ICRISAT
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

CGIAR

CGIAR POLICY INNOVATIONS

Policy Brief
July 2026

Beyond Minimum Support Price: What Drives Chickpea Supply Response in India's Major Producing States?

Evidence-based recommendations for achieving self-sufficiency in pulse production

R Paramasivam, Jyosthnaa Padmanabhan, Abhishek Das, Shalander Kumar, Umanath Malaiarasan and Swamikannu Nedumaran

KEY MESSAGES

1. Chickpea area responds significantly to relative prices vis-à-vis competing crops, but the short-run response is inelastic (0.210), indicating that price incentives alone cannot drive rapid area expansion.
2. Chickpea production can be more effectively increased through productivity enhancement than through area expansion. Yield responds positively to price incentives, pointing to gains from improved crop management and input use rather than additional area under cultivation.
3. Policy efforts to expand chickpea area should target rainfed, low-input production zones where the crop holds a genuine comparative advantage.
4. Pre-season Kharif and Rabi rainfall positively influence both area and yield, underscoring chickpea's dependence on rainfed conditions and the urgent need for climate-resilient varieties.
5. Rising minimum temperatures significantly reduce chickpea yield (long-run elasticity of –0.137), signaling a serious climate threat that requires breeding investment in heat-tolerant cultivars.

The Challenge

Pulses anchor India's protein and nutrition security, yet the country is both the world's largest producer and largest importer of pulses. Production has not kept pace with demand: total pulse demand is projected to reach about 32 million t by 2030 and the shortfall is routinely met through imports. This dependence carries significant costs: per-capita pulse consumption has fallen from 22.2 kg a year in 1950–51 to 17.2 kg in 2022–23, close to 80% of households consume less protein than recommended, and a rising pulse import bill widens the trade deficit while exposing consumers to sharp price volatility (Kumar et al. 2025).

Within this basket, chickpea is the crop with the greatest leverage to close the gap. It is India's dominant pulse, cultivated on about 10.1 million ha with production of 11.6 million t, accounting for roughly 70% of the world's chickpea area and 72% of its production. As the principal rabi pulse, it accounts for close to 70% of India's rabi pulse output (NITI Aayog 2025). Yet its performance has been uneven: over the past three decades, chickpea area and yield have expanded in some regions while stalling in others, and the crop is increasingly exposed to rising temperatures. Understanding the factors that influence chickpea area and yield is therefore central to a credible strategy for pulse self-sufficiency.

Over the years, governments have deployed price policies, expanded procurement and most recently, launched a mission-mode program on pulses to bridge yield gaps and bring additional area under chickpea cultivation. The response has been positive but has not been commensurate with the scale of support and price incentives extended.

This brief re-examines the evidence on chickpea supply response. Drawing on three decades of district-level evidence and using a rigorous estimation approach, it establishes which key factors including price, climate, inputs, policy interventions influence chickpea supply and over what time horizon. **The findings provide an evidence base for policymakers to better design and refine interventions aimed at increasing chickpea production.**

The Study

This study estimates how chickpea area and yield respond to price, climate and input signals across **71 major chickpea-growing districts** in five Indian states – Madhya Pradesh, Maharashtra, Rajasthan, Karnataka, and Telangana – over the period from **1990–91 to 2020–21** (Figure 1). Together these states account for about **73% of India's chickpea area.**

The study uses a dynamic panel supply-response model in the Nerlovian tradition, recognizing that farmers adjust land allocation and management practices gradually. Area response is estimated using chickpea's price relative to, its dominant rabi competitors including mustard, sorghum and wheat while yield response is estimated using chickpea's own price. To handle the long panel and persistence in the data, the analysis applies a bias-corrected split-panel jackknife fixed-effects estimator, supported by district-cluster bootstrap confidence intervals and robustness checks using alternative estimators. Short-run and long-run effects are reported separately.

Data on area, yield, prices and climate are drawn from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) District Level Database (http://data.icrisat.org/dld/), with data on state-wise chickpea varietal releases from the All India Coordinated Research Project (AICRP) on Chickpea (2021–22) included as a control variable. The state-level varietal indicator serves as a broad control for technological change rather than as a precise estimate for returns to breeding.

