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The Missing Crop of the Hills: Why the North-East Hills Need More Pulses Today, Not Tomorrow

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Pulses are often called the "poor man's protein," yet in the North-East Hill (NEH) region of India, they are much more than that. They are a cultural staple, a source of livelihood, and a sustainable solution for improving soil health. Several studies emphasize that pulses remain central to the region's nutrition security, especially where access to animal protein is limited (Semwal *et al*., 2023). At the same time, they naturally fix atmospheric nitrogen, making them vital for soil fertility and climate-resilient farming systems (Das *et al*., 2021).

Why pulses matter in the NEH far beyond nutrition

The NEH region, comprising Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and parts of West Bengal, has immense agro-biodiversity. Pulses such as rajma, lentil, black gram, mungbean, and pigeonpea are part of daily diets and local traditions. Research from the Directorate of Pulses Development (2024) shows that incorporating pulses in hill cropping systems improves protein availability while reducing fertilizer dependency. This dual benefit makes pulses essential both for human nutrition and ecological balance.

Current status and production gaps

Although the NEH region contributes significantly to India's pulse-growing area, overall production still falls short of its potential. Fragmented landholdings, shifting cultivation, limited access to improved seed varieties, and soil acidity are major constraints. *Biam et al.*, (2022) reported that despite the region's natural suitability, productivity remains inconsistent because farmers often lack quality seed, soil amendments, and technical support. Demonstrations conducted by state agriculture departments and KVKs have shown that when farmers adopt improved varieties and recommended practices, yields can increase dramatically (Directorate of Pulses Development, 2024). This indicates that the production gap is more technological than ecological.

Strengths the NEH already possesses

Despite challenges, the NEH region has strong natural and cultural advantages for pulses:

- Traditional mixed cropping systems already incorporate legumes in many communities.
- Many NEH districts achieve pulse yields equal to or above national averages under improved management (*Biam et al.*, 2022).
- Local diets naturally demand pulses, creating a reliable internal market.

These strengths mean that scaling up pulses is not an external imposition, but a natural extension of existing customs and agro-systems.

Major challenges needing attention

1. Soil constraints: Large parts of the NEH suffer from acidic soils, which reduce nutrient availability and pulse performance. Das *et al*., (2021) highlights that liming and conservation agriculture practices are highly effective for improving hill soil conditions.

2. Seed availability: Access to high-yielding, short-duration and disease-resistant varieties remains limited. *Biam et al.,* (2022) noted that farmers often depend on old or untested seed lines due to weak seed supply chains.

3. Shifting cultivation: In many areas, shifting cultivation (jhum) reduces stable land availability. Alternative models such as agroforestry, terracing, and settled conservation agriculture are necessary for expanding pulse acreage (Das *et al*., 2021).

4. Market linkages: Weak storage, processing and aggregation systems reduce farmer incentives. As per the NFSM-Pulses reports (Hazarika *et al.,* 2023), value-chain strengthening is crucial for ensuring better prices.

What works: Practical, evidence-backed interventions

Improved seeds and participatory trials: KVKs across NEH have shown that providing farmers with improved pulse varieties through participatory seed trials leads to higher acceptance and rapid scaling (Directorate of Pulses Development, 2024).

Soil health improvement: Liming acidic soils, incorporating green manures, and using contour trenches can reduce erosion and enhance moisture retention, practices strongly recommended by NEH conservation studies (Das *et al*., 2021).

Better storage and processing: Community-level mini dal mills, solar dryers, and seed storage structures can reduce losses and improve market value.

Connecting pulses to nutrition programs: Linking local pulse production to anganwadi centers, mid-day meals and public procurement can create assured markets while improving nutrition among children and women (Hazarika *et al.,* 2023)

Enhancing farmer income and climate resilience: Pulses are low-water-demand crops, making them ideal for climate-variable hill environments. Integrated pulse–maize or pulse–millet systems can distribute risks and generate stable incomes. Their nitrogen-fixing ability also reduces fertilizer costs, directly benefiting small and marginal farmers (Semwal *et al*., 2023).

Conclusion

A bowl of dal in a NEH household is more than food as it represents tradition, nutrition and resilience. Expanding pulse production in the North-East Hill region is both a scientific necessity and a cultural opportunity. By improving seed systems, soil health, and market access, the region can become a strong pulse-producing hub of India. Strengthening this sector will nourish not just the soil and crops, but also the livelihoods and well-being of millions.

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