REPORT

# Agriculture in Telangana

## Status, Trends and Policy Recommendations

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# ABBREVIATIONS

| Abbreviation | Full Form |
|---|---|
| ASER | Annual Status of Education Report |
| BAU | Business As Usual |
| bcm | Billion Cubic Metres |
| BNF | Biological Nitrogen Fixation |
| CACP | Commission for Agricultural Costs and Prices |
| CAGR | Compound Annual Growth Rate |
| CGWB | Central Ground Water Board |
| CIPI | Composite Input Price Index |
| CSA | Centre for Sustainable Agriculture |
| DBT | Direct Benefit Transfer |
| DDS | Deccan Development Society |
| DES | Directorate of Economics and Statistics |
| FPO | Farmer Producer Organisation |
| FYM | Farm Yard Manure |
| GCA | Gross Cropped Area |
| GDP | Gross Domestic Product |
| GSDP | Gross State Domestic Product |
| GW | Groundwater |
| ha | Hectare |
| HCES | Household Consumption Expenditure Survey |
| ICAR | Indian Council of Agricultural Research |
| ICAR-IIPR | Indian Council of Agricultural Research – Indian Institute of Pulses Research |
| ICAR-NIAP | Indian Council of Agricultural Research – National Institute of Agricultural Economics and Policy Research |
| ICDS | Integrated Child Development Services |
| ICMR | Indian Council of Medical Research |
| K | Potash (Potassium) — as used in N:P:K fertiliser ratios |
| KLIP | Kaleshwaram Lift Irrigation Project |
| LMT | Lakh Metric Tonnes |
| MAFW | Ministry of Agriculture and Farmers Welfare |
| mbgl | Metres Below Ground Level |
| MDD | Minimum Dietary Diversity |
| MDM | Mid-Day Meal (scheme) |
| MMT | Million Metric Tonnes |

| Abbreviation | Full Form |
|---|---|
| MPCE | Monthly Per Capita Consumption Expenditure |
| MSPMT | Minimum Support PriceMetric Tonnes |
| N | Nitrogen — as used in N:P:K fertiliser ratios |
| NABARD | National Bank for Agriculture and Rural Development |
| NAFIS | NABARD All India Rural Financial Inclusion Survey |
| NCD | Non-Communicable Disease |
| NCRB | National Crime Records Bureau |
| NSA | Net Sown Area |
| NGRI | National Geophysical Research Institute |
| NSS | National Sample Survey |
| P | Phosphorus — as used in N:P:K fertiliser ratios |
| PACS | Primary Agricultural Credit Societies |
| PC | Pay Commission |
| PDS | Public Distribution System |
| PJTSAU | Professor Jayashankar Telangana State Agricultural University |
| PLFS | Periodic Labour Force Survey |
| PM-KISAN | Pradhan Mantri Kisan Samman Nidhi |
| PMFBY | Pradhan Mantri Fasal Bima Yojana |
| PPQS | Directorate of Plant Protection, Quarantine and Storage |
| Qtl | Quintal (unit of weight = 100 kg) |
| RSV | Rythu Swaraj Vedika |
| SOC | Soil Organic Carbon |
| TGAFWC | Telangana Agriculture and Farmers Welfare Commission |
| TISS | Tata Institute of Social Sciences |
| tmc ft | Thousand Million Cubic Feet |

## GLOSSARY OF TECHNICAL TERMS

**Anemia:** A condition in which the blood has insufficient healthy red blood cells or hemoglobin to carry adequate oxygen to body tissues. In children, it is often caused by iron deficiency and is associated with poor dietary diversity and malnutrition.

**Aquifer:** An underground layer of water-bearing permeable rock, sediment, or soil from which groundwater can be extracted using wells or borewells.

**Biological Nitrogen Fixation (BNF):** The natural process by which certain bacteria living in the root nodules of leguminous plants (such as pulses/lentils) convert atmospheric nitrogen gas ($N_2$) into ammonia, a form usable by plants. This reduces the need for synthetic nitrogen fertilizers and enriches soil fertility. Pulses can fix between 40–60 kg of nitrogen per hectare.

**Business As Usual (BAU):** A projection scenario that assumes the continuation of current policies, practices, and structural factors without major interventions.

**Canal irrigation:** A traditional surface irrigation method using a network of man-made channels to distribute water from rivers, reservoirs, or barrages to agricultural fields.

**Chalka-type soils:** Shallow, low-fertility soils found predominantly in drought-prone districts of Telangana such as Mahabubnagar, constituting approximately 70% of soils in these areas. They are characterised by poor water retention capacity, limiting their agricultural productivity.

**Composite Input Price Index (CIPI):** An index that tracks changes in the prices of agricultural inputs — including seeds, fertilizers, pesticides, irrigation, labour, and machinery — over time. Used to measure input cost inflation faced by farmers.

**Cover cropping:** The practice of growing specific plants (often legumes or grasses) during the off-season or between main crop cycles primarily to protect and enrich the soil, prevent erosion, suppress weeds, and support beneficial soil microorganisms.

**Crop Diversity Index:** A numerical measure (ranging from 0 to 1) of the variety of crops cultivated in a given area. A value of 1 indicates maximum diversity and a value of 0 indicates complete monoculture.

**Desertification and land degradation:** The process by which productive land progressively loses its fertility and biological productivity, becoming increasingly arid and barren. Primary causes include water erosion, removal of vegetation cover, and unsustainable agricultural practices.

**Double burden of nutrition:** The coexistence, within the same population and often the same households, of undernutrition (stunting, wasting, anemia) alongside overnutrition (obesity, hypertension, non-communicable diseases).

**Dynamic groundwater resources:** The portion of groundwater that is replenished annually through rainfall infiltration and other natural recharge processes, as distinguished from static reserves stored over geological timescales. Sustainable extraction should not exceed dynamic resources.

**El Niño:** A periodic climate pattern characterised by warming of Pacific Ocean surface temperatures, which disrupts normal monsoon patterns in South Asia. El Niño years typically bring below-normal or delayed monsoon rainfall to India, increasing drought risk.

**Feminisation of agricultural labour:** The increasing proportion of women in the agricultural workforce, typically associated with male out-migration to urban areas.

**Fertiliser use efficiency:** The proportion of applied fertilizer nutrients actually taken up by the crop, expressed as a percentage.

**Fungicide:** A type of pesticide used to kill or inhibit fungi and fungal spores that cause plant diseases.

**Green manuring:** The practice of incorporating green plant material (especially nitrogen-fixing legumes) directly into the soil while still fresh, to improve soil organic matter, restore nutrients, and enhance microbial activity.

**Gross Cropped Area (GCA):** The total area sown with crops in a given agricultural year, counting each crop cycle separately. If a parcel of land is cultivated twice (double-cropped), it is counted twice. Distinct from Net Sown Area.

**Groundwater recharge:** The natural process by which surface water from rainfall percolates through soil and rock layers to replenish underground aquifers.

**Hard rock geology:** A subsurface geological formation composed predominantly of crystalline rocks such as granite and basalt. These rocks have very low permeability, severely restricting the infiltration of rainwater into the ground and limiting groundwater recharge capacity.

**Herbicide:** A type of pesticide used to control or eliminate unwanted plants (weeds) in agricultural fields.

**Insecticide:** A type of pesticide specifically used to kill or repel insects that damage crops.

**Kharif / Vanakalam season:** The monsoon (summer) cropping season in India, typically spanning June to September/October and dependent primarily on monsoon rainfall. Called Vanakalam in Telugu.

**Landholding fragmentation:** The progressive subdivision of agricultural land into smaller plots across generations, typically through inheritance laws.

**Lift irrigation:** A method of irrigation in which water is mechanically pumped from a lower source (river, reservoir, or canal) to agricultural land situated at a higher elevation.

**Logistic growth curve:** A mathematical model used for projecting variables that grow rapidly at first but slow down as they approach a theoretical maximum (ceiling) value.

**Micronutrients:** Nutrients required in small quantities by both plants and humans for healthy growth and function, including iron, zinc, boron, manganese, and others.

**Minimum Dietary Diversity (MDD):** A dietary indicator defined as the consumption of five or more out of eight recommended food groups within a 24-hour period.

**Minimum Support Price (MSP):** A government-guaranteed floor price at which government agencies agree to purchase specific crops directly from farmers, regardless of market prices. Computed on the basis of the C2+50% formula (comprehensive cost of production plus 50% profit margin).

**Monoculture / Monocropping:** The agricultural practice of cultivating a single crop species on the same land continuously across seasons. While simplifying operations, it depletes specific soil nutrients, promotes pest and disease resistance, and reduces ecological resilience.

**Mulching:** The practice of covering soil with a layer of organic (straw, leaves, crop residue) or inorganic material to conserve soil moisture, moderate soil temperature, prevent erosion, suppress weed growth, and improve soil biological activity.

**Net Sown Area:** The actual physical area of land used to grow crops in an agricultural year, counted only once regardless of how many crops are grown on it.

**Nitrogen cycle:** The continuous biogeochemical process by which nitrogen is converted between its various chemical forms — atmospheric nitrogen gas, ammonia, nitrates, and organic compounds — as it cycles through the atmosphere, soil, water, and living organisms.

**Nitrous oxide ($N_2O$):** A potent greenhouse gas (approximately 265 times more warming than $CO_2$ over 100 years) released primarily from agricultural soils.

**Non-Communicable Diseases (NCDs):** Chronic health conditions not caused by infectious agents and not transmissible between people, including obesity, hypertension, type 2 diabetes, and cardiovascular disease.

**N:P:K ratio:** The ratio of Nitrogen (N), Phosphorus (P), and Potassium (K) in fertilizer applications, used to assess the balance of nutrients supplied to crops.

**Pesticide treadmill:** A self-reinforcing cycle in which increasing pesticide use leads to the development of resistant pest strains, necessitating higher dosages and more potent chemicals to achieve the same level of pest control.

**Proletarianization:** The socioeconomic process by which small and marginal farmers become increasingly reliant on wage labour (agricultural and non-agricultural) for their livelihoods, effectively transitioning from independent cultivators to a rural working class.

**Rabi / Yasangi season:** The winter (post-monsoon) cropping season in India, typically spanning October/November to March/April and dependent primarily on irrigation. Yasangi in Telugu.

**Red zone (groundwater):** An official classification denoting areas where groundwater levels have fallen more than 20 metres below ground level, indicating critical over-exploitation.

**Regenerative agriculture:** A farming philosophy and set of practices aimed at restoring and continuously improving ecosystem health — including soil fertility, water cycles, biodiversity, and carbon sequestration — while sustaining or improving crop productivity.

**Salinization:** The accumulation of soluble salts (e.g., sodium chloride, sulphates) in the upper soil layers to concentrations harmful to crop growth. Caused primarily by excessive irrigation combined with poor drainage, leading to evaporation of water and deposition of salts in the root zone.

**Soil compaction:** The compression of soil particles that reduces pore space between them, limiting water infiltration, root penetration, and air circulation. Caused primarily by repeated heavy machinery use and the puddling practice in paddy cultivation.

**Soil Organic Carbon (SOC):** The carbon stored in soil organic matter (decomposed plant and animal material). A foundational indicator of soil health: higher SOC indicates better water retention, nutrient availability, microbial activity, and soil structure.

**Stunting:** A form of chronic undernutrition in children under five, defined as height-for-age more than two standard deviations below the WHO Child Growth Standards median.

**Three Horizons framework:** A systems thinking and scenario planning methodology that maps three overlapping time horizons: Horizon 1 (the current dominant system), Horizon 2 (pathways towards transition), and Horizon 3 (long-term ideal vision).

**Underweight:** A nutritional status in children under five where weight-for-age falls more than two standard deviations below the WHO standard, showing chronic and acute undernutrition.

**Wasting:** Acute malnutrition in children under five, measured as weight-for-height more than two standard deviations below the WHO standard. Reflects a recent and severe episode of insufficient food intake or acute illness.

REPORT

# Agriculture in Telangana

## Status, Trends and Policy Recommendations

Prepared for the ***'Telangana Agriculture Futures Workshop (2034 & 2047): Achieving Telangana Rising 2047 through Reality-Anchored Pathways'***

**Workshop Date:** 27th January 2026 | Time: 9:30 AM – 5:30 PM

**Venue:** Conference Hall, Burgula Rama Krishna Rao Bhavan, Hyderabad

**Organizers:** Telangana Agriculture and Farmers Welfare Commission; Centre for Sustainable Agriculture (CSA); Deccan Development Society (DDS); University of Hyderabad

**Report Authors:** Adrija Chaudhuri, Project Manager, CSA | Shloka Uchil, Project Coordinator, CSA | Sagar Kaware, Research Associate, CSA | Dr. G.V. Ramanjaneyulu, Executive Director, CSA | Dr. Divya Veluguri | Executive Director, DDS

**Report Designer:** Hemendra Malviya

**Sketch Artist:** Srinivas Mangipudi

## EXECUTIVE SUMMARY

Telangana's agricultural sector faces a critical convergence of challenges. While agriculture employs 47.3% of the workforce and contributes 17% to state GDP (₹14.64 lakh crore)[1], farmers confront mounting pressures from groundwater depletion, extreme land fragmentation, and India's highest rural indebtedness at 92%[2]. With 70.60 lakh operational holdings averaging just 0.89 hectares and 91.4% classified as small and marginal, the sector operates under severe structural constraints[3].

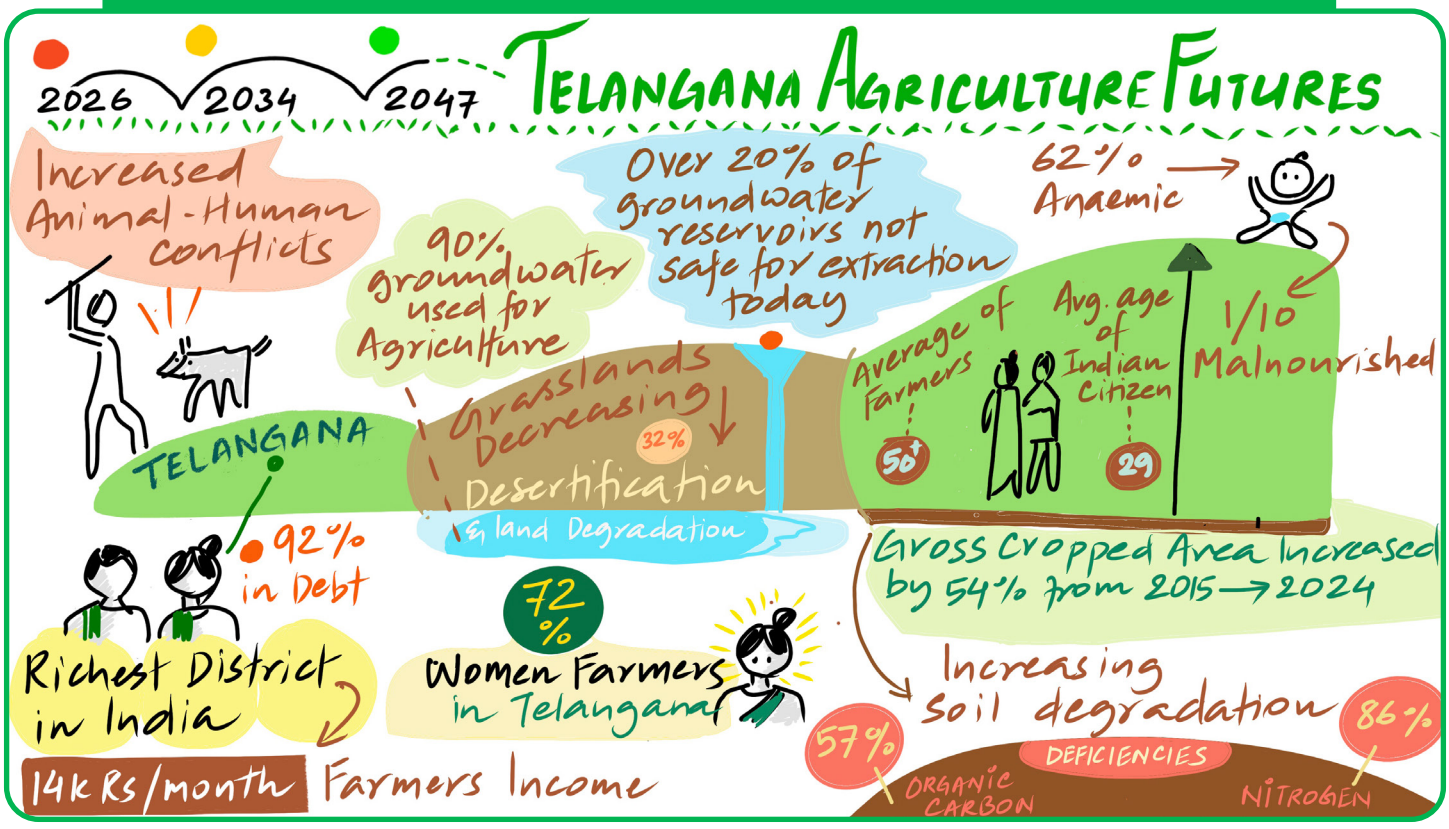
At the same time, current agricultural practices are placing immense pressure on the natural resources of the state. Soils are degrading at a worrying rate and losing their fertility rapidly. Groundwater stress affects 500+ villages, with critical depletion zones expanding 36% annually despite above-normal rainfall[4]. Child malnutrition worsened between 2015-16 and 2019-21, with stunting at 28% and anemia affecting 61% of children[5]. The income disparity between farmers (₹13,874 monthly) and government employees (₹36,020 monthly) reflects deep structural inequities[6]. Business-as-usual projections indicate that by 2047, average landholdings could shrink to 0.43 hectares and incomes from farming could stagnate in real terms, while resource extraction climbs and malnutrition potentially doubles.