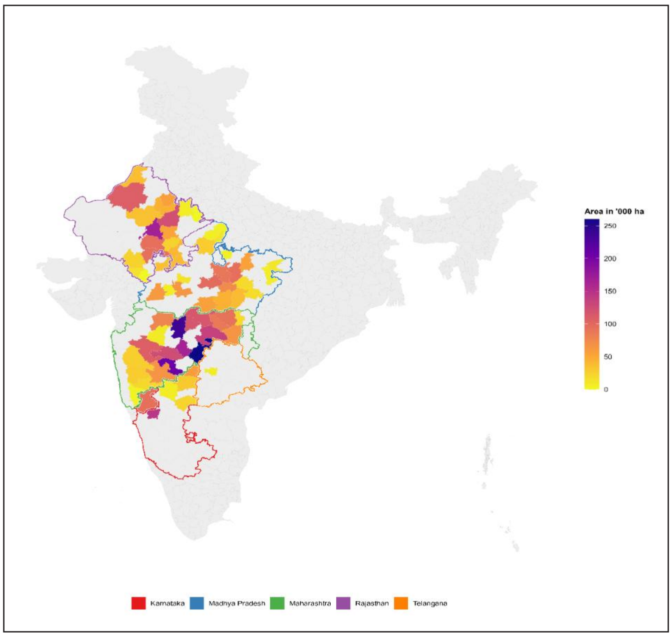

Figure 1: Spatial distribution of the study locations across five major chickpea-producing states in India.

What Evidence Shows

Area is sticky in the short run but is highly elastic in the long run

Chickpea area barely moves with price within a season or year (short-run elasticity ≈ 0.21); farmers close only about 13% of the adjustment gap each year. Over the long run, however, area is strongly responsive to the relative price premium over wheat (elasticity ≈ 1.62). Full adjustment therefore takes roughly seven to eight years of sustained incentive (Table 1).

Yield is price elastic

The own-price yield response is significant and materializes quickly (short-run 0.21, long-run 0.29), indicating that farmers adopt better management practices within about two seasons when price signals are favorable (Table 1; Figure 2).

Irrigation has a paradoxical effect

Expanding the share of irrigated area is associated with a decline in total chickpea area (long-run semi-elasticity ≈ –0.035). As irrigation spreads, chickpea tends to cede land to competing irrigated crops rather than expand (Table 1).

Table 1: Short-run (SR) and long-run (LR) effects on chickpea area and yield with 95% confidence intervals.

Variable	Area			Yield		
	SR	LR	95% CI	SR	LR	95% CI
Relative Price to Wheat, Lagged (Log Ratio)[b]	0.240***	1.873**	[0.68, 4.07]	—	—	—
Relative Price to Mustard (Log Ratio)	0.045	-0.353	[-1.24,2.18]			
Relative Price to Rabi Sorghum (Log Ratio)[c]	-0.155*	-1.211	[-3.19,0.06]			
Own Price, Lagged (Log)[b]	—	—	—	0.197***	0.292***	[0.20, 0.39]
Irrigated Area Share (%)[a]	–0.005***	–0.035*	[–0.09, –0.02]	0.001	0.002	[–0.00, 0.00]
Fertilizer (Log)	0.050	0.391	[-0.07, 1.22]	0.023	0.035	[–0.05, 0.12]
Rabi Rainfall, Current (Log)	0.012	0.094	[–0.03, 0.33]	0.002	0.004	[–0.02, 0.02]
Kharif Rainfall, Current (Log)	0.124***	0.966***	[0.52, 1.93]	0.157***	0.232***	[0.15, 0.33]
Temperature Minimum (°C)[a]	0.007	0.057	[–0.19, 0.40]	–0.093***	–0.137***	[–0.18, –0.10]
Price Volatility[a]	0.161	1.237	[–0.43, 3.59]	0.088	0.130	[–0.11, 0.37]
Persistence		0.870			0.324	
Coefficient of Adjustment		0.130			0.676	

*Notes: Estimates from bias-corrected fixed-effects models on a panel of 71 districts, 1990–2021. SR = short-run (first-year) effect; LR = long-run (fully adjusted) effect = SR/(1 – persistence). 95% CI are district-cluster bootstrap percentile intervals (2,000 replications). ***, **, * denote significance at 1%, 5%, 10% respectively. [a] Level-form regressor, so the coefficient is a semi-elasticity (proportional change per one-unit change – percentage point of irrigated share, per °C, or per unit of volatility); all other variables are elasticities. b Area responds to chickpea's price relative to each competing crop; yield to its own price. c Mustard (north-central belt) and rabi sorghum (Deccan) enter where the crop is grown, districts not growing a competitor are governed by wheat relative price alone.*

