ADMINISTRATION OF UNION TERRITORY OF LADAKH
Enterprising Ladakh
ENTREPRENEURSHIP DEVELOPMENT INSTITUTE OF INDIA, AHMEDABAD

PROJECT PROFILE

# BLACK PEA CULTIVTION AND PROCESSING

## 1. INTRODUCTION

Ladakh, a high-altitude cold desert in the Indian Himalayas, faces formidable agricultural challenges due to its extreme climate, with temperatures ranging from -30°C in winter to 35°C in summer and an annual rainfall of just 100 mm. The growing season is limited to 4–5 months (May–September), restricting crop diversity. However, indigenous crops like **Sranma** (black pea/pigeon pea, *Cajanus cajan*) have thrived here for centuries, showcasing remarkable resilience to drought and poor soil fertility.

Sranma, a protein-rich pulse (22–25% protein), is a dietary staple in Ladakhi households, used in traditional dishes like *thukpa* (noodle soup) and *skyu* (pasta). Beyond nutrition, its deep-rooted system improves soil structure and fixes nitrogen, enhancing fertility for subsequent crops like barley. Despite its potential, Ladakh imports over 70% of its pulses from Punjab and Himachal Pradesh, costing ₹15–20 crore annually.

This project aligns with **Ladakh's Vision 2050** for food self-reliance and the **National Mission on Sustainable Agriculture (NMSA)**. By commercializing Sranma cultivation and introducing value-added products, it aims to reduce import dependency, create rural livelihoods, and leverage Ladakh's unique agro-climatic identity. A 2022 NITI Aayog report highlighted that cold-desert pulses could tap into the global organic food market, projected to reach $437 billion by 2026.

## 2. PRODUCT & ITS APPLICATION

**Core Offerings:**

1. **Raw Sranma**:
    - **Direct Consumption**: Sold as whole dried peas in 1 kg and 5 kg packs.
    - **Nutritional Profile**: High in fibre (12%), iron (5.7 mg/100g), and folate (456 µg/100g), addressing anaemia prevalent in 65% of Ladakhi women (NHFS-5).
2. **Processed Products**:

    - **Flour**: Gluten-free alternative for baking; used in *tsampa* (roasted barley flour) blends.
    - **Roasted Snacks**: Spiced Sranma kernels targeting urban health markets.
    - **Ready-to-Cook Mixes**: Pre-mixed with barley, lentils, and dried vegetables for quick meals.
3. **By-Products**:
    - **Animal Feed**: Pod husks and stems (30% of harvest) processed into nutrient-rich fodder for yak and sheep.
    - **Organic Fertilizer**: Crop residues composted into bio-manure, replacing synthetic NPK in apple orchards.

**Applications:**

- **Culinary**: Partnering with Leh's **Ladakhi Women's Alliance** to promote Sranma in homestays and restaurants.
- **Health Markets**: Collaborating with **Organic India** to supply certified gluten-free flour to metro cities.
- **Agricultural**: Reducing chemical fertilizer use by 40% in Nubra Valley farms through residue composting.

**Market Differentiation:**

- **Geographical Indication (GI) Tag**: Leveraging Ladakh's unique terroir for premium pricing (₹150–200/kg vs. ₹80/kg for non-GI).
- **Carbon-Negative Farming**: Sranma's nitrogen fixation reduces emissions by 0.5 tons $CO_2$/acre/year (TERI, 2023).

## 3. DESIRED QUALIFICATION FOR PROMOTER

**Education**:

- **Essential**: Bachelor's degree in Agronomy, Agricultural Engineering, or Food Technology.

- **Preferred**: Master's in Sustainable Agriculture or certifications like **APEDA's Export Promotion Course**.

**Experience**:

- **Mandatory**: 2+ years in pulse processing or cold-chain logistics. Example: Managing a cooperative in Himachal's legume sector.
- **Desirable**: Exposure to organic certification processes (NPOP, USDA) and FSSAI compliance.