The **Telangana Agriculture Futures Workshop** brought together government officials, farmer organizations, civil society, research institutions, and funders to chart pathways toward regenerative agricultural transition using the Three Horizons framework and scenario planning, balancing productivity, farmer welfare, environmental sustainability, and nutrition security within the Telangana Rising 2047 framework. The insights and policy recommendations from the consultation are summarised towards the end of this report.

1 Telangana Socio Economic Outlook 2024, Planning Dept., Govt. of Telangana
2 NABARD All India Rural Financial Inclusion Survey 2021-22 (NAFIS 2.0)
3 Telangana Socio Economic Outlook 2024
4 Average groundwater table up in Telangana', May 2025, Serish Nanisetti, The Hindu (https://www.thehindu.com/news/national/telangana/average-groundwater-table-up-in-telangana-but-red-zone-of-overexploited-water-basin-increases-by-36/article69556772.ece)
5 Telangana State At a Glance 2024
6 NAFIS 2.0; '8th Pay Commission: A Guide To Expected Salary Hikes', Jan 30 2025, NDTV (https://www.ndtv.com/india-news/8th-pay-commission-what-salary-hike-central-staff-can-expect-in-level-1-10-7594289)

PART 1

# Agricultural Status and Trends

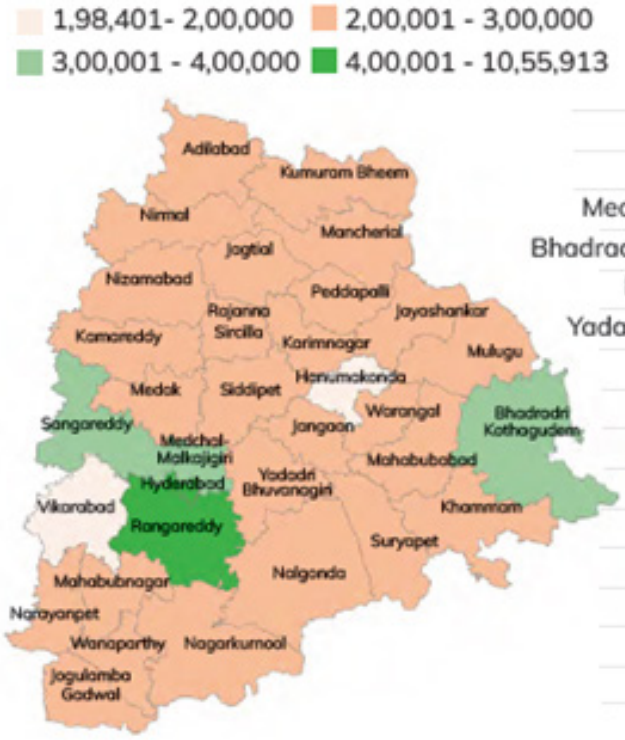


# 1.1 INCOMES AND LIVELIHOODS

- **Demographic Characteristics of Farmers** - Telangana's agricultural sector employs approximately 47% of the workforce (around 1.5 crore people[7]), with small and marginal farmers constituting 87% of farming households[8]. As per the Periodic Labour Force Survey 2025 (PLFS 2025), 68.87% of rural women are involved in agriculture activities. As in other states of India, the average age of farmers in Telangana is increasing, while the proportion of youth entering agriculture continues to decline. According to the ASER survey 2017, only 1.2% of youth are interested in agriculture as a profession[9]. The Agriculture Census of 2015-16 mentions that the average age of farmers is 51 at the national level, while the average age of an Indian citizen is 29. This clearly indicates an ageing farmer population.

- **Urban-Rural Income Gap** - Agriculture contributes significantly (17%) to the state's gross domestic product (GSDP) of ₹14.64 lakh crore (2023-24)[10], despite the state's rapid industrialization centered around Hyderabad and Rangareddy districts, which account for 40% of GSDP. This skewed economic development is reflected through the disparity in annual per capita income between districts: ranging from Rs. 10,55,913 in Rangareddy to Rs. 1,98,000 in Vikarabad, with the state average at Rs.3,46,457.This disparity in incomes is reflected in consumption expenditure as well. The Survey on Household Consumption Expenditure (HCES)-2023-24 shows that the average monthly per capita consumption expenditure (MPCE) in rural Telangana is ₹5,435 as against ₹8,978 average MPCE of urban Telangana, a significant difference of 65%.

**Figure 1.1.1: District wise Per Capita Income at Current Prices for the Year 2023-24 (₹)**




| District | PCI | Rank |
|---|---|---|
| Rangareddy | 10,55,913 | 1 |
| Hyderabad | 5,54,105 | 2 |
| Sangareddy | 3,45,478 | 3 |
| Medchal-Malkajgiri | 3,43,130 | 4 |
| Bhadradri Kothagudem | 3,21,281 | 5 |
| Mahabubnagar | 2,93,823 | 6 |
| Yadadri Bhuvanagiri | 2,88,599 | 7 |
| Peddapalli | 2,84,661 | 8 |
| Medak | 2,83,567 | 9 |
| Siddipet | 2,78,352 | 10 |
| Nalgonda | 2,76,273 | 11 |
| Jayashankar | 2,57,851 | 12 |
| Karimnagar | 2,50,243 | 13 |
| Khammam | 2,49,517 | 14 |
| Mulugu | 2,49,338 | 15 |
| Suryapet | 2,48,429 | 16 |
| Warangal | 2,44,278 | 17 |

| District | PCI | Rank |
|---|---|---|
| Nirmal | 2,34,640 | 18 |
| Jangaon | 2,33,215 | 19 |
| Nagarkurnool | 2,29,649 | 20 |
| Mancherial | 2,27,716 | 21 |
| Wanaparthy | 2,27,422 | 22 |
| Nizamabad | 2,23,282 | 23 |
| Adilabad | 2,22,233 | 24 |
| Kumuram Bheem | 2,21,456 | 25 |
| Jogulamba Gadwal | 2,14,861 | 26 |
| Kamareddy | 2,14,230 | 27 |
| Rajanna Sircilla | 2,13,725 | 28 |
| Mahabubabad | 2,12,232 | 29 |
| Narayanpet | 2,07,784 | 30 |
| Jagtial | 2,05,273 | 31 |
| Hanumakonda | 1,99,490 | 32 |
| Vikarabad | 1,98,401 | 33 |

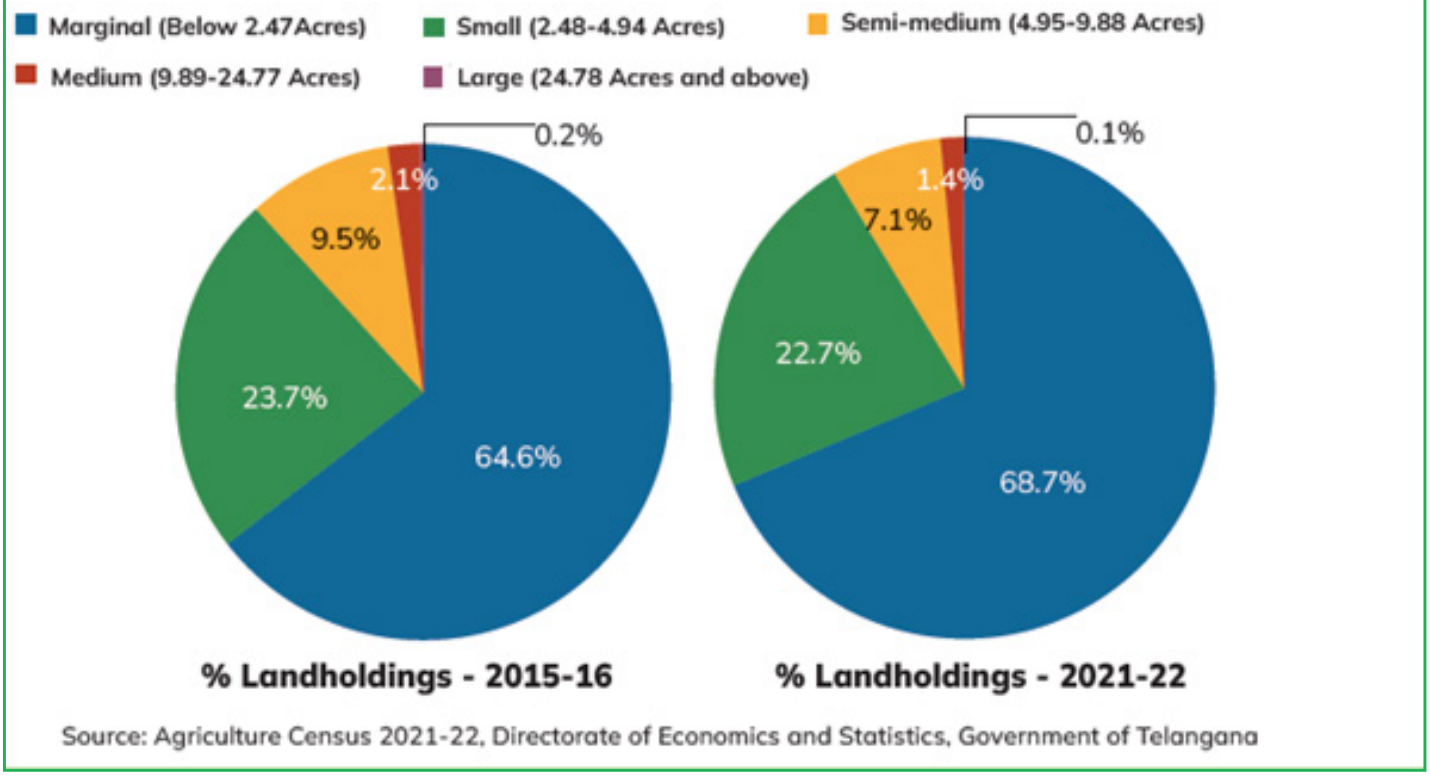
Source: Directorate of Economics and Statistics, Government of Telangana

7 Telangana Socio Economic Outlook 2024, Planning Dept., Govt. of Telangana;
Agri at the Core', Feb 2025, Sribala Vadlapatla, Times of India; https://timesofindia.indiatimes.com/city/hyderabad/agri-at-the-core-how-t-balances-tradition-with-growth/articleshow/118338496.cms
8 NSO (2021), Situation Assessment of Agricultural Households and Landholdings of Households in Rural India, NSS 77th Round, Ministry of Statistics and Programme Implementation, Government of India
9 'Farmers ageing, new generation disinterested: Who will grow our food?', July 2019, Down to Earth https://www.downtoearth.org.in/agriculture/farmers-ageing-new-generation-disinterested-who-will-grow-our-food--65800
10 Telangana Socio Economic Outlook 2025, Planning Dept., Govt. of Telangana, p.14

- **Agrarian Crisis and Landholding -** The widening rural-urban gap is due to the mounting economic pressures faced by the rural and agricultural workforce. While the service sector dominates state GDP at 66%, rural areas remain overwhelmingly dependent on agriculture and allied activities[11].

  Average farm sizes continue to decline, with operational holdings falling from 1.12 ha. in 2010-11[12] to 1 ha. in 2015-16 and to 0.89 ha. in 2021-22. Land subdivision is intensifying across generations faster than the rate of livelihood diversification, making the average farm size unviable. 91.4% of all holdings (as of 2021-22) are small and marginal, up from 88.3% in 2015-16[13]. Small and marginal farmers make up 86.7% of rural households in Telangana. This fragmentation compounds vulnerability to market shocks, climate variability, and input price fluctuations.

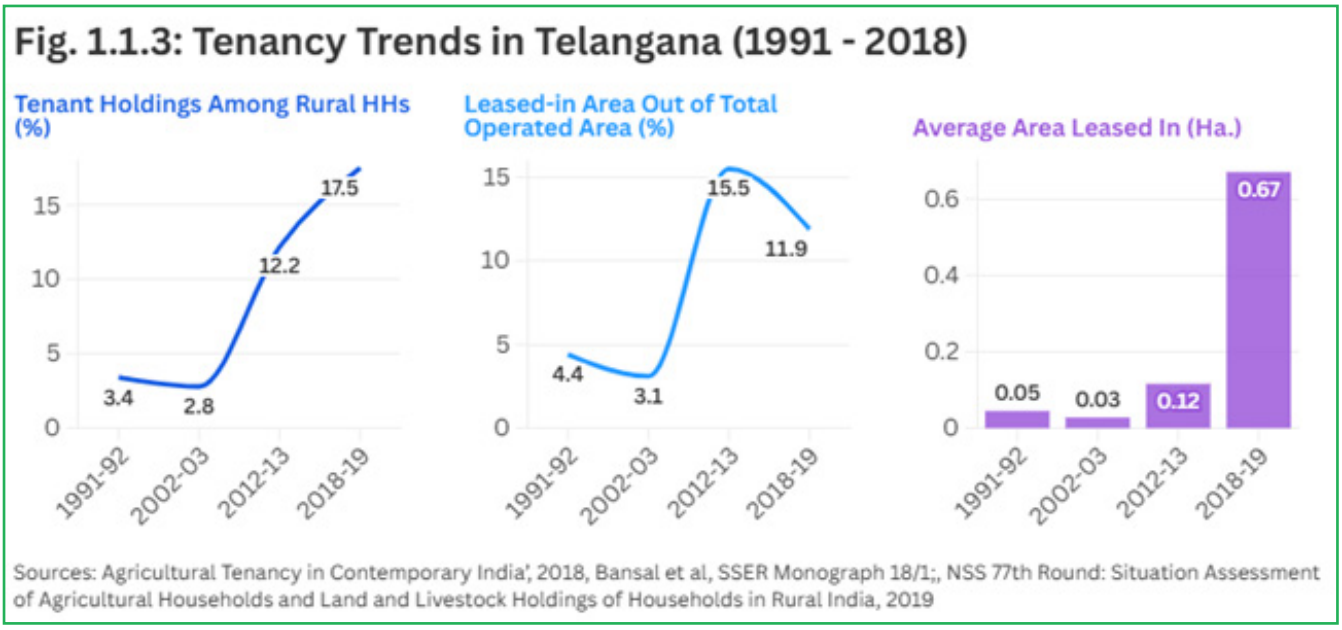
**Figure 1.1.2: Land Holding Size Comparison Between 2015-16 and 2021-22 for Telangana**



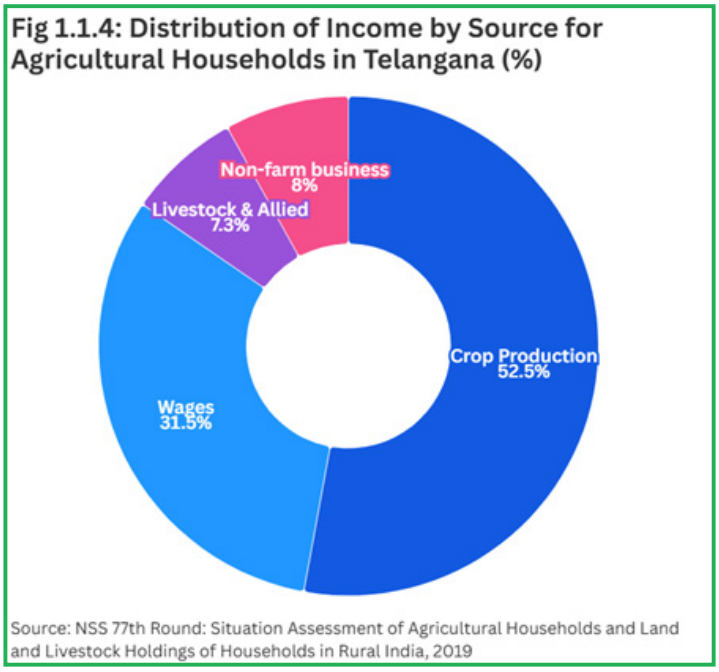

Source: Agriculture Census 2021-22, Directorate of Economics and Statistics, Government of Telangana

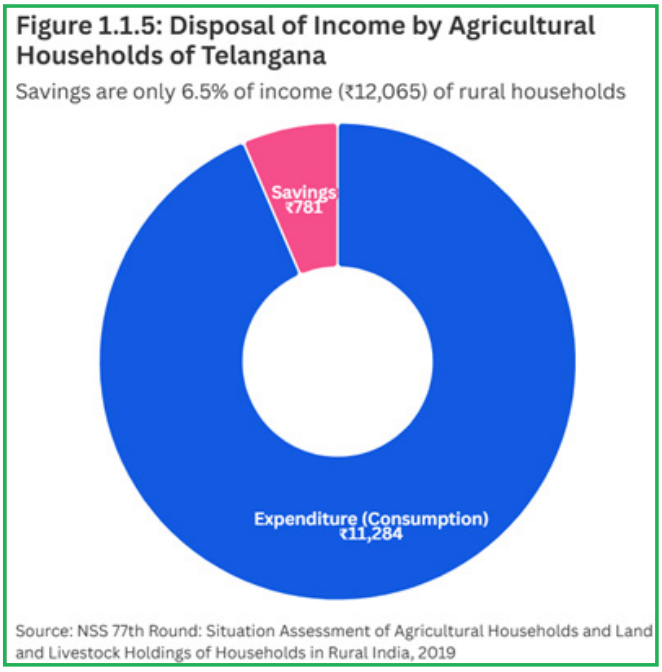
- **Tenancy** - According to the NSS data, the extent of tenancy is 17.5% in Telangana, reflecting a steadily increasing trend over the past two decades. As of 2018-19, 11.9% of total operational holding area is being leased in, while 12.7% of rural households in Telangana report leasing in of land[14]. The true extent of tenancy, however, can be much higher due to the informality of tenancy contracts. A survey conducted by the NGO Rythu Swaraj Vedika (RSV) found that 36% of farmers were leasing in land for cultivation[15]. The average land leased-in in Telangana ranges from 0.67 ha. (NSS), to 1.4 ha (CSA field survey) to 2 ha. (RSV report). Landless tenant farmers lack access to government support schemes such as the Rythu Bharosa, credit or insurance[16]. This especially impacts tenant farmers as they bear higher paid out costs (including lease) than owner cultivators and are more likely to be from marginalised socio-economic groups.

