



India's Superfoods: How Pulses Are Powering a Health and Climate Revolution

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A humble bowl of dal may hold the secret to ending India's hidden hunger. Every evening, millions of Indian families share meals centered around humble staple pulses like lentils, chickpeas, and pigeon peas and other pulses. Though often seen as ordinary ingredients, these pulses hold extraordinary potential. Rich in nutrients and naturally resilient to harsh climates, they offer a powerful solution to two of India's most pressing challenges: malnutrition and climate stress. Despite decades of progress, over half of Indian women remain anemic, and child stunting persists in many regions. At the same time, the world's demand for sustainable, plant-based proteins is soaring. As the largest producer and consumer of pulses, India is uniquely positioned to lead a global shift toward nutrition that is both healthy and environmentally responsible.

Pulses: People's Protein for a Healthier India

Chickpea (chana), lentil (masoor), and pigeon pea (arhar) are the primary plant protein source for millions. Containing about 20–25% protein by weight, they deliver several times more protein than rice or wheat. A single bowl of cooked dal (about 30 g dry seeds) provides 6–8 g of high-quality plant protein, making it an affordable lifeline for households across India. But pulses offer more than just protein. They are packed with iron (for healthy blood), zinc (for growth and immunity), and folate (vitamin B9 critical for fetal development). Lentils, in particular, are among the richest dietary sources of folate, while chickpeas and pigeon peas supply valuable iron and zinc to communities with limited access to meat or dairy. Pulses also provide complex carbohydrates, dietary fiber, and B-vitamins that sustain energy and support gut health. Equally important is how pulses complement cereals in Indian meals. Rice and wheat are low in lysine but rich in methionine, while pulses are just the opposite. Eating dal with rice or roti creates a more complete protein profile is an example of traditional dietary wisdom validated by modern nutrition science.

Fact Box of important pulses which are protein power of India's pulses:

Pulse	Protein (%)	Quality (Approx.)	Special Feature
Chickpea	20–22	Good digestibility	High lysine, iron-rich
Lentil	23–25	Very good	Exceptional folate content
Pigeon pea	19–21	Good	High yield, drought-tolerant

The Protein Puzzle: Beyond Quantity to Quality

If pulses are so protein-rich, why do deficiencies persist? The issue lies not in how much protein we eat, but in how well our bodies can use it. Pulse proteins face three nutritional challenges:

1. Imbalanced amino acids — low in methionine and tryptophan.

2. Lower digestibility — only about 60–80% of pulse protein is absorbed compared to animal proteins.
3. Antinutrients — compounds like phytates and trypsin inhibitors block nutrient absorption.

Cooking, soaking, sprouting, and fermenting can reduce these effects, but scientists are now breeding pulses with naturally better amino acid balance, fewer antinutrients, and higher digestibility. This is more than a biochemical problem and it is a public health one also. Diets dominated by cereals and limited pulses provide calories but not quality protein, leading to “hidden hunger” deficiencies in protein, iron, and folate that cause fatigue, anemia, and poor growth. Improving the protein quality and micronutrient density of pulses can directly combat this invisible crisis.

Breeding a Better Dal: Science Meets the Thali

Across India, agricultural scientists are developing “next-generation pulses” with higher protein, iron, and zinc. At the Indian Agricultural Research Institute (IARI) in New Delhi, breeders have released varieties such as Pusa Chickpea 10216, a drought-tolerant line developed using marker-assisted breeding, which maintains yield even under stress. Similarly, Super Annigeri-1 resists fusarium wilt and produces consistently high protein yields. Lentil breeders have created “iron lentils” containing up to 70% more iron than standard varieties and are enough to supply half the daily iron requirement per serving. Modern breeding programs use both traditional crosses and molecular tools like QTL mapping and CRISPR gene editing to fine-tune amino acid profiles and reduce anti-nutrients without affecting taste or cooking quality. These advances are transforming dal into a truly “biofortified” food.

From Field to Fork: Processing and Agronomy Boosts

Beyond genetics, agronomy and processing also improve nutrition. Field experiments show that applying iron- and zinc-enriched fertilizers and inoculating soils with beneficial microbes can raise micronutrient levels in pulse seeds. Post-harvest innovation such as roasting, extrusion, and fermentation are further enhanced protein digestibility. For instance, extruded chickpea flour achieves a protein quality score about 10 points higher than boiled flour, meaning our bodies can absorb and use more of its amino acids. These improved flours are now finding their way into snacks, breakfast mixes, and protein supplements, bridging traditional foods with modern convenience.

Pulses for Planetary Health

Improving pulses isn’t only about human nutrition it’s about the planet’s well-being too. Pulses are natural nitrogen fixers, converting atmospheric nitrogen into organic fertilizer through root-dwelling bacteria. This reduces the need for chemical fertilizers, which are energy-intensive to produce and release greenhouse gases when applied. They also have a low water footprint, thriving in semi-arid, rainfed regions where rice or sugarcane cannot. Growing more pulses thus conserves precious water resources. Their deep roots stabilize soil, prevent erosion, and foster biodiversity by hosting pollinators and beneficial insects. In short, when farmers grow pulses, they enrich the soil as much as they nourish the people.

Empowering Farmers: Especially Women

Over 80% of India's pulses are grown by smallholder farmers, frequently on marginal lands. For these farmers, pulses often serve as an insurance crop because they are resilient, require low inputs, and are quick to harvest. Because women play a major role in seeding, harvesting, and processing pulses, better yields directly uplift the livelihoods of rural women. Several self-help groups now train women to create value-added pulse products like roasted snacks and fortified flours. These micro-enterprises not only generate income but also spread awareness about better nutrition. In many villages, planting chickpeas or pigeon peas in kitchen gardens has enabled mothers to provide protein-rich meals to their children in a small quantity but powerful weapon against malnutrition.

Policy Push: India's Pulse Revolution

Government programs like the National Food Security Mission (NFSM) on Pulses, launched in 2007, have revitalized pulse farming by improving seed quality and expanding cultivation. Annual production has climbed to over 28 million tonnes (2024–25), making India nearly self-sufficient. NFSM now promotes biofortified and climate-resilient varieties, aligning food security with nutrition security. Policies are also nudging consumers back toward traditional diets: pulses are added to school lunches, ration-shop distributions, and mid-day meal schemes. Media campaigns portray dal as a modern “superfood,” while urban consumers rediscover lentil soups, hummus, and sprouted salads. The result is a quiet comeback of India's most sustainable protein source.

The Global Context

As the world searches for sustainable alternatives to meat, India's time-tested pulse tradition offers a blueprint. Studies show that replacing animal protein with legumes can cut dietary greenhouse-gas emissions by up to 40%, while providing essential nutrients for a growing population. From Canadian lentil exports to European plant-protein startups, pulses are at the heart of a global food transition and India's experience can guide the world toward affordable, climate-friendly diets.

The Road Ahead: A Bowl That Nourishes All

The future of food security lies not in pills or fortification powders but in improving what people already eat daily. When a bowl of dal becomes richer in protein, iron, and zinc, it quietly transforms millions of lives. By merging traditional knowledge with modern science, India's researchers, farmers, and policymakers are turning humble pulses into superfoods for people and the planet. Every time we choose dal-roti or rajma-chawal over a meat-heavy meal, we nourish ourselves and lighten our ecological footprint.

Truly, “*the pulse of India's future beats in its humble legumes—a testament to how small seeds can yield mighty change*”

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