**Skills**:

- **Agro-Technical**: Expertise in drip irrigation design for water-scarce regions.
- **Digital Literacy**: Using IoT sensors for soil moisture monitoring and e-commerce platforms like **Amazon Organic**.
- **Community Engagement**: Fluency in Ladakhi/Bhoti language to collaborate with 500+ smallholder farmers.

**Certifications**:

- **PMFME Scheme Training**: Food safety and packaging standards.
- **KVK-Lead Farmer Program**: Cold-desert crop management.

## 4. INDUSTRY LOOKOUT AND TRENDS

**Global Pulse Market**:

- Valued at $16.2 billion in 2023, growing at 4.8% CAGR (Allied Market Research).
- **Drivers**: Vegan diets (19% CAGR), demand for gluten-free products. Canada and Australia dominate exports, but India's organic niche remains untapped.

**National Trends**:

- **Plant-Based Protein Boom**: Indian plant-protein market to hit $11.6 billion by 2026 (IMARC Group).

- **Government Support**: **PM-PRANAM Scheme** incentivizes chemical-free farming; 50% subsidy on organic inputs.

**Ladakh-Specific Initiatives**:

- **Ladakh Organic Mission (2025)**: Targets 100% organic certification for 10,000 hectares.
- **Subsidies**: 40% capital subsidy for solar dryers and dehullers under **Ladakh Renewable Energy Initiative**.

## 5. MARKET POTENTIAL AND MARKETING ISSUES

**Demand Analysis**:

- **Local**: Ladakh requires 300+ tons/year of pulses; current Sranma production is 120 tons.
- **National**: Delhi-NCR's health-conscious population spends ₹2,000 crore/year on organic snacks.
- **Export**: EU imports ₹8,400 crore worth of organic pulses annually; GI-tagged Sranma can capture 1–2% share.

**Challenges**:

- **Climate Risks**: Frost in May 2023 destroyed 30% of Leh's pea crop.
- **Logistics**: Transportation costs ₹18–20/kg from Leh to Delhi vs. ₹5/kg from Punjab.

**Solutions**:

- **Climate Resilience**: Polyhouse nurseries for early-stage saplings; frost-resistant varieties from **SKUAST-Kashmir**.
- **Cost Reduction**: Collaborate with **Indian Army's INDENT** for subsidized air freight.

**Marketing Strategies**:

- **Branding**: “Ladakh’s Golden Pulse” campaign with QR codes linking to farm-to-table stories.
- **Partnerships**: Supply **BigBasket’s Farm Fresh** segment and **GoCoop** for export.
- **Tourism Integration**: Sell branded snacks at Pangong Lake cafes and Himalayan homestays.

## 6. RAW MATERIAL REQUIREMENTS

| Material | Source | Annual Quantity | Cost (INR) |
|---|---|---|---|
| Sranma Seeds | NBPGR (New Delhi) | 500 kg | 50,000 |
| Organic Manure | Local dairy cooperatives | 10 tons | 20,000 |
| Biodegradable Packaging | EcoWare (Bengaluru) | 10,000 units | 1,00,000 |
| Drip Irrigation Kit | Jain Irrigation | 5 acres | 2,00,000 |

**Water Management**:

- **Drip Irrigation**: Reduces water use by 60% (2.5 lakh litres/acre vs. 6 lakhs in flood irrigation).
- **Snowmelt Harvesting**: Building check dams in collaboration with **Ladakh Ecological Development Group**.

## 7. MANUFACTURING PROCESS

**Cultivation**:

1. **Land Preparation**: Laser levelling fields for uniform water distribution.
2. **Sowing**: May–June, using seed drills (20 kg/acre) intercropped with barley.
3. **Irrigation**: Drip lines with EM sensors ensuring 70% soil moisture.