11 Telangana Socio Economic Outlook 2025, p. 42
12 Agricultural Statistics at a Glance Telangana 2015-16, Directorate of Economics and Statistics, Government of Telangana, p.2
13 Telangana Socio Economic Outlook 2024, p. 64
14 NSS 77th Round, p. 115, 121.
15 1 out of 3 farmers are tenants in Telangana; are excluded from any government support; Dec 2022, Down to Earth
16 'Agricultural Tenancy in Contemporary India', 2018, Bansal et al, SSER Monograph 18/1




- **Farmer Income and Distribution** - Average monthly income for rural households in Telangana as of 2021-22 stands at ₹12,065, slightly lower than the national average of ₹12,698. For agricultural households, average monthly income is ₹13,874, slightly higher than the national average of ₹13,661. However, a monthly expenditure of ₹11,284 leaves only ₹781 in savings for most rural households[17]. The distribution of income from different sources has changed over time, with the proportion of crop income decreasing while the contribution of wage income increases, in line with national trends[18]. Crop production income has not only declined as a share of total income, but also in real terms, pointing to the increasing proletarianization of small and marginal farmers[19]. For comparison, the salary of a government employee at the lowest pay grade is ₹36,020/ month (according to 7th Pay Commission) and is predicted to increase to ₹51,480 in the 8th Pay Commission. This leaves a monthly parity gap of ₹22,146, implying that farmers earn only 38% of the salary of a government employee.



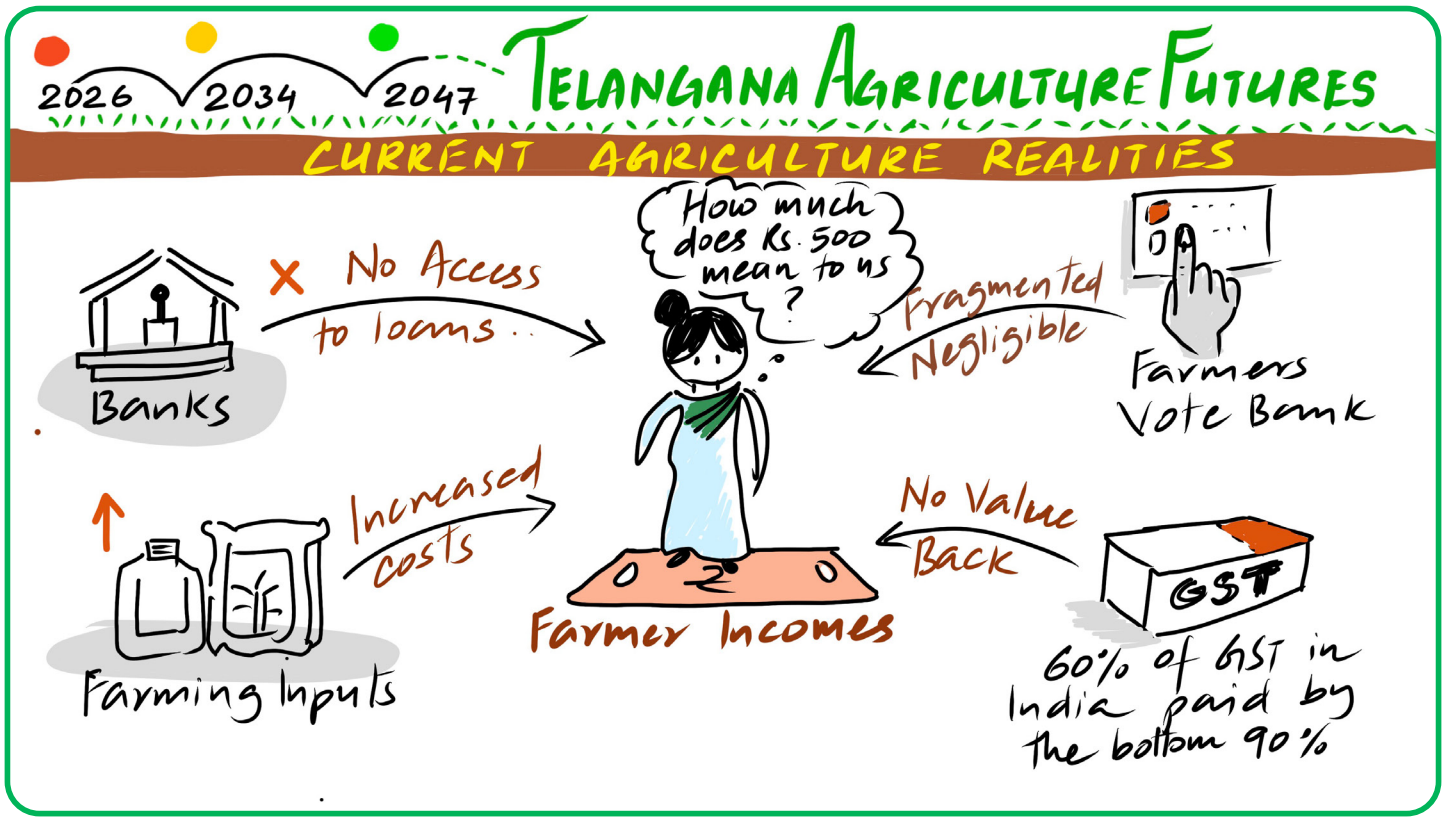




17 NABARD All India Rural Financial Inclusion Survey 2021-22 (NAFIS 2.0)
18 NSS 77th Round
19 Situation Assessment Survey of Agricultural Households 2019: A Statistical Note; Aparajita Bakshi, Review of Agrarian Studies, Vol. 11, No. 2, 2021, https://doi.org/10.25003/RAS.11.02.0009

## Box 1: Income Support through Rythu Bharosa

Rythu Bharosa (earlier Rythu Bandhu) is Telangana's flagship income support scheme for farmers, which also served as the model for PM-KISAN[20]. While PM-KISAN provides a flat amount to each eligible farmer per year (Rs. 6,000), the Rythu Bharosa scheme provides Rs. 5,000 (now 6,000) per acre and per season (biannually) to all eligible farmers. This amounts to a substantial payment of Rs. 12,000 per acre every year [21].

The timing of the disbursement (pre-sowing) has also helped farmers reduce dependence on moneylenders and usurious credit for capital to buy inputs. However, the scheme also has major flaws: its lack of an upper ceiling means that larger farmers receive proportionally higher transfers, implying that the majority of Rythu Bharosa funds (Rs. 18,000 crore allocated in 2025-26) goes to medium and large farmers, who may need it less[22]. The scheme also completely excludes tenant farmers, who cultivate an estimated 40% of Telangana's agricultural land[23]. Tenant farmers are often excluded from formal credit as well, making their exclusion from Rythu Bharosa all the more crushing. According to a TISS study, 75% of farmer suicides in Telangana were tenant cultivators excluded from the scheme[24]. Thus, while Rythu Bharosa presents a promising model of income security for farmers, its structural bias towards large and landowning farmers needs to be corrected to truly benefit small, marginal, and tenant farmers.



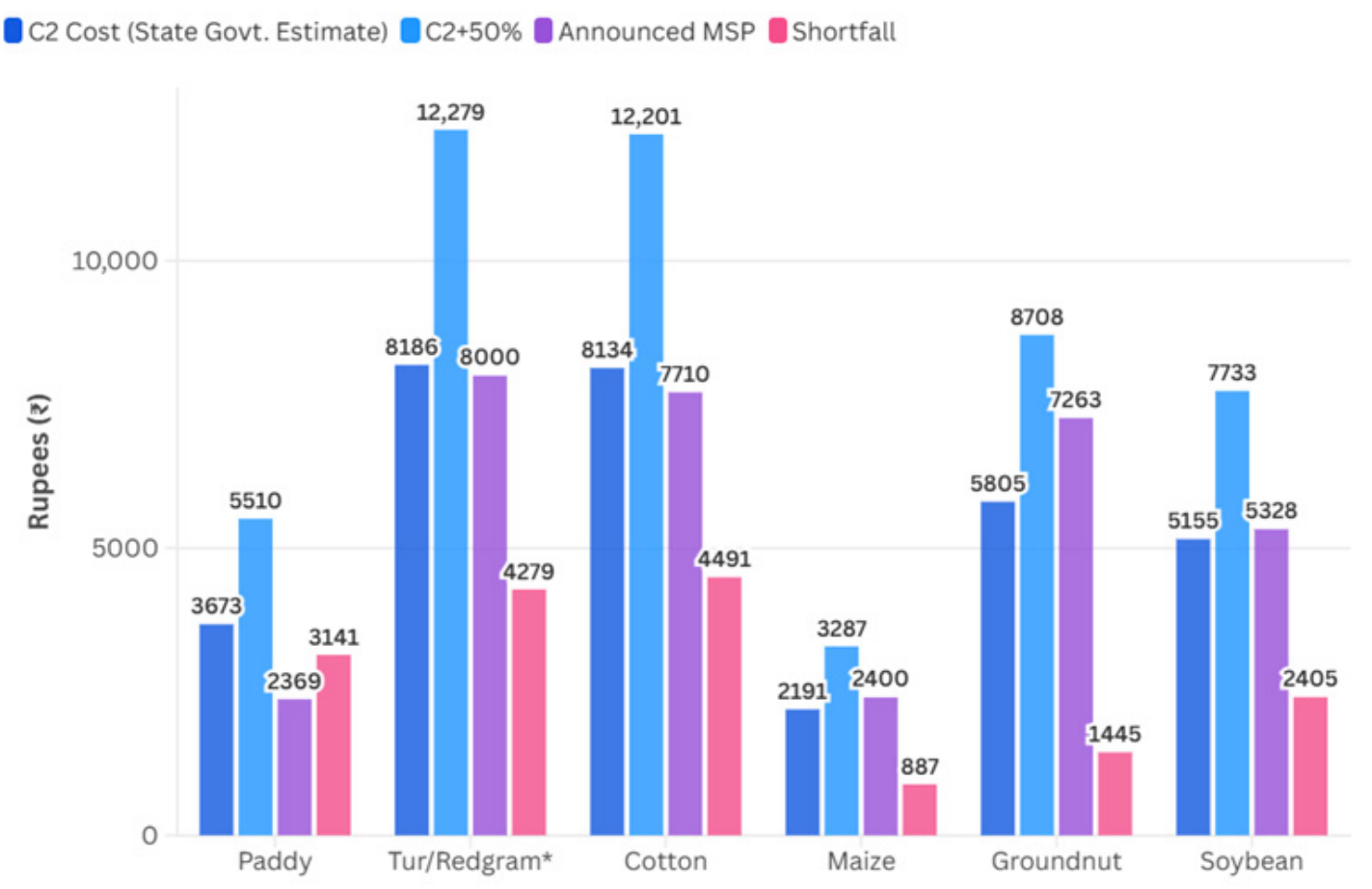

20 Pradhan Mantri - Kisan Samman Nidhi (PM-KISAN) is the Central government's income support scheme for farmers and disburses Rs. 6000 per year to each eligible farmer, irrespective of landholding.
21 'Telangana's Rythu Bharosa: Old promises, new disappointments', Ayesha Minhaz, Jan 15 2025, Frontline; https://frontline.thehindu.com/the-nation/agriculture/telangana-farmers-schemes-congress-rythu-bharosa-rythu-bandhu-brs-revanth-reddy/article69095662.ece
22 'SM-99: Ensuring Income Security for Farming Households: What India Owes Its Farmers', Ramanjaneyulu G V, Sustainability Matters newsletter, https://www.linkedin.com/pulse/sm-99-ensuring-income-security-farming-households-what-g-v-bkd-0c/?trackingId=zRBw0z82TPaIQIGA%2FIlz6w%3D%3D
23 'Telangana's Rythu Bharosa: Old promises, new disappointments', Frontline
24 'SM-99: Ensuring Income Security for Farming Households: What India Owes Its Farmers', Ramanjaneyulu G V

- **Indebtedness** - It is not surprising then, that Telangana reports India's highest household indebtedness at 92%, with average outstanding debt of ₹1,29,599[25]. This has marginally decreased from ₹1,52,113 in 2018-19[26], but still continues to be much higher than the national average of ₹90,372[27]. The access to credit for agricultural purposes is also high, with our primary data from the field reflecting that 90% of farmers had availed credit in the last year (2024-25). Telangana leads in the association with microfinance institutions (63%) in rural areas[28]. Many small and marginal farmers have meagre earnings from crop production and resort to credit institutions to bear the increasing costs of cultivation, which eventually results in higher indebtedness.
- **Farmer Suicides** - Telangana has been known to have a high incidence of farmer suicides. From 2014-2022, NCRB recorded 6,658 farmer suicides (14.4% women), with civil society reporting 7,064 (2014-2023). Leading districts include Nalgonda (931), Khammam (508), Karimnagar (501) and Rangareddy (438). Only 19.96% of families received ex-gratia (2014-2020), which has nearly stopped since 2018[29]. From the picture outlined above, rising input costs, stagnant prices, high indebtedness and a declining natural resource base, including land, are pushing farmers in Telangana towards the brink. Coupled with this, tenant farmers and cultivators lack institutional support and safety nets due to the ownership bias of state and central government agriculture schemes.
- **Economics of Crops** - The cost of cultivation for the major crops have been increasing in Telangana, as in the rest of India. However, the Minimum Support Price (MSP) for these crops has not grown at the same rate, often falling short of the recommended price according to the C2+50% formula. Additionally, the costs of cultivation of major crops such as paddy, maize, groundnut and cotton are higher in Telangana than the national average. Telangana has the highest costs of production for cotton among major producing states. As MSPs are calculated on the basis of average costs of cultivation for the country, Telangana farmers face a higher shortfall in major crops such as paddy, cotton and maize. See **Annexure** for the shortfall between costs and MSP according to Commission for Agricultural Costs and Prices(CACP) own estimates for Telangana.

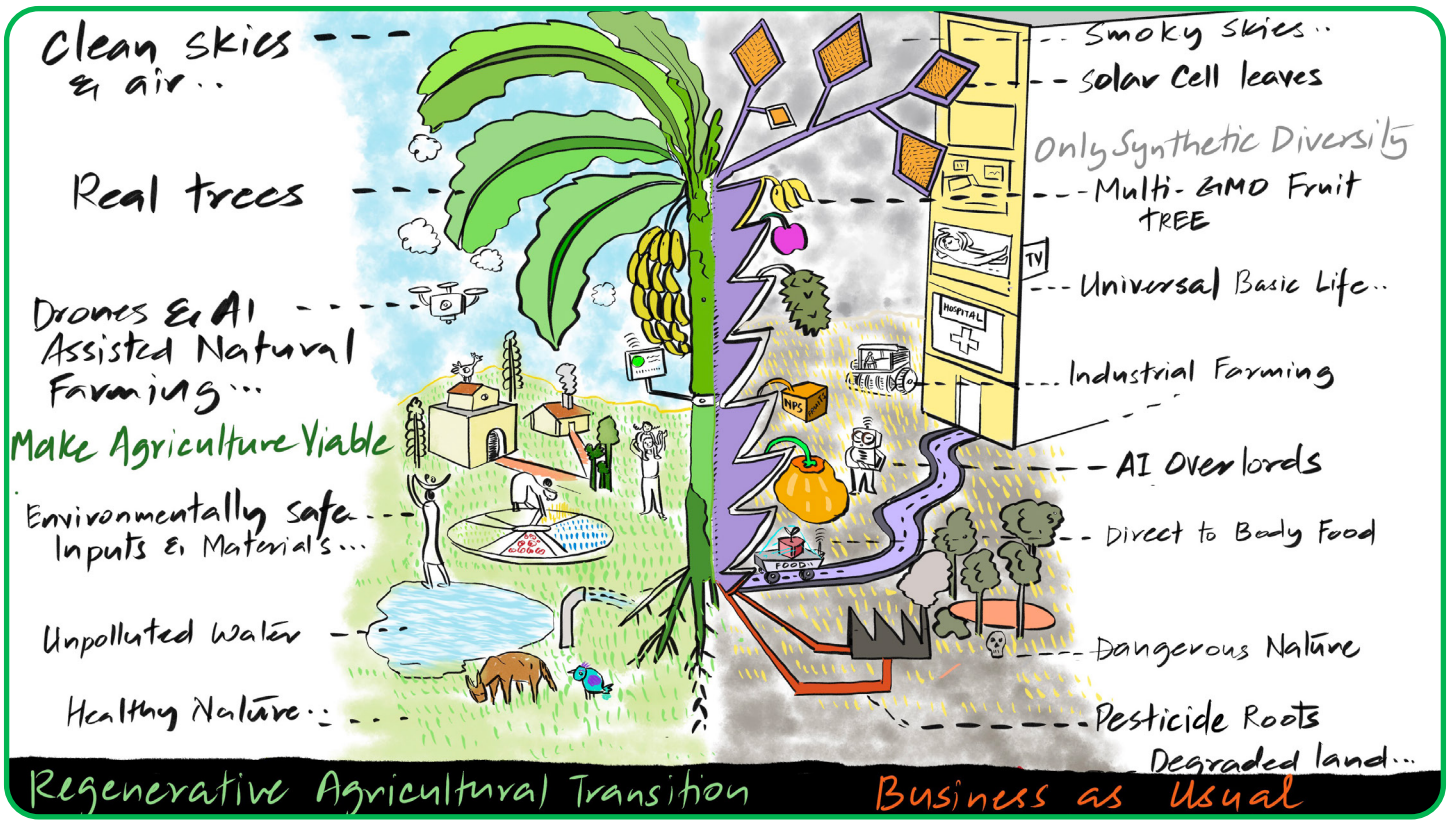
  Additionally, CACP cost estimates for Telangana are often lower than the State government's estimates. Thus, the MSP announced by CACP is often far lower than the MSP (C2+50%) suggested by the State government, according to its own cost estimates. This is evident in the Figure 1.1.6, which shows the State government estimated costs for Telangana, the CACP announced MSP and the shortfall for major crops in the year 2025-26. Thus, the majority of farmers do not even recover their actual cost of cultivation for most crops in Telangana.