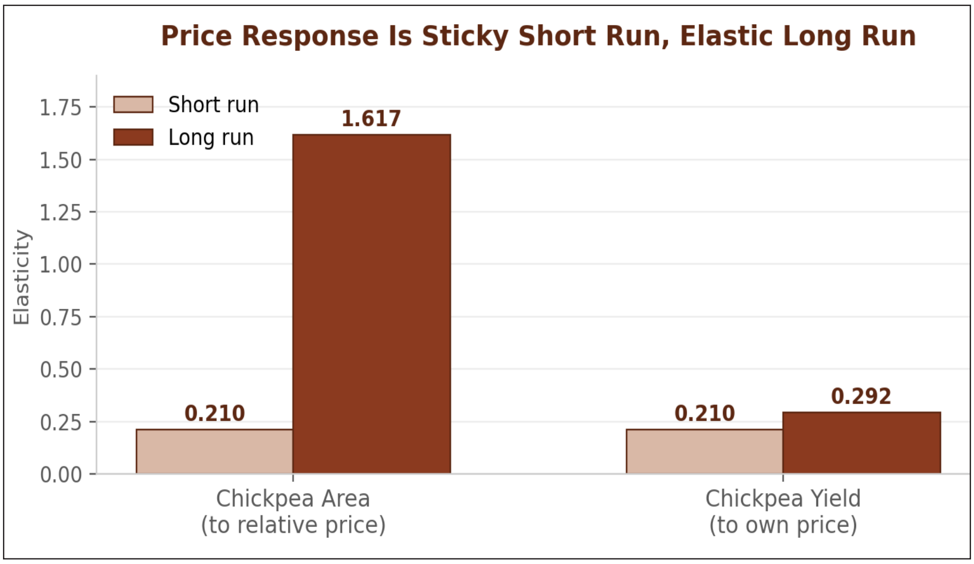

Figure 2: Area and yield elasticity over the time horizon.

Temperature emerges as a key climate constraint

Pre-season (kharif) rainfall increases both chickpea area and yield by helping retain soil moisture for sowing. This finding aligns with field observations showing significant increase in yield with one supplemental irrigation through harvested rainwater in rainfed areas. Once the crop is established, heat poses a significant constraint: every 1°C rise in minimum temperature is associated with a reduction in yield of about 9% in the short run and 14% in the long run (Table 1; Figure 3).

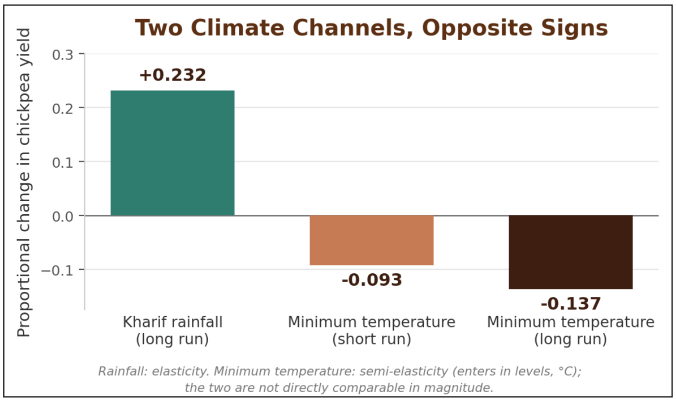

Figure 3: Impact of climate variables on chickpea yield.

Varietal development lags the geography of area expansion

Chickpea area is expanding rapidly in the southern and peninsular India, yet cumulative varietal releases in these emerging production areas remain well below those in the traditional chickpea growing regions: about 15–17 each in Karnataka and Telangana, compared with 80 in Rajasthan and 65 in Madhya Pradesh (AICRP on Chickpea, 2021–22; Figure 4).

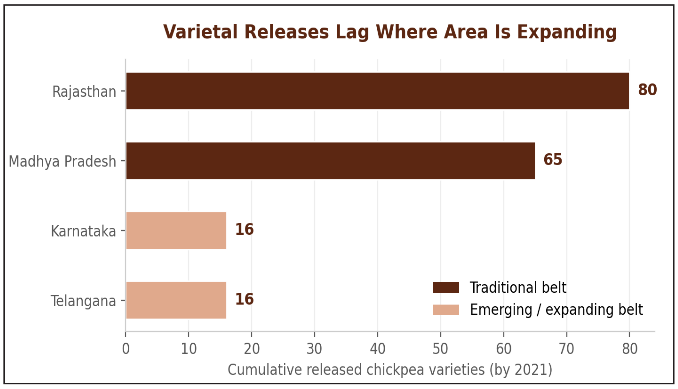

Figure 4: Varietal releases of improved chickpea varieties in the focus states.

