GLOBAL & NATIONAL EXPERIENCE

	Theme	Insights
1.	**Export-Oriented Production**	**Learning:** Costa Rica and the Philippines dominate exports by standardising one variety (MD2), enforcing PoPs, and ensuring traceability/certification. Reliable infrastructure (power, labs, nurseries, cold chain) underpins the system. **Relevance:** For NE India, outright varietal replacement risks biodiversity loss. Instead, the opportunity is to standardise within local varieties (Queen, Kew) through better nurseries, grading, and Brix-based quality checks – making them competitive without erasing local strengths.
2.	**Aggregation + Contract Farming**	**Learning:** Models like Del Monte (contract farming) and Ghana's farmer cooperatives show how aggregation and forward purchase agreements prevent glut-season price crashes. **Relevance:** NE India's FPCs often lack real aggregation power. Building functional federations with buyer tie-ups could stabilise prices and create consistent supply without forcing farmers into exploitative contracts.
3.	**Climate Adaptation**	**Learning :** In Nigeria and Ghana, bio-mulching, intercropping, and solar irrigation help manage erratic rainfall. **Relevance:** NE India's monsoon variability mirrors these challenges. Demonstrating climate-resilient PoPs (mulching, high-density planting, mixed cropping) is crucial to reduce vulnerability and labour burden while sustaining yields.

LEARNINGS FROM GLOBAL & NATIONAL EXPERIENCE

	Theme	Insights
4.	**Infrastructure + Processing**	**Learning:** Kerala's Vazhakulam cluster and Thailand's modular processing hubs thrive on reliable energy, water, cold chain, and demand-aligned machinery (slicers, pulpers, blast freezers). **Relevance:** In NE India, many MOVCD-funded centres remain idle due to poor power supply and weak business models. The clear takeaway: energy-resilient, decentralised processing hubs + long-term handholding for FPCs are non-negotiable.
5.	**Policy & Ecosystem Support**	**Learning:** Thailand and the Philippines coordinate pineapple policies through sector boards, aligning subsidies, infrastructure, and exports. **Relevance:** India has multiple schemes (MOVCD, MIDH, SFURTI, AIF), but poor convergence means wasted resources. A cluster-level coordination model, integrating horticulture, MoFPI, and rural development, can unlock synergy.

Lesson from global: Productivity and exports thrive where systems are standardised, aggregated, and well-coordinated.

Lesson for NE India: Adapt, don't copy – interventions must align with biodiversity, climate realities, and farmer livelihoods.

KEY INSIGHTS FROM SECONDARY RESEARCH

Mismatch Between Production and Value Realization

NE India produces large volumes of pineapple – **but poor aggregation, lack of grading, and minimal value addition** cap income potential.

Infrastructure Exists, But Ecosystems Don't

Processing units built under MOVCD and PMFME remain idle **due to unstable power, lack of skilled operators, and no market tie-ups.**

The Value Chain is Fragmented and Siloed

Cultivation, processing, and marketing are handled by different actors – with little coordination between departments, FPOs, or schemes.

Traditional On-Farm Practices Limit Productivity

Low-density planting, no mulching, high drudgery, and rain-fed dependence reduce yield quality and increase labour costs.

Market Volatility + Perishability = High Losses

In peak season, farmers face **price crashes and up to 30% wastage** due to lack of cold storage, aggregation, or demand-side intelligence.

By-Products Offer Untapped Enterprise Potential

Leaves, core, peel, and stem could support micro-enterprises (e.g., fibre, feed, enzymes) – but there are no operational models yet.

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WHERE DO WE GO FROM HERE?

Having understood the systemic gaps and opportunities across the pineapple value chain, this section outlines potential pathways to strengthen the ecosystem – not just through infrastructure or schemes, but by enabling strategic convergence, adaptive practices, and institutional facilitation.

These program directions are not one-size-fits-all. They depend on:

- **Typologies of end users**
- **Existing public schemes and policies**
- **Readiness of clusters for demonstration, processing, aggregation, and market linkage**

What follows is a synthesis of who the actors are, what already exists, and how interventions can be tailored across contexts.

NOT ALL ACTORS IN THE PINEAPPLE ECOSYSTEM FACE THE SAME CONSTRAINTS OR REQUIRE THE SAME SOLUTIONS.

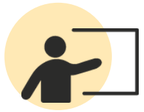
	Typology	Description	Key Needs / Gaps	Role in Ecosystem
1.	**Individual Farmer**	Smallholder, often <1 acre; mostly rain-fed; follows traditional practices	Training on PoP, access to sucker nurseries, irrigation support, market intel	Primary cultivator, sells to traders or FPOs
2.	**Clustered SHGs / IVCS**	Women's groups or village-level collectives managing own land	Exposure to post-harvest handling, potential for micro-enterprises in fibre or drying	Labour, processing, packaging
3.	**FPOs / FPCs**	Registered farmer collectives with processing infra (MOVCD-supported)	Power access, trained ops staff, working capital, buyer tie-ups	Aggregation, processing, potential anchor for market
4.	**Local Processors / Entrepreneurs**	Emerging or informal actors doing value addition at small scale	Access to tech, packaging support, demand linkages	Build regional processing footprint

SCHEMES SUPPORTING THE PINEAPPLE ECOSYSTEM

Stage	Key Scheme(s)	Support Provided	Gaps & Opportunities
Production	**MIDH**	Training, PoP, quality seeds	Low awareness, limited field trainers, weak monitoring
Infrastructure	**MOVCD-NER, Agri Infra Fund**	Processing/Storage support, infra loans	Under-utilized infra, power/staff gaps, no cold chain, poor maintenance
Processing	**PMFME**	Equipment subsidy, cluster support	Complex application, low awareness, few processors, weak linkage
Marketing	**APEDA, SFAC**	Export/domestic market promotion	Lack of aggregation, no standards, poor branding/packaging
Finance	**NABARD, NCDC**	Infra funding, business loans	FPOs lack business plans, access, collateral & literacy issues

WHERE INTERVENTION IS POSSIBLE: THEMES AND ENTRY POINTS

Based on secondary insights, the following thematic areas present the most promising entry points for catalysing systemic change – in alignment with what already exists on the ground.

	Theme	Intervention Scope
	**Production Practices**	Demonstration plots for high-density planting & bio mulching
	**Energy Access**	Solarize processing units to overcome power barriers
	**Market Linkages**	Tie-ups with buyers for Grade A/B fruit; explore slicing, drying and canning units
	**Aggregation**	Facilitate FPO federations or clusters for volume-based negotiation & exports
	**Processing Skills**	Hands-on training on value addition & machine ops
	**By-product Utilisation**	Support pilots for leaf fibre (textile), peel compost, and wine/vinegar units
	**Policy Convergence**	Bring together MoFPI, horticulture, rural dev for joint planning at cluster level

The Northeast already grows pineapple at scale.

The challenge – and opportunity –
is to convert that production into prosperity.

This isn’t about pineapple alone – it’s about building equitable, decentralised, climate-resilient rural economies.

LET’S CO-CREATE IT.

If you're working with rural communities, FPOs, or institutional partners in the North East – or building climate-resilient agri-value chains anywhere – we’d love to collaborate.

Reach out to us to explore ideas, align efforts, or pilot together.

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