25 NAFIS 2.0, NSS 77th Round
26 This decline in average outstanding debt is likely to be due to Rythu Bharosa/ PM-KISAN disbursements during windows of high capital requirements such as prior to sowing.
27 NAFIS 2.0, NSS 77th Round
28 NAFIS 2.0
29 Fact Sheet on Farmer Suicides in Telangana – 2024', MAKAAM and Rythu Swarajya Vedika (RSV); https://soppecom.org/pdf/exi-Fact-sheet-farm-suicides-five-states.pdf?utm_source

## Fig. 1.1.6: Cost, MSP and Shortfall for Major Crops, Telangana (2025-26)




Source: CACP Price Policy Report for Kharif Crops: The Marketing Season 2025-26




# 1.2 NATURAL RESOURCE STATUS AND QUALITY

## 1. Water Resources Crisis

### Irrigation

- Irrigated area in Telangana has grown by more than **125%** between **2014-15 and 2022-23**[30]. Major irrigation projects, such as Mission Kakatiya, which focused on restoring traditional tanks and water bodies, and multiple lift irrigation projects including the massive Kaleshwaram Lift Irrigation Project, have significantly expanded the net irrigated area.

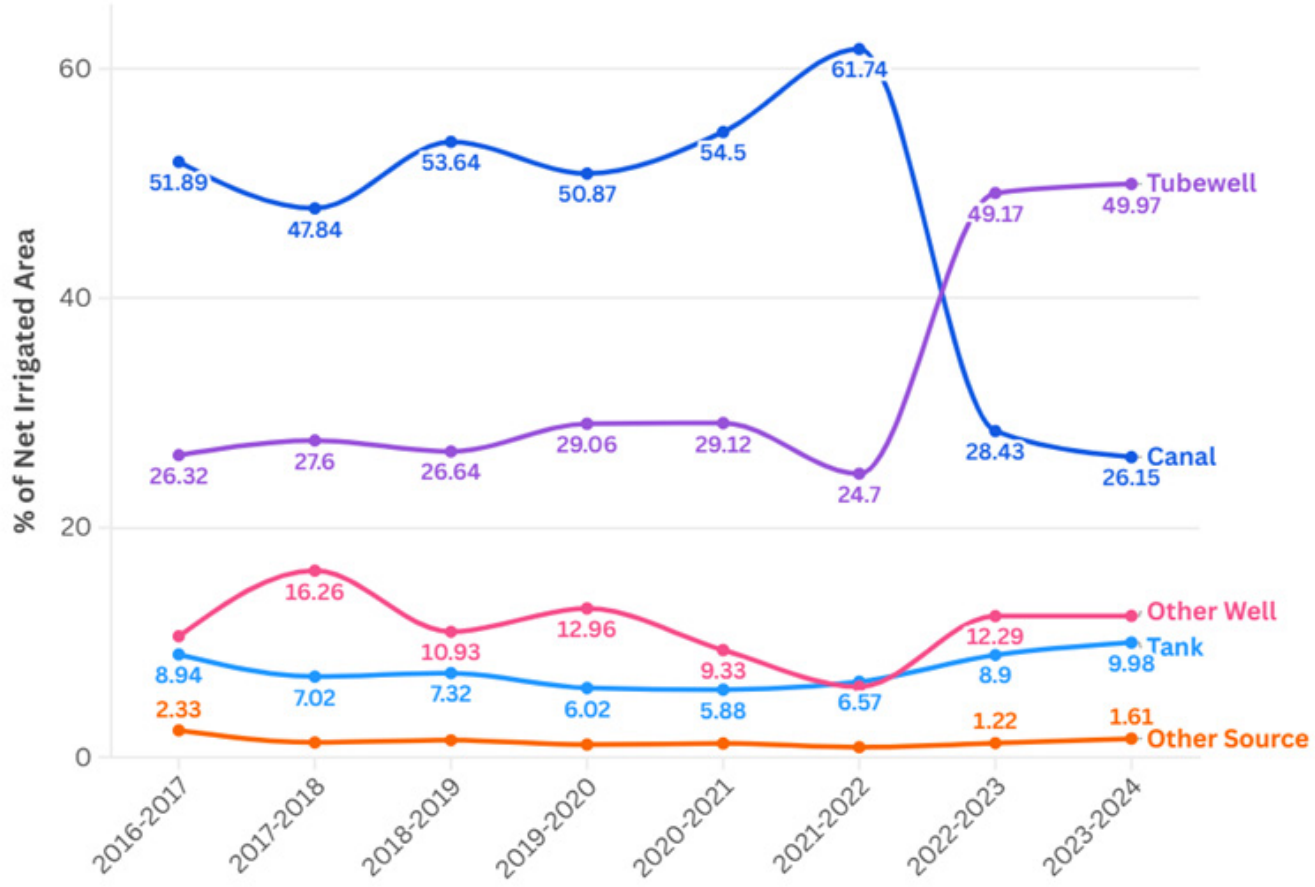
- Canal irrigation, a traditional surface irrigation method, has declined slightly from 11.49 lakh hectares in 2015-16 to 9.75 lakh hectares in 2023-24. In contrast, **tube well irrigation more than tripled** from 5.88 lakh hectares to 18.63 lakh hectares in the same period. Currently over **26.97 lakh agricultural borewell connections** pump water, with more than half of cropped area dependent on groundwater[31]. Figure 1.2.1 shows how the proportion of irrigated area serviced by canals has fallen and area under tubewells has **increased to almost 50% of net irrigated area.**

- This boom in tubewell irrigation has also been incentivised through the power subsidy. In 2018, Telangana became the only state in India to implement 24×7 free power supply to all farmers. This has been costing the government between ₹10,000 crore and ₹13,500 crore annually as of 2020-21[32] and projected at ₹15,470 crore for 2024-25[33]. It has also led to a boom in groundwater withdrawal for agricultural use, most of it to irrigate paddy especially in the winter (Yasangi) season.

30 Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW; https://data.desagri.gov.in/weblus/lus-grand-query-report-statewise
31 'Monocropping Patterns in Telangana Agriculture', unpublished Draft
32 '24 × 7 free agriculture supply: Lessons from Telangana's unique initiative', Nhalur and Prayas (Energy Group), April 2020
33 'Agriculture in Telangana: From Scarcity to Abundance', Ramachandra and Barman, Centre for Development Policy and Practice, 2024.

- Surface water availability also faces constraints. The Kaleshwaram Lift Irrigation Project (KLIP), designed to irrigate over 40 lakh acres, has been non-operational since October 2023 due to structural concerns at the Medigadda barrage[34]. This has forced farmers back to groundwater dependency and monsoon reliance, creating a vicious cycle of aquifer depletion. This has been a direct accelerant of the groundwater crisis and of farmer indebtedness (due to costs incurred in installing pump sets for groundwater extraction), particularly in Karimnagar, Nizamabad, and Siddipet districts.

**Fig 1.2.1: Trends in Irrigated Area by Source in Telangana**



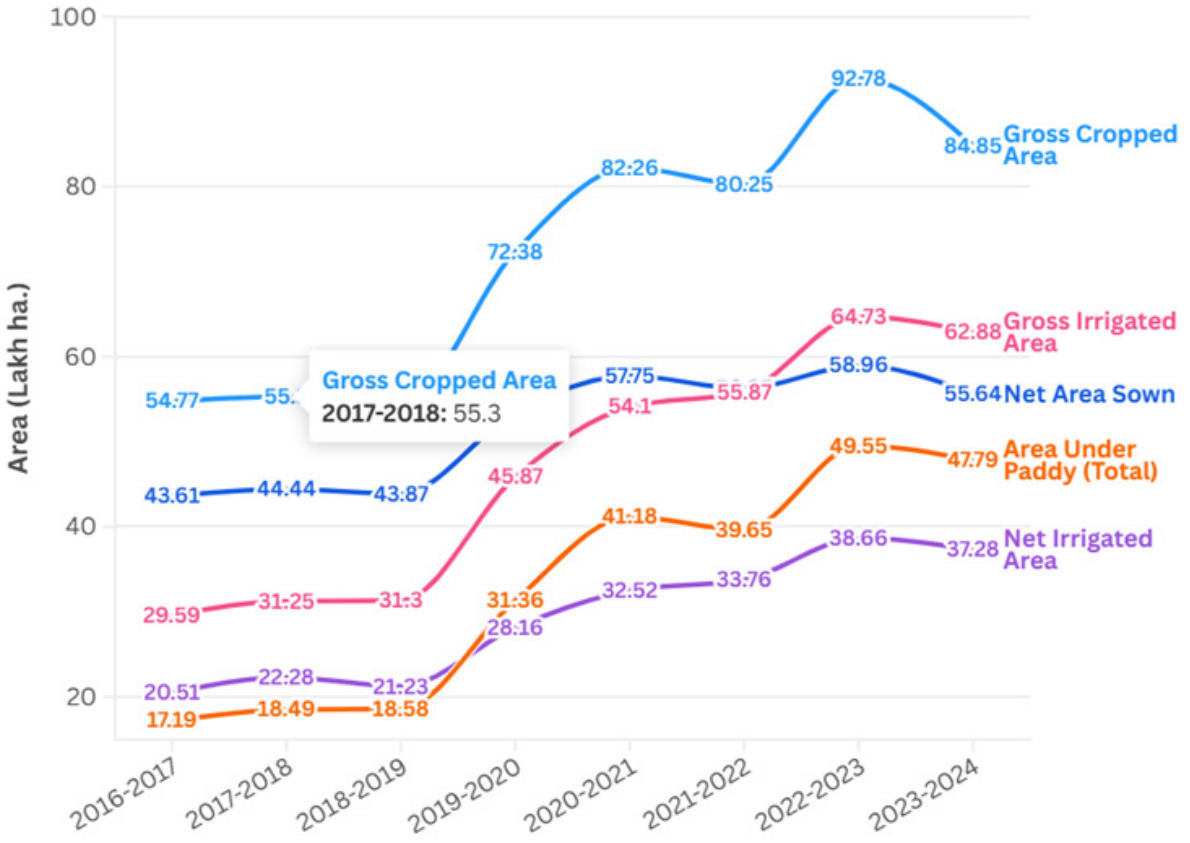

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW

## Box 2: Increase in Cropped Area, Irrigated Area and Paddy Cultivation

Between 2016 - 2024, the net sown area in Telangana grew by 27%, while the gross cropped area increased by 55% to 88.85 lakh hectares. Similarly, the net area under irrigation grew by 82% while the gross irrigated area grew by a staggering 113%[35][36]. Thus, more and more lands have been brought under Yasangi (Rabi) cultivation since 2016. The expanded irrigation coupled with free power supply has led to a huge rise in paddy cultivation, as seen in the Figure 1.2.2. The rise in paddy area nearly mirrors the increase in gross cropped and irrigated areas. However, unlike other states where Kharif (Vanakalam) paddy is the main crop and Rabi (Yasangi) paddy is relatively lower in extent, Telangana shows only marginally lower or equal paddy cultivation in the Yasangi season, reflecting its dependence on groundwater (see Figure 1.2.3).

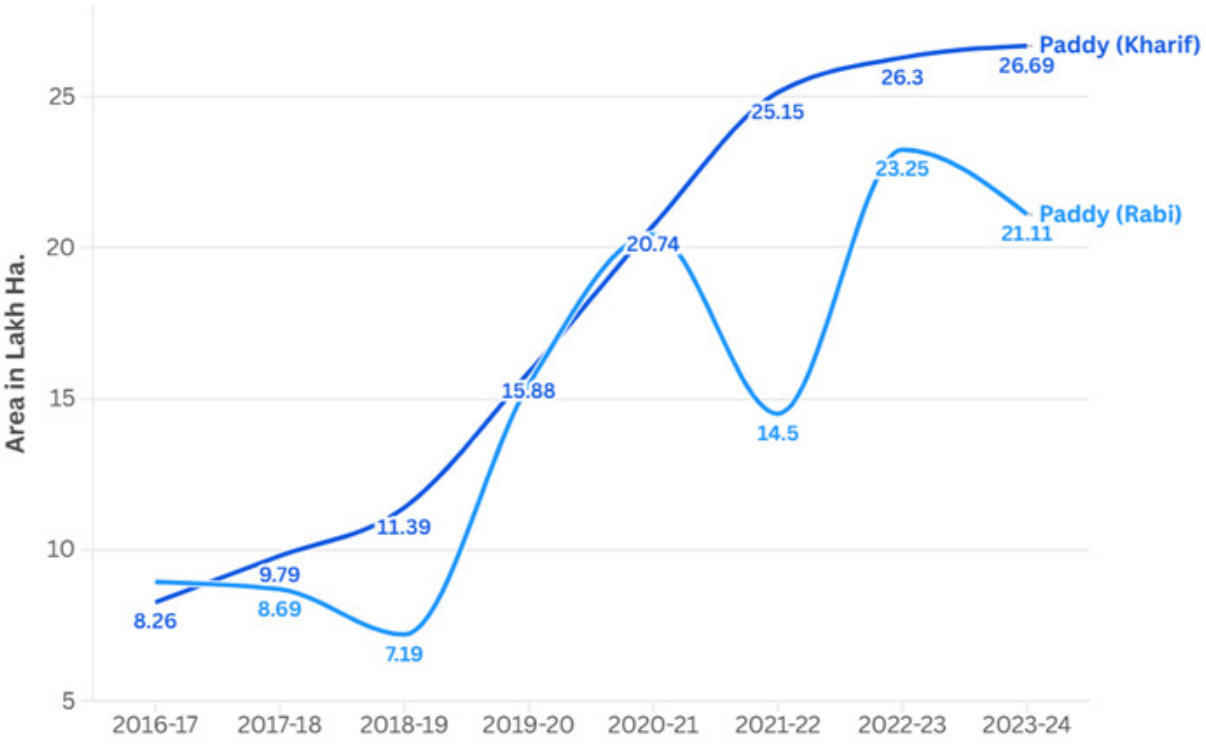
34 'Monocropping Patterns in Telangana Agriculture', unpublished Draft
35 Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW
36 Net Sown Area is the actual physical extent of land used to grow crops, counted only once in an agricultural year. Gross Sown Area (or Gross Cropped Area) is the total area sown one or more times in a year. Similarly for net and gross irrigated area.

## Fig 1.2.2: Trends in Area under Cultivation, Irrigation, and Paddy in Telangana (2016-2024)




Source: Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW

## Fig 1.2.3: Trends in Area under Paddy in Telangana



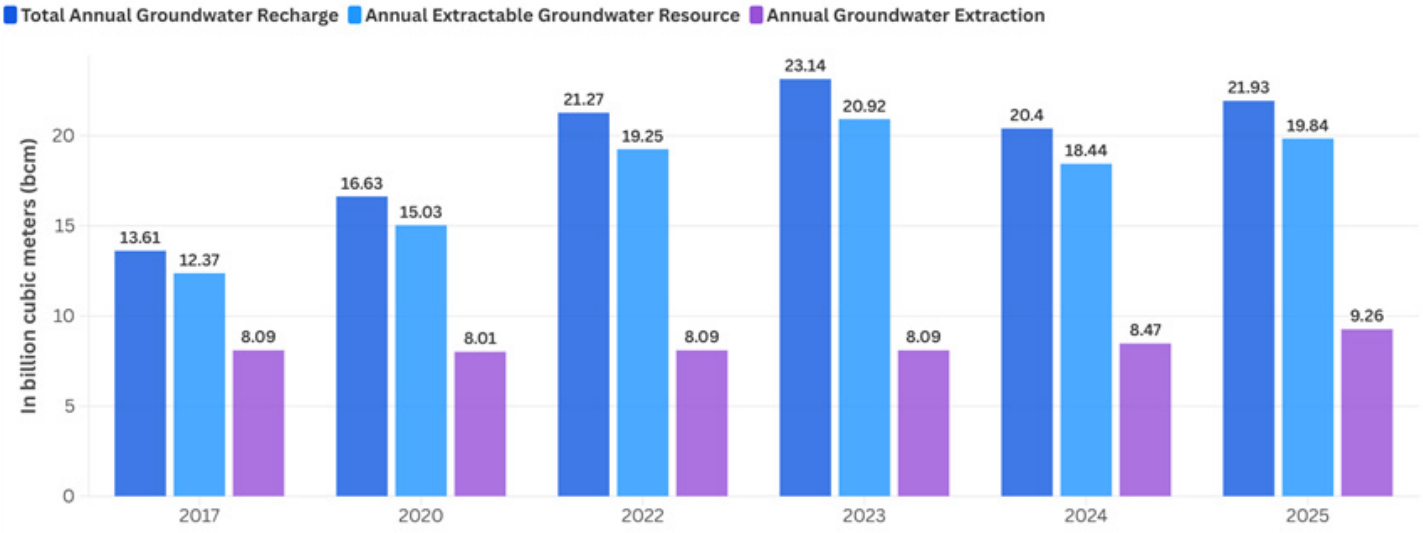

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW

## 1. Groundwater Depletion

As the previous section has shown, there has been a shift towards groundwater reliance over surface irrigation to grow water intensive crops such as paddy. Groundwater depletion represents Telangana's most critical agricultural challenge. The state utilizes 47%[37] of its dynamic groundwater resources, comparable to national usage rates. However, recent trends show an accelerating decline:

- As of July 2025, the groundwater level in Telangana is 8.37 meters below ground level (mbgl). The decadal average of groundwater levels during July is 9.45 mbgl. The slight increase can be attributed to 22% excess rainfall in 2025, however this failed to arrest overall depletion trends[38].
- According to the Central Ground Water Board (CGWB), groundwater extraction for agriculture increased from 235 tmc ft (thousand million cubic feet) in 2019-20 to 256 tmc ft in 2022, showing increased reliance on groundwater resources[39]. This is almost twice the maximum storage capacity of the Kaleshwaram Lift Irrigation Project (KLIP).
- The area under extreme depletion (red zone >20m depth) grew by 36% in just one year, from 3,452 sq km (April 2024) to 4,714 sq km (April 2025). 500 plus villages are overexploiting groundwater[40].
- Districts like Nalgonda, Vikarabad, and Nagarkurnool face the most severe depletion, with farmers drilling 70+ borewells in desperate attempts to access water.