Policy Recommendations

Direct Study Recommendations

1. **Sustain relative price incentives over competing crops.** Because area responds strongly to the chickpea–wheat price premium but only over the long run, comparative price incentives must be held steady for roughly seven to eight years to earn farmers' trust and unlock the full acreage response. Price signals should be paired with a redesigned procurement policy that guarantees expanded and timely purchase of chickpea from high-volume production zones through agencies such as the National Agricultural Cooperative Marketing Federation of India (NAFED) and the National Cooperative Consumers' Federation of India (NCCF).
2. **Harness the double dividend of price policy.** Yield responds to price within about two seasons, while area responds over several years. A well-designed price policy can therefore serve a dual purpose – incentivizing better yield-enhancing management in the short run and area expansion in the long run, provided it is complemented by targeted agronomic and extension support.
3. **Capitalize on chickpea's rainfed comparative advantage.** Because irrigation expansion often shifts land away from chickpea, promote the crop in rainfed niches where it has a clear comparative advantage rather than in irrigated zones. In these areas, combine critical life-saving irrigation with scaled-up rainwater conservation measures, and link irrigation infrastructure subsidies to the adoption of these practices.
4. **Target area expansion in low-input zones.** As a nitrogen-fixing legume grown under low-input conditions, chickpea shows a relatively weak response to purchased inputs. Area expansion efforts are therefore likely to yield better returns when directed toward regions with below-normal input use.
5. **Prioritize heat-tolerant R&D and pre-season moisture conservation.** With minimum temperature emerging as a key climate constraint, breeding pipelines should be resourced to accelerate the development of heat-tolerant chickpea varieties, alongside in-situ soil moisture conservation measures to protect the pre-season moisture on which the crop depends at sowing.

6. **Rebalance the varietal-release pipeline toward emerging zones.** Redirect a share of R&D investment to build the varietal portfolio for the southern and peninsular states, particularly Karnataka and Maharashtra, where chickpea area is expanding rapidly but adapted varietal releases remain limited.
7. **Recognize the Dual Purpose Value of Rabi Sorghum:** Because land allocation responds positively to relative returns, chickpea expansion should not inadvertently displace rabi sorghum from areas where it is well adapted to deep residual soil moisture. Recognizing the dual-purpose value of Rabi Sorghum in procurement and other support could help maintain its competitiveness and ensure that dryland intensification is complementary rather than substitutive.

Recommendations from Broader Observations

- **Assess Reforms Costs and Phase them realistically.** Expanding procurement coverage especially in the high-potential regions, redesigning irrigation subsidies, and rebalancing R&D pipelines carry significant budgetary implications. Cost, feasibility and phasing assessments need to be conducted prior to implementation enabling prioritized interventions, including sustained relative price incentives and targeted R&D investment, to be sequenced appropriately.
- **Integrate climate-risk instruments.** Given chickpea's acute sensitivity to heat, expanded and better-calibrated crop insurance coverage, including under the Pradhan Mantri Fasal Bima Yojana (PMFBY) should accompany the production push to protect farmers through the multi-year adjustment period.
- **Build flexibility into program timelines.** Because chickpea area adjusts only over a period of seven to eight years, flagship programs such as the Pradhan Mantri Annadata Aay Sanrakshan Abhiyan (PM-AASHA) and the Mission for Aatmanirbharta in Pulses should provide sufficient continuity and flexibility beyond their initial implementation periods, as the intended area response may take longer to materialize than the conventional program timelines allow.

Alignment With National Goals

- ✓ **Mission for Aatmanirbharta in Pulses:** Supports the goal of pulse self-sufficiency through productivity-led expansion.
- ✓ **National Food Security Mission (NFSM):** Contributes to pulse-specific productivity targets.
- ✓ **PM-AASHA and Price Stabilization Fund:** Supports stronger price incentives and procurement mechanisms to encourage sustained production.
- ✓ **PMFBY:** Strengthens climate-risk mitigation through expanded insurance coverage for chickpea producers.
- ✓ **Sustainable Development Goals (SDGs) 2, 3, and 13:** Contributes to food and nutrition security, improved health outcomes, and climate resilient agriculture.