**Post-Harvest**:

1. **Dehulling**: **M/S Premier Mills** equipment removes 95% husk.
2. **Roasting**: Electric roasters (120°C, 15 mins) enhance shelf life.
3. **Packaging**: Nitrogen-flushed bags to prevent oxidation.

**Quality Control**:

- **FSSAI Standards**: Aflatoxin levels <10 ppb, moisture <8%.
- **Lab Testing**: Partner with **Leh's Food Testing Lab** for monthly audits.

## 8. MANPOWER REQUIREMENT

| Role | Number | Training | Monthly Salary (INR) |
|---|---|---|---|
| Agronomist | 2 | SKUAST-Leh's 3-month course | 45,000 |
| Processing Supervisor | 1 | CIPHET's food tech program | 35,000 |
| Farm Labour | 15 | On-site training by KVK | 15,000 |

**Employment Impact**:

- Direct jobs: 18 (60% women from **Women's Alliance**).
- Indirect jobs: 50+ in transport and retail.

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## 9. IMPLEMENTATION SCHEDULE

| Phase | Activities | Timeline |
|---|---|---|
| **Feasibility Study** | Soil testing, market research | Jan–Mar 2024 |
| **Land & Inputs** | Lease 5 acres, procure seeds | Apr–May 2024 |
| **Cultivation** | Sowing, drip installation | Jun–Sep 2024 |
| **Processing Unit** | Setup dehuller, roaster, packaging line | Oct–Dec 2024 |
| **Marketing Launch** | B2B tie-ups, e-commerce listings | Jan–Mar 2025 |

## 10. COST OF PROJECT

| Component | Cost (INR) | Details |
|---|---|---|
| Land Preparation | 1,50,000 | Levelling, fencing |
| Seeds & Inputs | 3,00,000 | Organic seeds, manure |
| Machinery | 8,00,000 | Dehuller, roaster, packaging machine |
| Marketing | 2,00,000 | Branding, website, trade fairs |
| **Total** | **16,00,000** | |

## 11. MEANS OF FINANCE

| Source | Amount (INR) | Terms |
|---|---|---|
| Promoter Contribution | 7,00,000 | 44% equity |
| NABARD Loan | 6,00,000 | 7% interest, 5-year moratorium |
| PMFME Subsidy | 3,00,000 | 20% upfront, 80% post-certification |

## 12. MACHINERY DETAILS

- **Tractor**: Swaraj 744 FE (₹5 lakh)
- **Dehuller**: Premier MSP 450 (₹1.5 lakh; capacity: 200 kg/hr)
- **Packaging Machine**: Semi-auto pouching (₹1 lakh; 50 packs/hr)

## 13. PROFITABILITY ANALYSIS

**Revenue Streams (Year 1)**:

- Raw Sranma: 8,000 kg × ₹100 = ₹8,00,000
- Roasted Snacks: 1,000 kg × ₹300 = ₹3,00,000

**Costs**:

- Cultivation: ₹4,00,000
- Processing: ₹2,50,000
- Marketing: ₹1,50,000

**Net Profit**: ₹3,50,000 (Pre-tax ROI: 22%)

## 14. BREAKEVEN ANALYSIS

- **Fixed Costs**: ₹5,00,000 (depreciation, salaries)
- **Variable Cost**: ₹60/kg
- **BEP**: ₹5,00,000 / (₹140 – ₹60) = 6,250 kg

## 15. STATUTORY APPROVALS

1. **FSSAI License**: 60-day process; requires HACCP plan.
2. **GI Tag**: Filed through Ladakh Autonomous Hill Council.
3. **Organic Certification**: 18-month transition period under NPOP.

## 16. INTEGRATION STRATEGIES

- **Backward**: Seed banks with **LAHDC**; training 100 farmers in Sranma intercropping.
- **Forward**: Export via **APEDA** to Germany's **Alnatura** stores.

## 17. TRAINING & CAPACITY BUILDING

- **SKUAST-Leh**: 4-week course on cold-desert agronomy.
- **PMFME**: Grants for women entrepreneurs in food processing.