**Fig 1.2.4: Groundwater Resource and Extraction in Telangana**




Source: Dynamic Groundwater Resources of Telangana State, 2024

- By 2025, groundwater extraction reached over 46.7%, up from 38% in 2022-23, with nearly 88% of this water used for irrigation[41].
- On the other hand, the rate of groundwater recharge is limited by Telangana's hard rock geology, which makes up around 85% of its geographical area. According to a study by NGRI, only 15% of rainwater received by Telangana actually percolates into the ground[42].

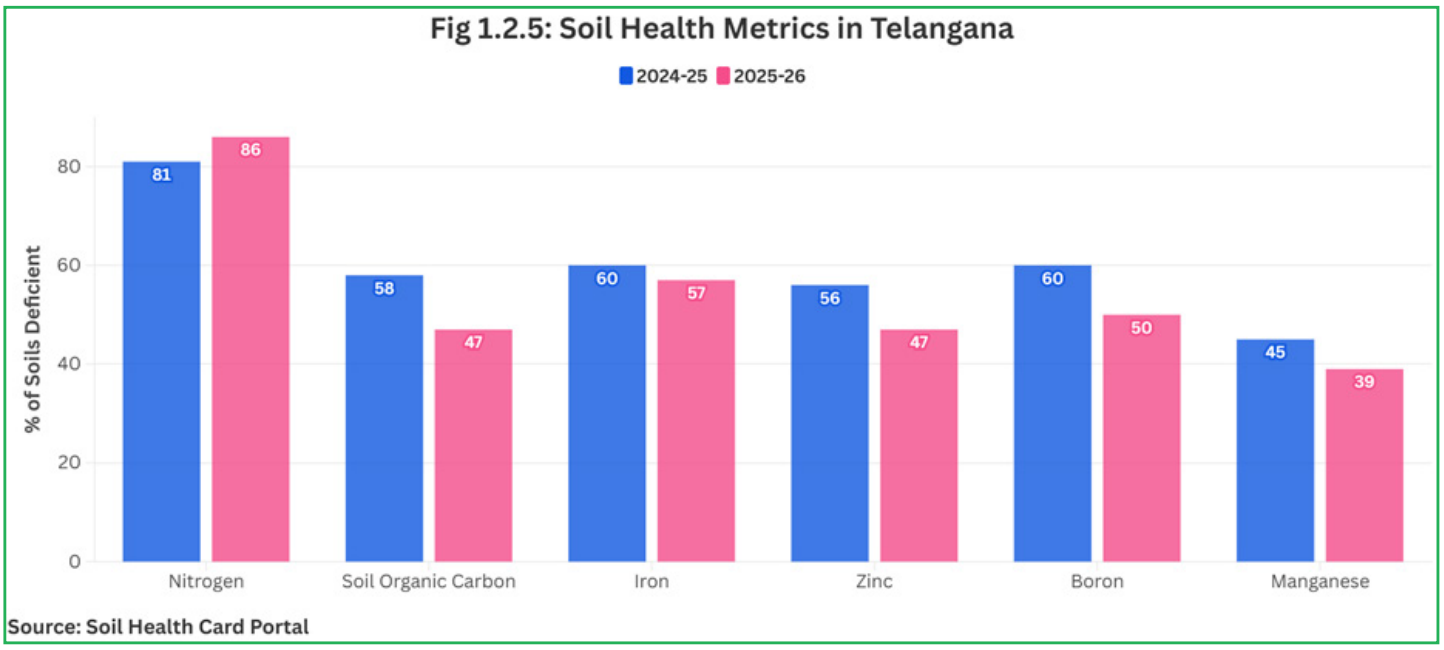
37 National Compilation on Dynamic Ground Water Resources of India, 2025; p. 114.
38 Status of Ground Water Level Scenario (July-2025), Groundwater Dept., Govt. of Telangana,
39 National Compilation on Dynamic Ground Water Resources of India, 2025
40 'Average groundwater table up in Telangana', May 2025, Serish Nanisetti, The Hindu
41 National Compilation on Dynamic Ground Water Resources of India, 2025; p. 114
42 'Telangana On Brink Of Severe Water Crisis', ETV Bharat, July 2025 ,https://www.etvbharat.com/en/!state/telangana-on-brink-of-severe-water-crisis-ngri-study-finds-only-15-percent-of-rainwater-seeps-into-the-ground-enn25071701746

## 2. Soil Health Degradation

Soil quality degradation stems from multiple interacting factors. Intensive monoculture, particularly paddy cultivation in water-stressed regions, depletes soil organic matter and disrupts nutrient cycles. The state's predominance of Chalka-type soils (70% in drought-prone districts like Mahabubnagar) presents inherent challenges due to poor water retention capacity.

### Key soil degradation patterns:

- Declining soil organic carbon (SOC) content due to crop residue removal and limited organic amendments. Currently 47% soils are deficient in SOC, which is an improvement over 58% in 2024-25[43].
- Nutrient imbalances from over-reliance on chemical fertilizers, without corresponding attention to organic matter or biomass addition. Despite overapplication of urea, 86% of soils in Telangana are deficient in nitrogen, as well as micronutrients including Iron 57%, Zinc 47%, Boron 50%, and Manganese 39%[44]
- Telangana's soils are undergoing desertification and land degradation at a rate of 31.68%. The primary cause is water erosion, exacerbated by removal of vegetation cover[45] .
- Salinization in areas with poor drainage and excessive irrigation.
- Soil compaction from heavy machinery use and loss of soil structure.




43 Soil Health Card Portal, Dept. of Agriculture and Farmers' Welfare, MAFW, Govt. of India; https://soilhealth.dac.gov.in/nutrient-dashboard
44 Soil Health Card Portal
45 'Desertification and Land Degradation Atlas of India', Space Applications Centre. (2021)

## 3. Cropping Pattern Shifts

Telangana cultivates 27 major crops across Kharif and Rabi seasons, covering approximately 55.64 lakh hectares[46]. Despite this, Telangana's Crop Diversity Index remains alarmingly low: 0.31 (2020-21) to 0.41 (2021-22)[47]. Rice dominates as the primary food crop and staple, with paddy cultivation concentrated in districts with irrigation access. The area under rice cultivation has expanded by 240% in the past 10 years. In 2023-24, paddy accounted for 46.9% of the area sown in Vanakalam[48] and 75.6% of area sown in Yasangi[49]. This is all the more surprising as Rabi paddy hardly existed a decade ago. The state has also rapidly become one of the largest producers of paddy in India, becoming the fifth largest rice producer in 2025-26 (producing 96.35 lakh tonnes of paddy). In the same year, the state also set the record for the highest amount of paddy procured from any state (70.82 lakh metric tonnes)[50].

### Major crop categories and trends:

- **Cereal crops:** Paddy production shows a steep upward trend since 2016, while maize shows an overall decline. Millets have shown a slight increase, however they still make up only around 1.15% of Gross Cropped Area (GCA)[51].

- **Pulses and Oilseeds:** Bengal gram, red gram, green gram, and groundnut show a declining trend in the past 10 years. Overall, pulses have seen a steep decline since 2016, from occupying 10.8% of GCA to now 3.9%[52].

- **Non-food crops:** Cotton production shows variable growth, however it is the second most dominant crop after paddy, occupying ~30% of area sown in Kharif. Groundnut and sunflower exhibit declining trends.

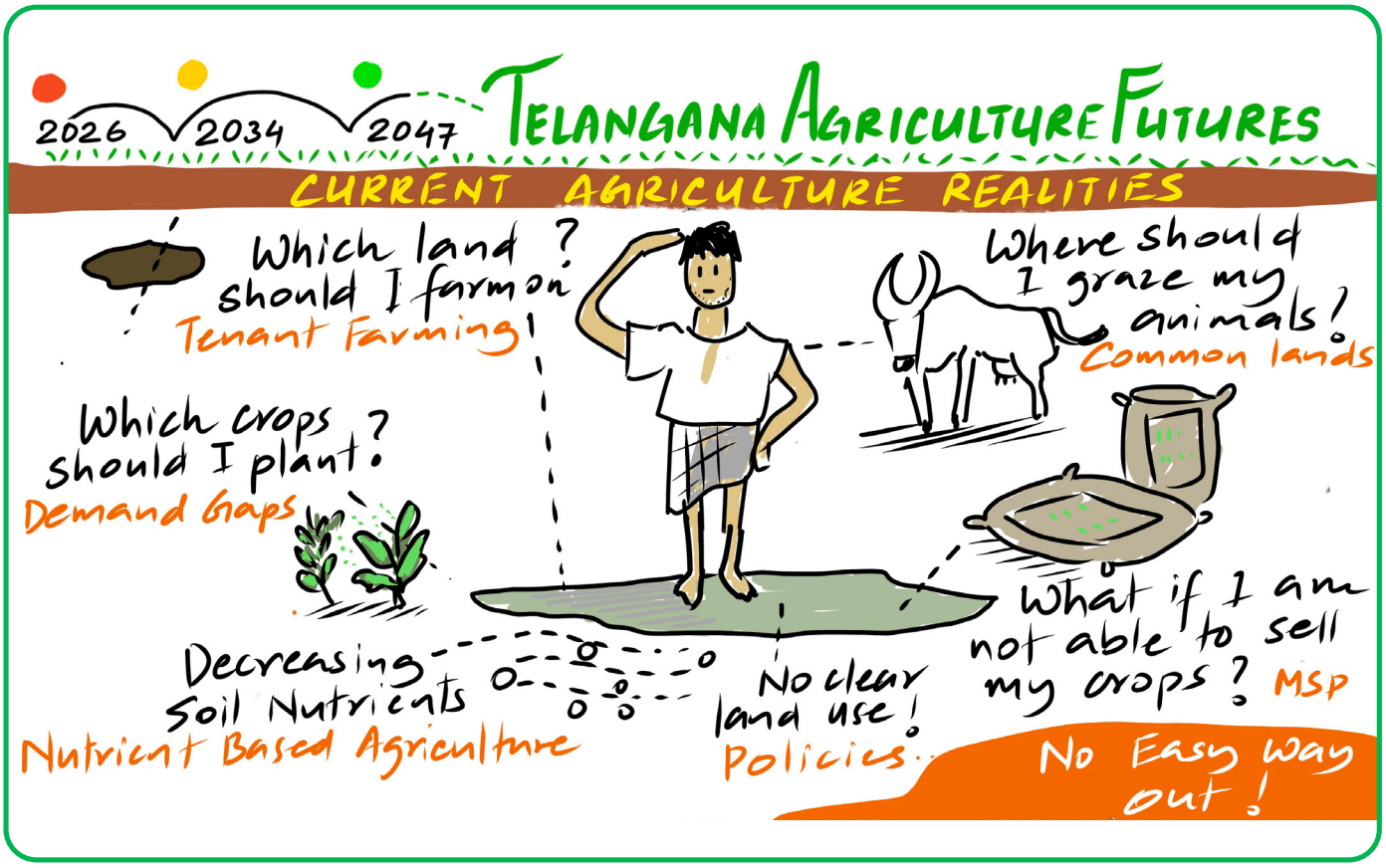
- **Horticulture:** Area under horticulture as a whole has declined, with area under vegetables falling to only 0.56% of GCA (47,000 ha.). Area under fruits has also fallen, from 2.8% of GCA in 2016 to 2% in 2024. However, mango, grapes, and gherkins have been identified as export potential crops, with dedicated agri-export zones proposed.

46 Telangana Socio Economic Outlook 2025, Planning Dept., Govt. of Telangana, p.43
47 Crop Diversity Index Assessment for Telangana State Using Remote Sensing', Tharun Kumar et. al., PJTSAU, August 2023.
48 The Vanakalam (Kharif) season (June-September) accounts for the majority of cropped area, heavily dependent on monsoon timing and intensity.
49 Telangana Socio Economic Outlook 2025
50 'Telangana procures record 70.82LT paddy produced this Kharif season', The Hindu, January 13, 2026; https://www.thehindu.com/news/national/telangana/telangana-procures-record-7082lt-paddy-produced-this-kharif-season/article70506038.ece
51 Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW.
52 Directorate of Economics and Statistics.

## Box 3 - Challenges to Crop Diversification

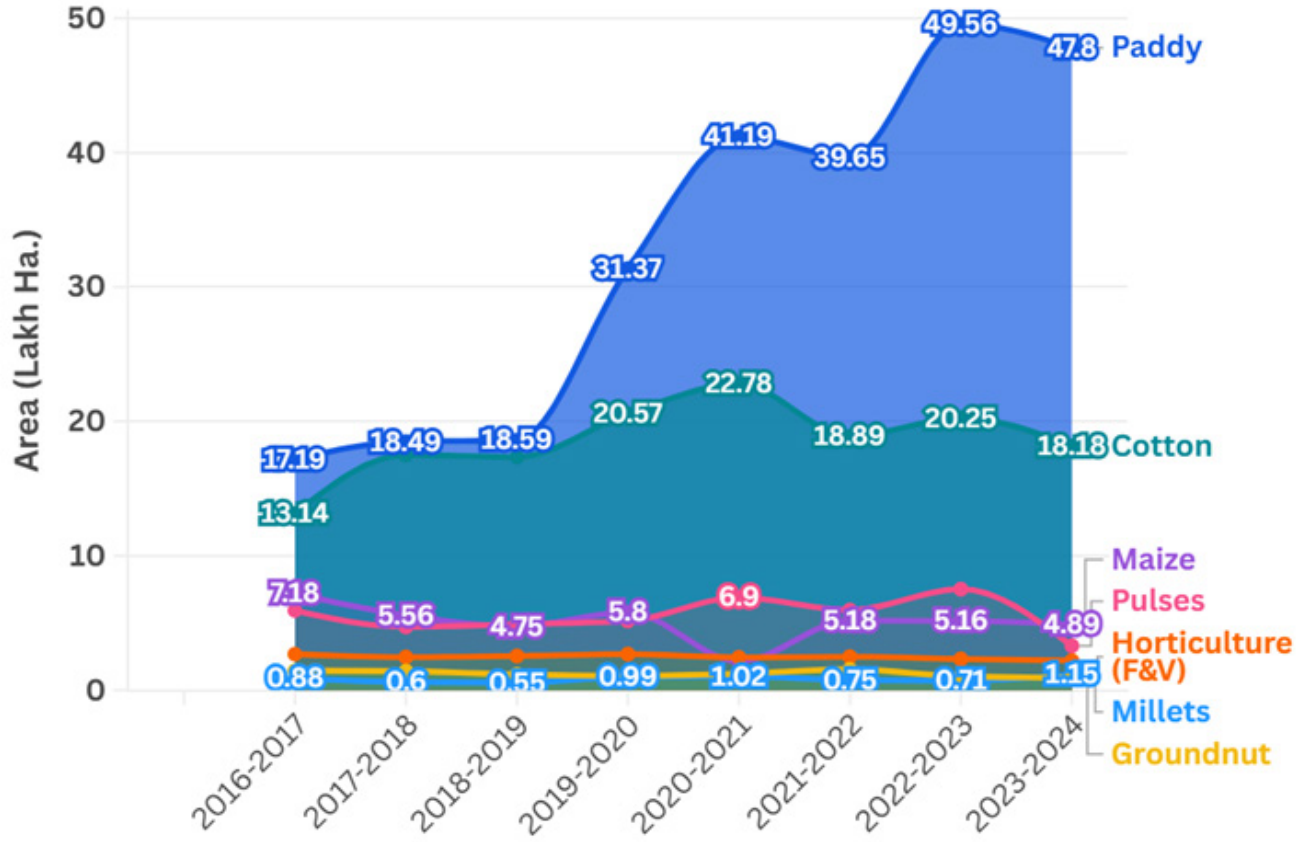
After years of paddy-friendly policies, crop diversification away from paddy has been recently recognised as an important policy imperative in Telangana. There have been many factors that have led to this major policy shift, including the upcoming fertiliser shortage and predicted low rainfall due to El Nino, as well as increasing fiscal burden due to the import of fertilisers and pulses[53]. In May 2026, the Central government had also issued a directive to high rice producing states, including Telangana, to reduce the area under paddy by 5 lakh acres a year. The Telangana Agriculture and Farmers Welfare Commission and the state agricultural university (PJTSAU) have already submitted recommendations and proposals for crop diversification in the state[54].

However, farmers face several challenges in diversifying away from paddy. They are locked into a subsidy and procurement structure that provides more incentives for cultivating paddy than other crops. The average yield of paddy per acre at 18 Qtl is much higher than other crops. While the MSP for paddy was ₹2,369 per quintal in 2025-26, the state government's bonus of ₹500 per quintal for fine varieties has increased the price received by farmers to ₹2,800-₹2,900[55]. Free, 24×7 electricity supply also incentivises the indiscriminate use of groundwater for flood irrigation in paddy, even in the Yasangi season. Additionally, in many regions of the state, horticulture, pulses and even millet crops are attacked by wild animals such as monkeys, peacocks, other birds and wild boars. This leads communities to shift towards paddy cultivation to protect their crops. Thus, policy measures promoting crop diversification must also address the underlying structural issues that shape crop choices.