Suggested Citation

Paramasivam R, Padmanabhan J, Das A, Kumar S, Malaiarasan U, and **Nedumaran S.** (2026). Beyond Minimum Support Price: What Drives Chickpea Supply Response in India's Major Producing States? Policy Brief. Hyderabad, Telangana, India: International Crops Research Institute for the Semi-Arid Tropics.

Acknowledgement

The authors gratefully acknowledge CGIAR Science Policy Innovation, for its funding, support and collaboration. The authors also thank Dr Ramarao of the Central Research Institute for Dryland Agriculture for his critical review and valuable comments, which has helped in enhancing the quality of the policy brief.

Contact

Dr Swamikannu Nedumaran
Principal Scientist, Agricultural Economist, ICRISAT
Swamikannu.Nedumaran@icrisat.org

About Authors

Paramasivam Ramasamy
Scientist, Indian Council of Agricultural Research – Central Institute of Fisheries Education (ICAR-CIFE), Mumbai

Padmanabhan Jyosthnaa
Associate Manager, Transforming Agrifood Systems, ICRISAT, Patancheru, Hyderabad

Das Abhishek
Scientist (Agricultural Economics), Transforming Agrifood Systems, ICRISAT, Patancheru, Hyderabad

Kumar Shalander
Global Theme Leader - Socioeconomics, Inclusion and Impacts, Transforming Agrifood Systems, ICRISAT, Patancheru, Hyderabad

Umanath Malaiarasan
Associate Professor, Madras Institute of Development Studies (MDIS), Chennai

Swamikannu Nedumaran
Principal Scientist (Agricultural Economics), Transforming Agrifood Systems, ICRISAT, Patancheru, Hyderabad

Asia

ICRISAT - India (Headquarters)
Patancheru 502 324, Hyderabad
Telangana, India
Phone: +91 8455683071
Fax: +91 8455683074
Email: icrisat-ind@icrisat.org

ICRISAT - India (Liaison Office)
CG Centers Block
NASC ComplexDev Prakash Shastri Marg, New Delhi 110012, India
Phone: +91-11-25840294
Fax: +91 1125841294
Email: icrisat-ind@icrisat.org

West and Central Africa

ICRISAT - Mali
(Regional hub WCA)
BP 320 Bamako, Mali
Phone: +223 20 709200
Fax: 223 20 709201
Email: icrisat-mli@icrisat.org

ICRISAT - Niger
BP 12404
Niamey, Niger
Phone: +(227) 20722725, 20722626
Fax: +227 20734329
Email: icrisat-ner@icrisat.org

ICRISAT - Nigeria
PMB 3491
Sabo Bakin Zuwo Road
Tarauni, Kano, Nigeria
Phone: +234 7034889836
Email: icrisat-nga@icrisat.org

ICRISAT - Senegal
c/o Africa Rice
Mamelles Aviation, Villa 18
BP 24365 Dakar, Senegal
Phone: +221 338600706
Email: icrisat-sen@icrisat.org

Eastern and Southern Africa

ICRISAT - Kenya
(Regional hub ESA)
PO Box: 39063, Nairobi, Kenya
Phone: +254 20 7224550
Fax: +254 20 7224001
Email: icrisat-ken@icrisat.org

ICRISAT - Ethiopia
C/o ILRI Campus
PO Box 5689, Addis Ababa, Ethiopia
Phone: +251-11 617 2541
Fax: +251-11 646 1252, +251 11 646 4645
Email: icrisat-eth@icrisat.org

ICRISAT - Malawi
Chitedze Agricultural Research Station
PO Box 1096, Lilongwe, Malawi
Phone: +265 1 707 297/071/067/057
Fax: +265 1 707 298
Email: icrisat-mwi@icrisat.org

ICRISAT - Zimbabwe
Matopos Research Station
PO Box 776, Bulawayo, Zimbabwe
Phone: +263 292 809314/315
Fax: +263 383 307
Email: icrisat-zwe@icrisat.org

ICRISAT - Mozambique
(c/o IIAM) nr 2698 1st Floor, AV. FPLM
Maputo, Mozambique
Phone: +258 1 461657
Fax: +258 1 461581
Email: icrisat-moz@icrisat.org

ICRISAT - Tanzania
Plot 25, Mikocheni Light Industrial Area
Mwenge Coca-Cola Road, Mikocheni B,
PO Box 34441, Dar es Salaam, Tanzania
Email: icrisat-tza@icrisat.org