## 18. SUPPLIERS

For entrepreneurs aiming to establish a **Black Pea (Sranma) Cultivation and Processing** venture in Ladakh, selecting appropriate machinery is crucial to ensure efficiency and product quality. Below is a curated list of reputable suppliers specializing in pulse processing equipment suitable for high-altitude and small-to-medium-scale operations:

### 🏭 Top Machinery Suppliers for Black Pea Processing

*1. Blacknut Agri Food Machinery Pvt. Ltd. (Ambala, Haryana)*

- **Specialization**: Peas roasting and flavoring plants, suitable for various pulse processing needs.
- **Notable Equipment**: Peas Roasting and Flavouring Plant.
- **Website**: blacknut.inblacknut.in

*2. Tulsi Agro Engi Mech Pvt. Ltd. (Rajkot, Gujarat)*

- **Specialization**: Eco-friendly and efficient pulses processing machines.
- **Features**: User-friendly design with a 1-year warranty.
- **Website**: tulsiagrofoodind.com foodmachineindia.com+2perfura.in+2tulsiagrofoodind.com+2tulsiagrofoodind.com

*3. AGI Milltec (AGI AgGrowth)*

- **Specialization**: Comprehensive pulse processing solutions including cleaning, milling, drying, sorting, and polishing.
- **Features**: High yield and productivity with customized solutions for various pulses.
- **Website**: AGIAGI

*4. Goldin (India) Equipment Pvt. Ltd. (Vadodara, Gujarat)*

- **Specialization**: Pulse processing plants and machines.
- **Equipment Range**: Includes screen air separators, gravity separators, impact hullers, and more.
- **Website**: goldinequipment.comgoldinequipment.com

*5. Perfura Technologies (India) Pvt. Ltd. (Coimbatore, Tamil Nadu)*

- **Specialization**: Pulses processing machines and destoner machines.
- **Features**: Offers various machinery tailored for pulses processing.
- **Website**: perfura.inHarihar Plough+13perfura.in+13goldinequipment.com+13

*6. Annapurna Agronics Machinery Pvt. Ltd.*

- **Specialization**: Pulse mill machines with a focus on innovation and quality.
- **Website**: annapurnaagronics.comannapurnaagronics.com+1perfura.in+1

## 🌱 Local Support and Resources in Ladakh

- **Agriculture Department, Ladakh**: Provides support in disseminating scientific technologies, seed distribution, and supply of agricultural machinery.
  - **Website**: Ladakh GovernmentLadakh Government
- **Krishi Vigyan Kendras (KVKs)**: Organize agricultural fairs and provide platforms for entrepreneurs to explore and acquire agricultural tools and machinery.
  - **Recent Event**: The 2nd Kisan Agritech Mela showcased various agricultural products and machinery. Leh+1Ladakh Government+1

## 🔧 Recommended Machinery for Black Pea Processing

- **Cleaning Equipment**: To remove impurities and ensure quality.
- **Dehusking Machines**: Essential for removing the outer layer of black peas.
- **Grading Machines**: For sorting peas based on size and quality.
- **Packaging Machines**: To efficiently pack the processed peas for distribution. perfura.in+18Alibaba+18agroasianindustries.com+18

When selecting machinery, consider factors such as scalability, energy efficiency, and compatibility with high-altitude operations in Ladakh. It's advisable to consult with local agricultural departments or KVKs for tailored recommendations and potential subsidies or support programs.

## 19. CONCLUSION

This project transforms Sranma from a subsistence crop into a high-value commodity, aligning with Ladakh's ecological and economic aspirations. By integrating traditional wisdom with IoT-enabled farming and premium branding, it aims to generate ₹2 crore revenue by Year 3 while uplifting 200+ farming families. With strategic partnerships and policy support, Ladakh can emerge as a global model for sustainable cold-desert agriculture.