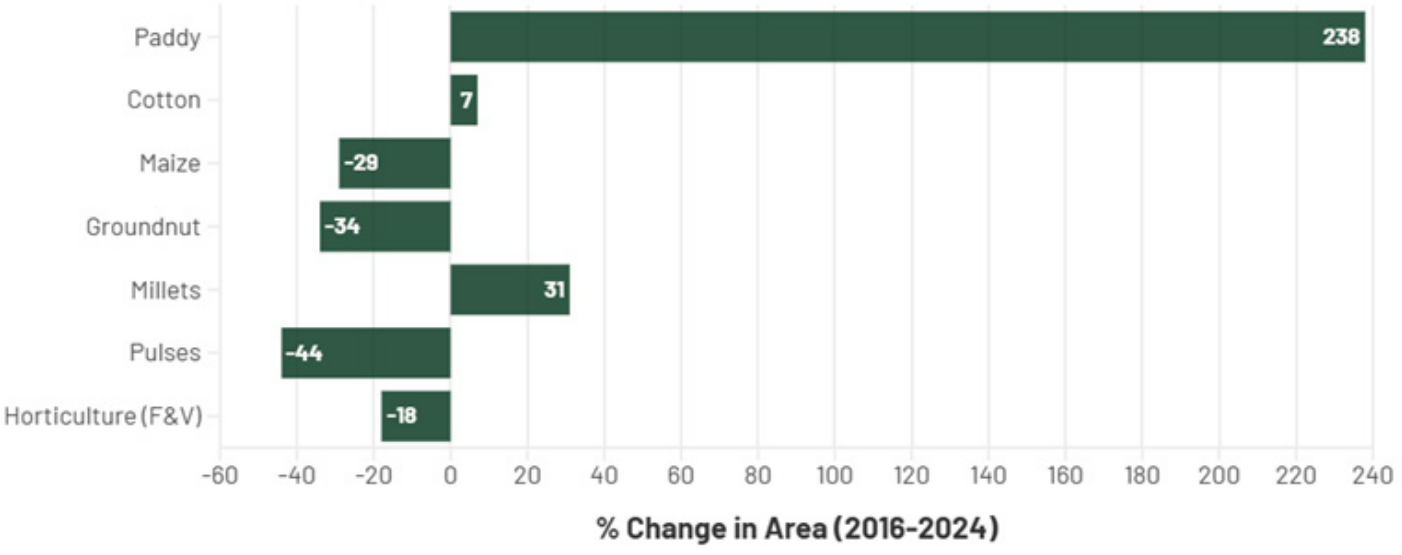

53 'For India, weakening monsoon and fertiliser crisis, a double whammy', Soumya Bhowmick, May 22 2026, The Indian Express; https://indianexpress.com/article/opinion/columns/india-monsoon-fertiliser-crisis-urea-iran-war-strait-hormuz-10703157/
54 'Paddy Glut: Centre pushes for crop diversification in Telangana', Sribala Vadlapatla, May 27 2026, TOI, https://timesofindia.indiatimes.com/city/hyderabad/paddy-glut-centre-pushes-for-crop-diversification-in-telangana/articleshow/131336618.cms; Telangana Agriculture University Proposes Incentive of Rs 8000 per Acre for Crop Shift Plan', Sribala Vadlapatla, May 02, 2026, TOI; https://timesofindia.indiatimes.com/city/hyderabad/telangana-agricultural-university-proposes-incentive-of-rs-8000-per-acre-for-crop-shift-plan/articleshow/130719935.cms
55 Price Policy Report for Kharif Crops for Marketing Season 2025-26, Commission for Agricultural Costs and Prices; https://cacp.da.gov.in/Home/kharifreports

## Fig 1.2.6: Trends in Area under Crops in Telangana (2016 - 2024)




Source: Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW

## Fig 1.2.7: % Change in Area under Crops in Telangana (2016 - 2024)




Source: Directorate of Economics and Statistics, Dept. of Agriculture and Farmers' Welfare, MAFW

## 4. Agrochemical Use

Telangana is one of the highest consumers of fertilisers and pesticides in the country. As of 2024, it is the 3rd highest consumer of pesticides behind Haryana and Punjab, at 900 g/hectare[56]. As of 2022-23, it is also the fourth highest consumer of all fertilisers in terms of per ha. use, behind Andhra Pradesh, Punjab and Bihar[57].

### Fertiliser Consumption

- **Total Consumption:** The state's total fertiliser consumption has seen a significant overall increase, rising from around 10 lakh metric tonnes (LMT) in 2015-16 to 18.79 LMT in 2023-24, an increase of over 80%[58]. During the same period, however, the gross cropped area of Telangana has also increased by 54% and irrigated area by 125%.

- **Per-Hectare Consumption:** In 2015-16, per-hectare fertiliser consumption was 269.01 kg, nearly double the national average of 135.03 kg. However, by 2021-22, per-hectare consumption had dropped by 24%, reaching 203.89 kg/ha[59]. This gradual reduction could be due to increased awareness of green manure crops and soil enrichment. However, our calculations based on more recent figures show per ha. consumption going up again from 2022-23, reaching 234 kg/ha. in 2024-25[60]. This shows a worrying trend in overall fertiliser consumption.

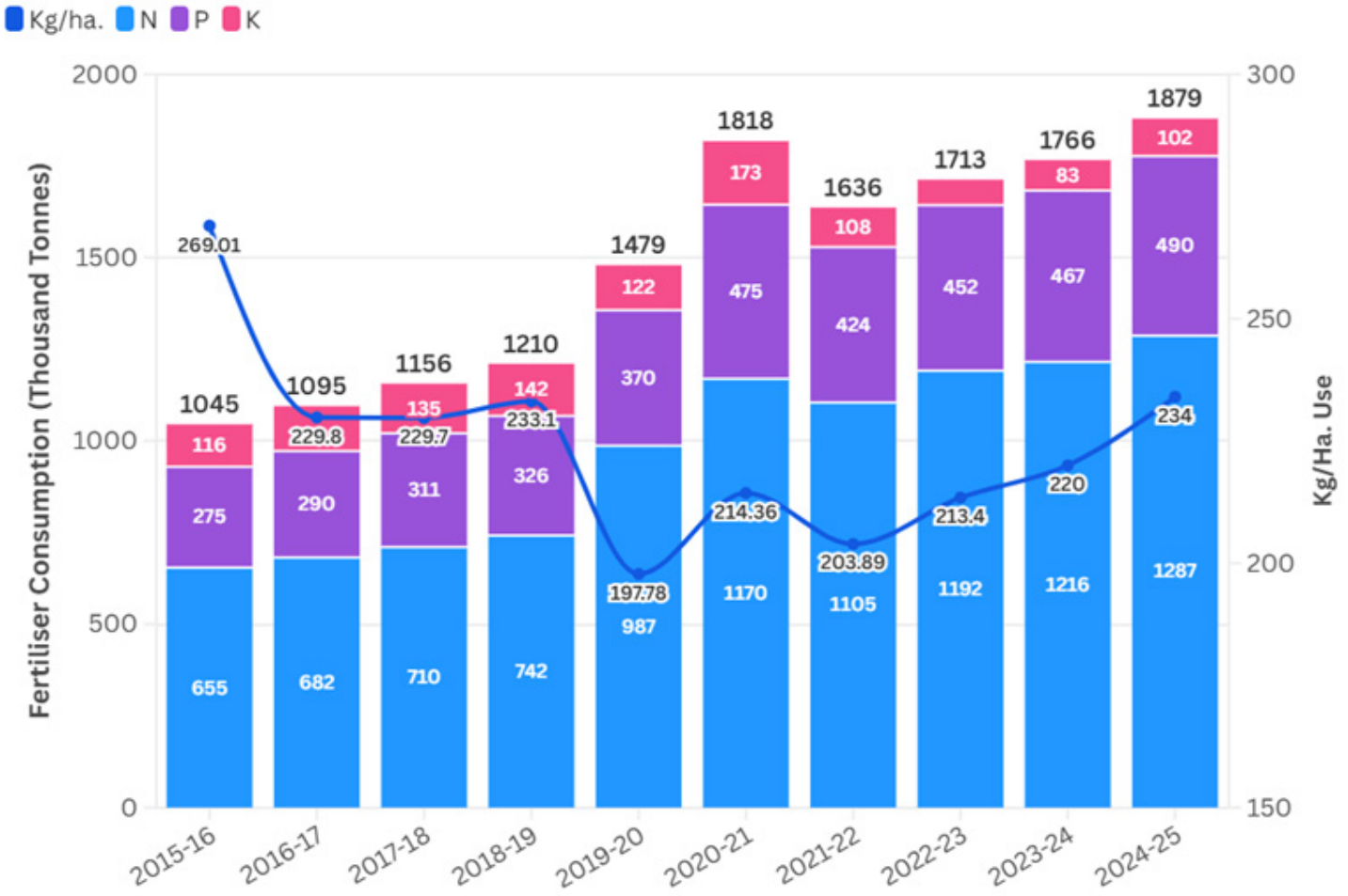
- **Imbalanced Use and Declining Efficiency:** Fertiliser application in India, and in Telangana specifically, is highly skewed towards urea application, due to its highly subsidised price (Rs. 242 per 45 kg bag) and nitrogen-deficient soils. The below table shows the N:P:K ratio of Telangana compared to the national average over the past few decades. Excessive urea use has been raising concerns, crossing 20 LMT in 2024-25[61]. This not only makes the state more vulnerable to global supply chain disruptions (as with the West Asia conflict) but also increases nitrogen pollution through leaching of excess fertiliser. Fertiliser use efficiency has also been declining steadily in India, with urea efficiency being only 30-45%[62]. The remaining nitrogen leaches into the soil and groundwater and emits nitrous oxide.

**Table 1.2.1: N:P:K Ratio of Telangana Compared to the National Average**

| Financial Year | Nitrogen (N) | Phosphorus (P) | Potash (K) | National Average (India) |
|---|---|---|---|---|
| 1985-86 | 10 | 4 | 1 | 6 : 2.4 : 1 |
| 2014-15 | 17 | 6 | 1 | 6.7 : 2.4 : 1 |
| 2021-22 | 10.3 | 3.9 | 1 | 7.7 : 3.1 : 1 |
| 2022-23 | 17.2 | 6.5 | 1 | 11.8 : 4.6 : 1 |
| 2023-24 | 14.7 | 5.6 | 1 | 10.9 : 4.4 : 1 |
| 2024-25 (Est.) | 12.6 | 4.8 | 1 | 9.3 : 3.5 : 1 |

56 'Pesticide Use in Telangana 3rd Highest in Country', Times of India, June 2024. https://timesofindia.indiatimes.com/city/hyderabad/pesticide-use-in-telangana-3rd-highest-in-country-agriculture-experts-flag-toxic-residues-in-food/article-show/110953657.cms
57 'Indian Agriculture to 2047: Reshaping Policies for Sustainable Development'; Birthal et. al., March 2025, Policy Paper 50, ICAR-NIAP
58 Agriculture Statistics at a Glance 2023 and 2024, Directorate of Economics and Statistics, Dept. of Agriculture & Farmers Welfare, MAFW, Government of India. New Delhi
59 'Agriculture in Telangana: From Scarcity to Abundance', Ramachandra and Barman, 2024
60 Agriculture Statistics at a Glance 2024; Directorate of Economics and Statistics
61 'T'gana Farmers Overusing Urea by 50% to 100%', Sribala Vadlapatla, TOI, Jan 2026; https://timesofindia.indiatimes.com/city/hyderabad/tgana-farmers-overusing-urea-by-50-to-100/articleshow/126339374.cms
62 'Nitrogen Pollution in India's Agriculture Sector: A Looming Crisis', Firefly Life Sciences Pvt. Ltd.

## Fig 1.2.8: Fertilizer Consumption Trends in Telangana (2016-2025)



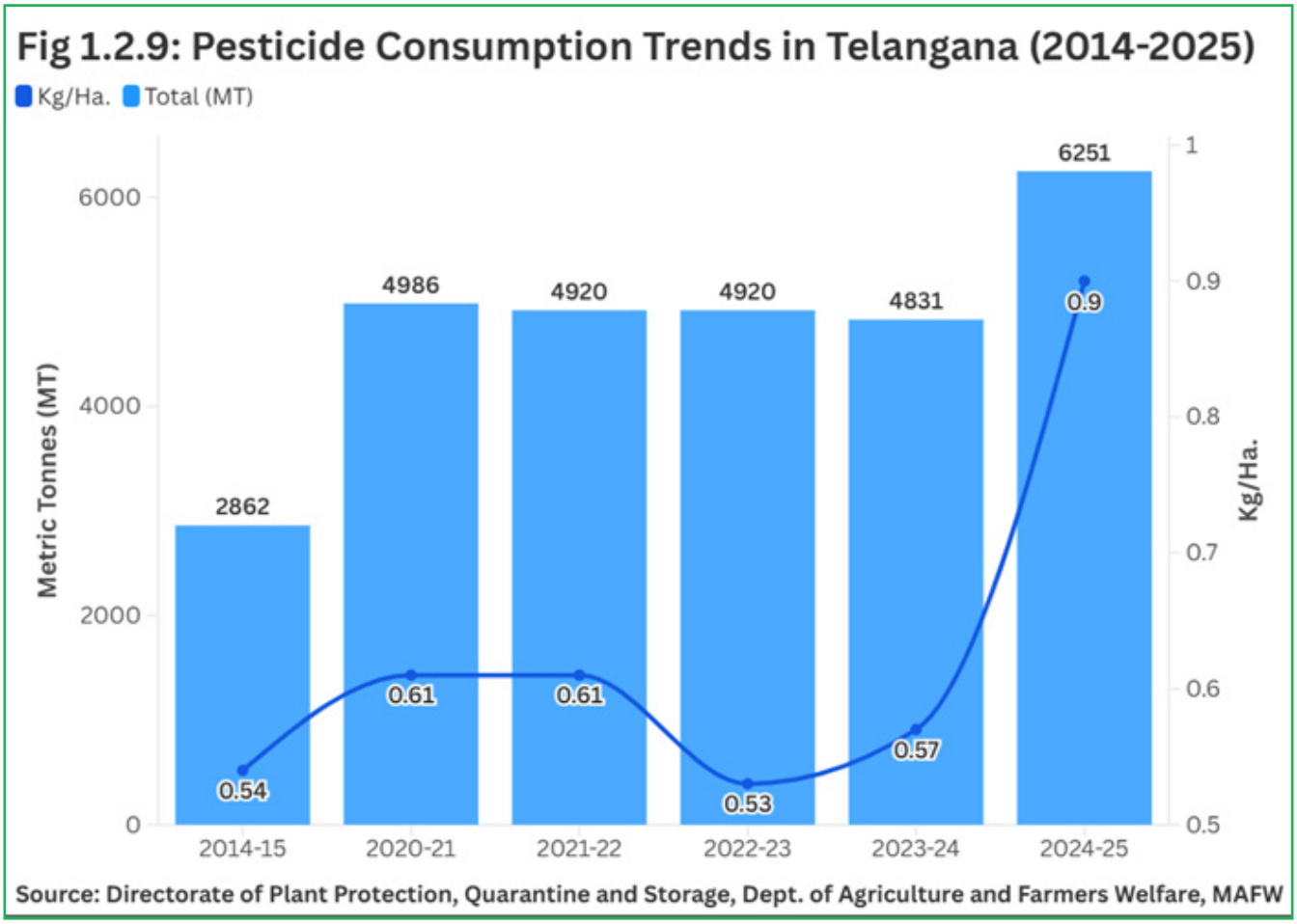

Source: Agricultural Statistics at a Glance, and Directorate of Economics and Statistics, MAFW

## Box 4 - The Link between Fertiliser Consumption and Pulse Crops

Telangana's fertiliser consumption has steadily increased since 2015. Even accounting for the expansion in cultivated area, there is an overall rising trend in per hectare application. This can be seen especially in urea consumption, whose total use has doubled from 6.5 lakh tonnes to 12.8 lakh tonnes in a span of 10 years. Read together with the steep decline in pulse area (10.8% to 3.9% of gross cropped area), it is clear that the biological nitrogen fixation system ensured by pulse crop rotations has been dismantled. Pulse crops can fix between 40-60 kg fertilizer-equivalent N/ha. Telangana now has to procure more urea (which itself has low nutrient efficiency) and also procure the pulses that it used to export earlier. Together with the nitrous oxides emissions bill from overapplication of urea, this amounts to a heavy fiscal burden for the state.

## Pesticide Consumption

Since its inception as a state, Telangana's total pesticide consumption has increased by 118% (from 2,862 MT to 6,251 MT), and it has consistently ranked among the top 5 states in both total consumption volume and per hectare intensity[63]. In the same period, gross cropped area has increased by 54% and irrigated area by 125%, leading to cropping shifts towards high value crops such as paddy, cotton and chilli. The graph below shows the increase in total volume and per hectare use since 2014-15.




## Causes

The primary driver of increased pesticide use in Telangana is increased monocropping of commercial crops such as paddy, cotton, maize and chillies. Monocropping leads to increased vulnerability and reduced resilience to pest attacks. Hybrid cotton crops are highly susceptible to sucking pests such as thrips, whiteflies and aphids, while chillies are vulnerable to thrips, mites, and various fungal wilts. These two crops account for a high proportion of insecticide consumption nationally, as well as in Telangana[64]. Paddy is also one of the largest consumers of agrochemicals in the country and has led to increased fungicide and herbicide use in Telangana. In addition, herbicide use for all crops has been rising in Telangana due to increasing labour costs. Thus, the combination of land fragmentation and monocropping has led to farmers applying more and more insecticides as pests develop resistance, leading to a 'pesticide treadmill'. Another major factor behind increased pesticide use in the state is the spread of agrochemical dealers and agents who routinely recommend cocktails of pesticides or excessive dosages.

63 Directorate of Plant Protection, Quarantine and Storage, Dept. of Agriculture and Farmers Welfare, MAFW; https://ppqs.gov.in/en/statistical-database?page=1

64 'Pesticide Use in Telangana 3rd Highest in Country', Sribala Vadlapatla, Times of India, June 2024;
Consumption Of Fertilizer And Pesticides In Telangana: Small And Marginal Farmers' Challenges, Cherupelly et al., Glocalism, https://doi.org/10.54103/gjcpi.2024.24077

## 5. Climate Change Impacts and Vulnerability

Climate change amplifies existing agricultural vulnerabilities in Telangana. The state has witnessed a 0.81°C increase in average annual temperatures over the past century. Agricultural scientists in the state identify several critical climate-related challenges:.

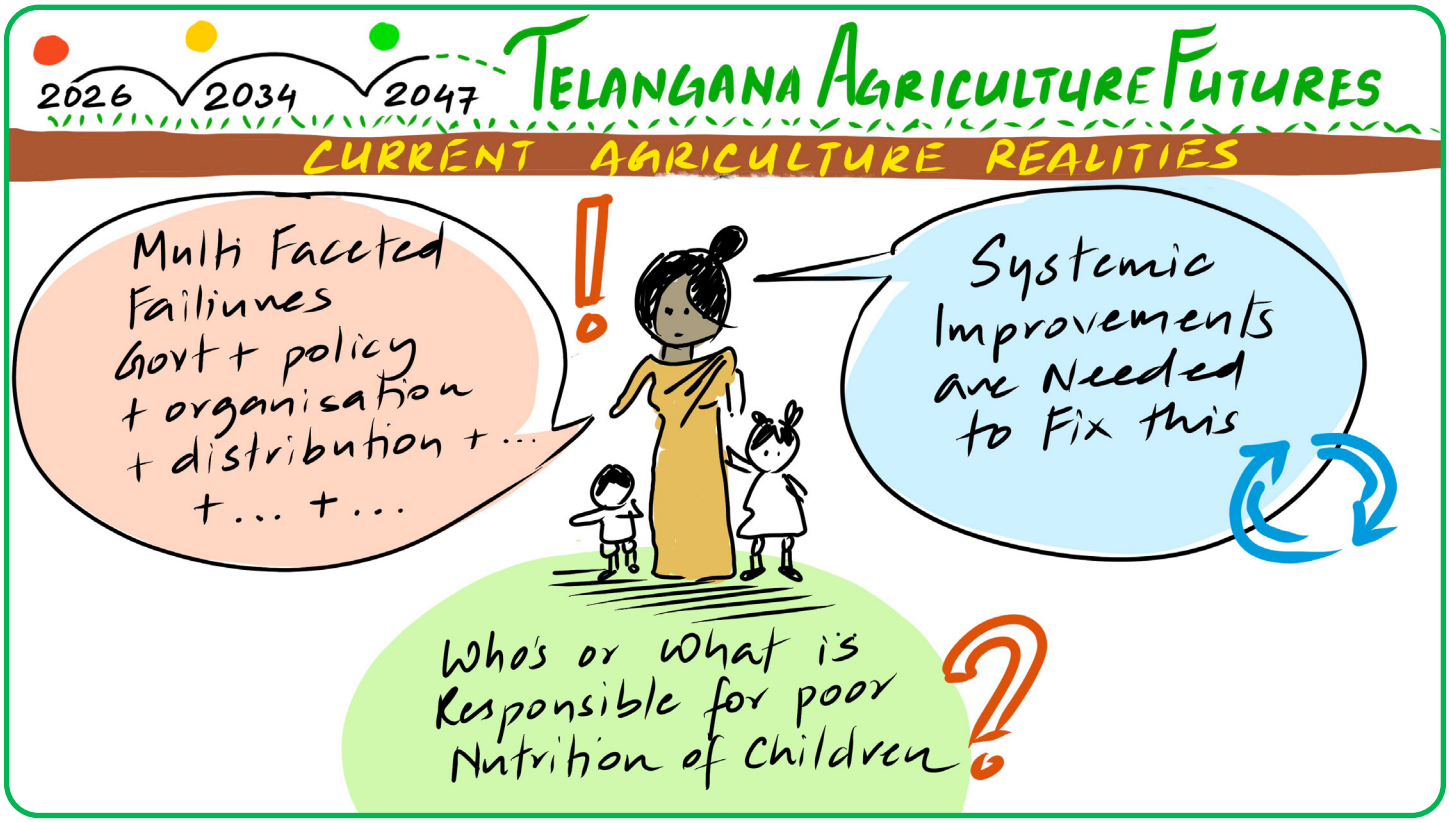
- **Temperature extremes:** Summer temperatures regularly exceed 45°C in districts like Adilabad and Nizamabad, creating heat stress during critical growth phases. Increased frequency of heatwaves impacts pollination, grain filling, and overall crop productivity[65].

- **Rainfall unpredictability:** Despite 80% of annual rainfall occurring during monsoon months, distribution has become increasingly erratic[66]. Shifts in sowing seasons and prolonged dry spells within the monsoon period disrupt traditional cropping calendars.

- **Vulnerability projections:** Climate assessments indicate the number of vulnerable mandals will increase from 28% currently to 45% by the early century and 59% by mid-century, affecting the majority of agricultural areas[67].

- **Crop sensitivity:** Both Kharif and Rabi crop yields show high sensitivity to maximum temperature, minimum temperature, and rainfall variations. Non-weather variables like fertiliser and irrigation cannot fully compensate for climate impacts. In 2025, extreme weather events caused significant crop failures, such as drought-like conditions in March 2025 in Jangaon and Jogulamba Gadwal districts, and hailstorms in April 2025 in Kamareddy and Nizamabad districts that destroyed paddy and maize crops[68]. Additionally, monocultures of crops such as paddy, maize and cotton have lower resilience and greater sensitivity to weather extremes than traditional, diverse cropping systems with millets, groundnuts and pulses[69].

65 Telangana State Action Plan on Climate Change and Human Health 2022-27, Ministry of Health and Family Welfare and Government of Telangana.
66 'Crop Diversity Index Assessment for Telangana State Using Remote Sensing', August 2023.
67 'Assessment of climate change and vulnerability in Indian state of Telangana for better agricultural planning', Kadiyala, M.D.M., Gummadi, S., Irshad, M.A. et al., Theor Appl Climatol 143, 309–325 (2021). https://doi.org/10.1007/s00704-020-03425-8
68 'Monocropping Patterns in Telangana Agriculture', unpublished Draft
69 'Crop Diversity Index Assessment for Telangana State Using Remote Sensing', August 2023; 'Agriculture in Telangana: From Scarcity to Abundance', Ramachandra and Barman, 2024




# 1.3 FOOD AND NUTRITION

## 1. Nutrition Status and Trends

Telangana faces significant challenges in food and nutrition security, with all 31 districts showing public health concerns across multiple nutrition indicators. Between 2015-2016 and 2019-2021, the state witnessed upward trends in child malnutrition, with increases in stunting, wasting, and anemia rates. At the same time, there has been a jump in nutrition-related Non-Communicable Diseases (NCDs), such as obesity and hypertension. If these trends continue, Telangana would likely see steep increases in this double burden of nutrition by 2047 (refer to Table 1.3.1 and Figure 1.3.1).

**Table 1.3.1: Trends and Projections in Undernutrition Outcomes for Telangana'.**

| Indicator | Prevalence[70] (2019-2021) | India Average (2019-2021) | Change from 2015-2016 (per-centage points) | #BAU by 2034 | BAU by 2047 |
|---|---|---|---|---|---|
| Stunting | 28% | 33% | +5 | 42% | 53% |
| Wasting* | 18% | 18% | +4 | 29% | 37% |
| Severe Wasting | 8% | 8% | +3 | 16% | 22% |
| Underweight | 28% | 32% | +4 | 39% | 47% |
| Anemia | 61% | 70% | +9 | 80-82% | 90-93% |

*(children under 5 years of age who are acutely undernourished)
(# Business As Usual - given current trends continue)

70 Christopher, Anita, et al. State Nutrition Profile: Telangana. PO SHAN Data Note 85, International Food Policy Research Institute, Dec. 2022.

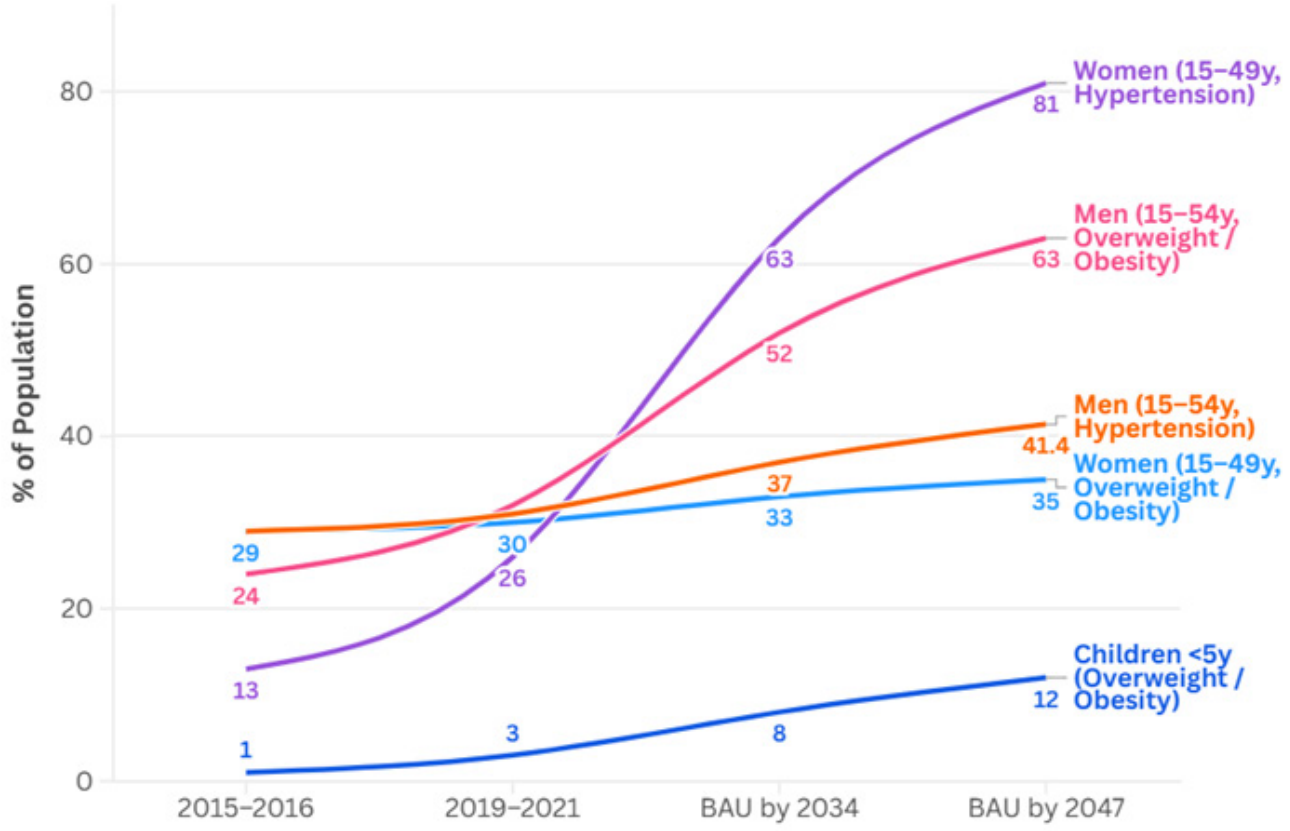
## Districts with Highest Burden:

**Stunting:** Ranga Reddy (173,073), Mahbubnagar (155,653), Hyderabad (102,126)
**Anemia:** Ranga Reddy (311,768), Mahbubnagar (271,114), Hyderabad (191,931)[71]

Table 1.3.2: Trends and Projections in nutrition-related NCDs for Telangana

| Population Group | Indicator | 2015–2016 (%) | 2019–2021 (%)[72] | BAU by 2034 | BAU by 2047 |
|---|---|---|---|---|---|
| Children (<5y) | Overweight / Obesity | 1 | 3 | 8% | 12% |
| Women (15–49y) | Overweight / Obesity | 29 | 30 | 33% | 35% |
| | Hypertension | 13 | 26 | 62-65% | 80-83% |
| Men (15–54y) | Overweight / Obesity | 24 | 32 | 52% | 62-65% |
| | Hypertension | 29 | 31 | 37% | 41% |

Fig 1.3.1: Current and Future Trends in Nutrition-Related NCDs for Telangana




Source: State Nutrition Profile: Telangana. POSHAN Data Note 85

71 State Nutrition Profile: Telangana. POSHAN Data Note 85
72 State Nutrition Profile: Telangana. POSHAN Data Note 85

## 2. Diet Diversity and Cropping Patterns

With a projected population of approximately 38.67 million in 2026, Telangana records nutritional intake levels above the national average, with per capita calorie intake of 2541 (rural) and 2699 (urban) compared to all-India averages of 2383 and 2472, respectively[73]. However, Telangana has recorded a historical decline in dietary diversity from a once rich food system of over 300 species[74]. Cropping pattern shifts towards monocrops of cereals (rice, maize) and cash crops such as cotton, and the reduction of area under millets, pulses and horticulture have led to reduced access and availability of diverse food groups in the food system. Several studies have found that underweight, stunting, and wasting in children are significantly associated with the absence of Minimum Dietary Diversity (MDD), which is defined as the consumption of five or more food groups out of eight recommended food groups within 24 hours for children aged 6–23 months[75].

Telangana is a significant agricultural exporter, with agriculture and allied exports valued at ₹6,737 crore in 2021–22, including ₹3,055 crore from cotton, ₹1,936 crore from spices, and ₹1,480 crore from cereals, indicating a production system oriented toward non-food commodities and selective surpluses[76]. The state faces structural deficits in key food groups, with pulses cultivation declining from ~10.8% to ~3.9% of gross cropped area and per capita consumption at 1.74 kg/month. Similarly, edible oil demand is met through imports estimated at 4–5 LMT annually, and a 70% decline in vegetable production since 2014 has increased dependence on neighbouring states. Table 1.3.3 shows the gap between production, consumption and demand for different food groups.

73 'Nutritional Intake in India (2022–23 & 2023–24)', Ministry of Statistics and Programme Implementation, NSO, June 2025
74 Government of India, Ministry of Statistics and Programme Implementation, National Statistics Office. (2025). Nutritional intake in India (2022–23 & 2023–24) (NSS Report No. 594).
75 Jayakumar, K., L. Vijayasree and B. Kiranmai (2025). 'A cross sectional study on minimum dietary diversity and nutritional status among the Children aged 6-23 months in the urban field practice area of Osmania Medical College',MRIMS Journal of Health Sciences, 13(4); https://doi.org/10.4103/mjhs.mjhs_16_24
76 PS Dileep. (2023, February 7). Agriculture exports see rapid growth in Telangana. Telangana Today. https://telanganatoday.com/agriculture-exports-see-rapid-growth-in-telangana

Table 1.3.3: Demand and Production of Different Food Groups in Telangana

| Food Group | ICMR Recommended (g/person/day) | Recommended Annual State Requirement (MMT/yr) | Actual Daily Consumption (g/person/day) | Actual Annual Demand (MMT/yr) | Total Produced (MMT/yr) | Gap: Recommended vs Produced (MMT/yr) | Gap: Actual Demand vs Produced (MMT/yr) | Notes |
|---|---|---|---|---|---|---|---|---|
| **Cereals & millets** | 250 | 3.53 | ~380 | ~5.37 | ~9.60 | +6.07 (SURPLUS) | +4.23 (SURPLUS) | The state produces ~2.7x its recommended nutritional need. Surplus exported inter-state and internationally. Rice dominates at 95%+ of cereal production. |
| **Pulses** | ~45 | 0.64 | ~58 | 0.82 | 0.42 | -0.22 (DEFICIT) | -0.40 (DEFICIT) | Area collapsed from 10.8% to 3.9% of GCA since 2016. The state meets only 51% of the recommended need from its own production. |
| **Vegetables** | 400 | 5.65 | ~150-170 | ~2.28 | 1.07 | -4.58 (DEFICIT) | -1.21 (DEFICIT) | Actual consumption falls far below ICMR norms. Production covers only ~19% of recommended needs. Vegetable area is just 0.56% of GCA. |
| **Fruits** | 100 | 1.41 | ~60-80 | ~0.97 | 3.95 | +2.54 (SURPLUS) | +2.98 (SURPLUS) | Significant mango, grape and sweet orange producer. Surplus largely exported. |
| **Edible oils & fats** | 27 | 0.38 | ~40 | 0.57 | ~0.05-0.10 (est.) | -0.28 (DEFICIT) | -0.47 to -0.52 (DEFICIT) | Proportionally, the most severe deficit. Groundnut and sunflower areas are declining. Heavily import-dependent on palm oil. |
| **Nuts & seeds** | 35 | 0.49 | n/a | n/a | n/a | n/a | n/a | Groundnut is the primary crop but largely processed into oil. Disaggregated nut/seed production data not available at state level. |

# 1.4 STRUCTURAL LOCK-INS AND SYSTEMIC INERTIA

Since its formation as a state, Telangana's food system has moved towards high groundwater exploitation, exponential growth in paddy production and an alarming rise in agrochemical use. These trends are simply unsustainable in an era of climate change. The reduction in crop diversity has also impacted diets and nutrition, as reflected in indicators of anemia, stunting, wasting as well as Nutrition-related Non-Communicable Diseases (NCDs). As this report has shown, several structural factors and policies perpetuate these trends in Telangana, despite their recognized limitations.

## SUBSIDY STRUCTURES

- Free 24×7 electricity for agriculture combined with the expansion of tubewells across the state have incentivized ecologically harmful cropping practices such as the cultivation of paddy in dry areas and seasons (Yasangi). This leads to the overexploitation of groundwater and a decline in soil quality due to the lack of crop rotations.
- Chemical fertilizer subsidies also create path dependency on synthetic inputs, as their exclusive and imbalanced application causes a decline in soil quality, leading to an agrochemical 'treadmill', where more and more fertilizer is required to achieve the same yields.

## PROCUREMENT POLICIES

- Government procurement focuses primarily on rice and cotton, disincentivizing diversification to less water-intensive or more nutritious crops. Rice procurement from Telangana increased from 16 Lakh Metric Tons (LMT) in 2015–16 to 70.82 LMT in 2025–26, a staggering 342% increase. While the MSP for paddy in 2025-26 was ₹2,369 per quintal, the state government's bonus of ₹500 per quintal for fine varieties has increased the price received by farmers to ₹2,800-₹2,900. The average yield of paddy per acre at 18 Qtl is much higher than other crops, further incentivizing farmers to grow paddy instead of other crops.

## LACK OF MARKET LINKAGES AND PREMIUMS

- The lack of effective market linkages and premiums for diverse and organic produce is a major challenge in crop diversification and transition towards sustainable agriculture. Farmers face dual production and marketing risks. Price volatility in commodity markets, delayed procurement, inadequate storage infrastructure and processing facilities create income uncertainty. The dominance of middlemen in agricultural value chains leaves producers with minimal margins. Although FPOs have been promoted by central policies, they often lack the capacity and bargaining power to build direct market linkages and facilitate remunerative prices for farmers.

## KNOWLEDGE SYSTEM AND EXTENSION SERVICE GAPS

- Agricultural universities and research institutions primarily focus on high-input agriculture. Indigenous knowledge and farmer innovations receive limited recognition. Agricultural extension also remains oriented toward productivity maximization through external inputs rather than ecological farming approaches. Staff often lack training in regenerative methods.

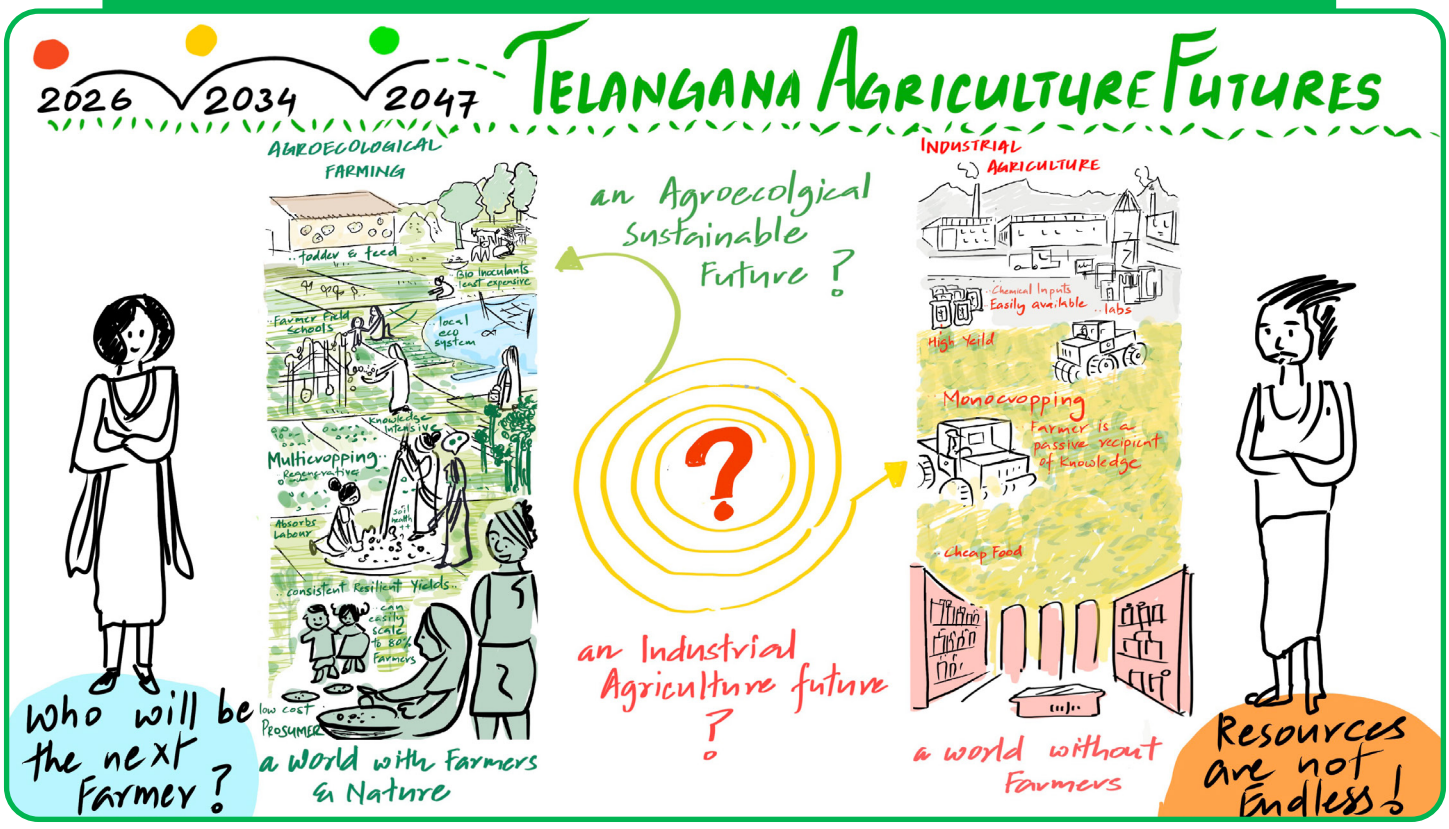
## CREDIT ACCESS AND INSURANCE

- Formal credit mechanisms favor conventional farming packages due to lower perceived risks. Area or crop based insurance schemes, including PMFBY, also end up incentivising conventional monocropping over diverse cropping systems due to the complexities of claims estimates for small-scale, diverse farms. Thus, without supportive financing, the transition to diverse, organic cropping systems can become challenging. Tenant farmers often lack access to formal sources of credit and insurance, constraining their ability to bear the risks of transition. Interlinked input, credit and output markets further constrain small and marginal farmers' choices of crops and production practices[77].

77 Pradhan Mantri Fasal Bima Yojana (PMFBY) is the primary crop insurance scheme in India and calculates payouts based on the average yield in a given area.

PART 2

# Future Projections (2034 & 2047)



## METHODOLOGICAL NOTE

Projections here use trend extrapolation from the most recent data points that have been referenced in the previous section, from national databases and verified sources (CGWB, NAFIS 2.0, NSS, Soil Health Card Portal, PPQS, and DES). Three modelling approaches are applied:

- **Linear extrapolation** for indicators with no natural ceiling and stable trend direction (e.g., fertiliser consumption, pesticide volume).
- **Logistic growth curves** for bounded percentage indicators approaching theoretical ceilings (e.g., anemia prevalence, small-marginal holding share, groundwater stage of extraction).
- **Qualitative range estimates** where interacting structural forces make precise modelling unreliable (e.g., farmer suicide rates, income-debt dynamics).

The choice of 2034 and 2047 for projected scenarios is partly symbolic, as it marks 20 years of Telangana's formation as a state and 100 years of India's independence. However, it roughly corresponds to a medium term (~10 years) and long-term (~20 years) horizon from the present.

All projections assume no major policy intervention or changes in structural factors beyond current trajectories. These estimates should be read as directional signals rather than precise forecasts. Artificial intelligence tools have been used with due verification to refine projection methodology and indicators.

# 2.1 INCOME AND LIVELIHOOD PROJECTIONS

## DEMOGRAPHY

Only 1.2% of youth (ASER 2017) express interest in agriculture as a profession. The average farmer age is already ~51 nationally (Agriculture Census 2015-16). If current disinterest continues:

**Table 2.1.1: Age and Gender Projections**

| Indicator | Current (~2025) | 2034 | 2047 |
|---|---|---|---|
| Average age of farmer (years, est.) | ~51–56 | ~60+ | ~65-70+ (near retirement age) |
| Share of youth (under 30) in agricultural workforce (%) | Declining | <10% | <5% |
| Female share in agricultural labour (%) | 68.87% | ~72–75% (feminisation deepens) | ~78%+ |

The ageing farmer crisis has a hard 2047 horizon: a majority of today's 51-year-old farmers will have either retired or passed away by 2047, with no reliable pipeline for succession. In such a scenario, distress driven migration to urban areas will also increase, leading to the further feminisation of agricultural labour (that is currently occurring without adequate policy recognition). At the same time, around half the population will continue to be dependent on agriculture, compounding the fragility of the farming workforce.

## LANDHOLDING FRAGMENTATION

The historical rate of decline in average operational holding size is 0.018 ha per year (from 1.12 ha. In 2010-11 to 1.00 ha in 2015-16 to 0.89 ha in 2021-22). The absence of structural reforms in inheritance law and the lack of diversification away from agriculture mean fragmentation will continue, although the rate may decline marginally as land sizes become more and more economically unviable.

**Table 2.1.2: Landholding Fragmentation and Projections for Telangana**

| Indicator | 2021-22 (Baseline) | 2034 Projection | 2047 Projection |
|---|---|---|---|
| Average holding size (ha) | 0.89 | ~0.67 ha | ~0.43 ha |
| Small & marginal holdings (%) | 91.4% | ~97% | ~99% (logistic ceiling) |

At 0.43 ha by 2047, the average Telangana farmer will cultivate a plot roughly the size of a football field. By 2047, barely 1% of holdings will be larger than 2 hectares, posing serious challenges to the economic viability of farming. Even in cases where the size of land owned remains viable, the average size of cultivated land is likely to remain much lower due to tenancy arrangements. This creates a structurally created income deficit for the vast majority of farming households.

## AGRICULTURAL INCOME AND WIDENING INEQUALITY

Under a business as usual (BAU) scenario, the gap between agricultural income and government salaries is likely to widen dramatically because Pay Commission revisions systematically increase government salaries every 10 years, while agricultural income grows only marginally in real terms. Additionally, high rates of agricultural inputs costs inflation, estimated from the Composite Input Price Index (CIPI), which stood at 8.1% in 2026-27, further eat into real earnings from crop production[78].

**Table 2.1.3: Projections for Incomes of Farmers and Government Employees**

| Indicator | 2021-22 | 2034 | 2047 |
|---|---|---|---|
| Agri. household income (nominal, ₹/month) | ₹13,874 | ~₹24,900 (5% CAGR) | ~₹47,000 (5% CAGR) |
| Agri. household income (real, 2022 ₹) | ₹13,874 | ~₹16,000 (2% real growth) | ~₹20,000 (2% real growth) |
| Government entry-level salary (nominal, ₹/month) | ₹36,020 (7th PC) | ~₹67,000 (9th PC est.) | ~₹1,00,000 (11th PC est.) |
| Monthly parity gap (real, 2022 ₹) | ₹22,146 | ~₹35,000+ | ~₹45,000+ |
| Farmer income as % of gov. employee salary | 38% | ~24% | ~20% |

78 Price Policy for Kharif Crops: The Marketing Season 2026-27, March 2026, Commission for Agricultural Costs and Prices, p. 139

Even in nominal terms, agricultural income cannot keep pace with government salary growth driven by structured pay revisions. In real purchasing power terms, the farmer-to-government-employee income ratio will deteriorate from 38% to approximately 20% by 2047. Even accounting for income support schemes such as Rythu Bharosa and PM-KISAN, the income ratio will not exceed 30% by 2047. This escalating disparity, combined with declining landholding sizes and rising input costs, represents the principal driver of rural-urban income disparities, rural-to-urban migration and agrarian distress.

### INDEBTEDNESS

Telangana currently holds India's highest rural indebtedness at 92% of households, with average outstanding debt of ₹1,29,599. The slight decline from ₹1,52,113 (2018-19) occurred in a period of PM-KISAN and Rythu Bharosa disbursements and may not be sustained as input costs continue rising.

**Table 2.1.4: Projections for Rural Indebtedness in Telangana**

| Indicator | 2021-22 (Baseline) | 2034 Projection | 2047 Projection |
|---|---|---|---|
| Prevalence of indebted households (%) | 92% | ~93–95% | ~95% (saturation) |
| Average outstanding debt (nominal ₹) | ₹1,29,599 | ~₹2,60,000 | ~₹5,55,000 |
| Debt-to-annual-agri-income ratio | ~0.78x | ~0.87x | ~0.98x |

## 2.2 NATURAL RESOURCE PROJECTIONS

### GROUNDWATER DEPLETION

This is the most urgent threat to Telangana's natural resources, with depletion rates compounding annually. The red zone (>20 m depth) grew 36% in a single year (April 2024 to April 2025), driven mostly by tubewell proliferation for Yasangi paddy. The critical question is not whether Telangana faces a groundwater crisis, but when — and in which districts — that crisis will reach an irreversible threshold. Preliminary estimates from NGRI and CGWB data suggest that Nalgonda, Nagarkurnool, and Vikarabad districts, already in the most severe depletion category, face functional exhaustion of shallow aquifers (above 50m) within 8–12 years at current extraction rates, without significant recharge interventions. This would make groundwater-based Yasangi paddy cultivation ecologically impossible in these districts long before 2047.

Even a conservative 10–15% annual growth scenario places approximately 27–36% of Telangana's geographical area in critical groundwater depletion by 2047. Given that hard-rock geology limits recharge to only 15% of rainfall[79], and recharge rates have not kept pace with extraction growth despite above-normal rainfall in recent years, natural recovery is structurally constrained. Several districts — Nalgonda, Vikarabad, Nagarkurnool — face a realistic risk of effectively exhausting accessible shallow aquifers by 2034, leaving farmers dependent on deep borewells at 150+ metres that are both expensive and ecologically catastrophic. **This represents an irreversible threshold, not merely a policy challenge.**

79 Telangana On Brink Of Severe Water Crisis', ETV Bharat, July 2025, https://www.etvbharat.com/en/!state/telangana-on-brink-of-severe-water-crisis-ngri-study-finds-only-15-percent-of-rainwater-seeps-into-the-ground-enn25071701746

Table 2.2.1: Projections for Groundwater Depletion in Telangana

| Indicator | 2025 (Baseline) | 2034 Projection | 2047 Projection |
|---|---|---|---|
| Stage of GW extraction (% of dynamic resource) | 46.7% | ~62–68% | ~75–82% |
| Red zone area (sq km, >20m depth) | 4,714 | ~11,000–14,000 (10–15%/yr growth) | ~30,000–40,000 (~27–36% of state area) |
| Over-exploited villages | 500+ | ~900–1,200 | ~1,800–2,500 |
| Agricultural share of GW extraction (%) | 88% | ~87–89% | ~85–88% (slight shift to urban use) |
| Bore well average depth (m) | Escalating; 70+ m in worst areas | 100–150 m in red zones | 150–200 m in depleted zones |

## SOIL HEALTH DECLINE

Soil organic carbon (SOC) is the foundational indicator of long-term soil health. Under continued paddy monocropping and urea-dominant fertiliser consumption, SOC deficiency will approach two-thirds of all agricultural soils by 2047. This creates a self-reinforcing vicious cycle: lower SOC reduces water retention capacity, which increases irrigation demand, which accelerates groundwater extraction, which forces deeper drilling and greater energy use. ICAR studies by the Indian Institute of Pulses Research have found that rice-pulse rotations maintain higher SOC than wheat or monocrop systems[80], making the pulse area collapse even more devastating for Telangana's soil health.

The table below projects the deterioration in Telangana's soil health if current trends and practices continue:

Table 2.2.2: Soil Health Indicators and Projections for Telangana

| Indicator | 2024-25 (Baseline) | 2034 Projection | 2047 Projection |
|---|---|---|---|
| SOC deficiency (% of soils) | 47% | ~57–62% | ~68–74% |
| Nitrogen deficiency (% of soils) | 86% | ~88–90% | ~90–93% (near-universal) |
| Iron deficiency (% of soils) | 57% | ~62–67% | ~70–75% |
| Zinc deficiency (% of soils) | 47% | ~55–60% | ~65–70% |
| Land degradation (% of state area) | 31.68% | ~40–43% | ~50–55% |
| Salinisation-affected area | Expanding | Significant increase in poorly-drained paddy areas | Major constraint in 4–6 key districts |
| Fertiliser efficiency (urea use efficiency, %) | 30–40% | 25–35% (declining) | 20–30% (declining) |

80 'Estimating Positive Externalities of Nitrogen Fixation by Pulses', 2016, Bhat and Umesh, ICAR-IIPR, UAS GKVK; https://www.researchgate.net/publication/312575004_Estimating_Positive_Externalities_of_Nitrogen_Fixation_by_Pulses;
'Pulses as a candidate crops: Pulses as a candidate crops for doubling farmers' income', January 2018, NP Singh, ICAR-IIPR; https://icar.org.in/sites/default/files/inline-files/Pulses-as-a-condidate-crops.pdf

## CROPPING PATTERN AND AGROCHEMICAL TRENDS

The table below shows the projections in area under different crops and consumption of agrochemicals if current policy incentives such as free electricity, paddy procurement and tubewell expansion continue.

**Table 2.2.3: Cropping Patterns and Agrochemical Use Trends and Projections for Telangana**

| Indicator | 2024-25 (Baseline) | 2034 Projection | 2047 Projection |
|---|---|---|---|
| Paddy area (Yasangi, % of sown area) | 75.6% | ~80–85% | Physical limit determined by available GW |
| Paddy area (Vanakalam, % of sown area) | 46.9% | ~52–57% | ~55–60% |
| Pulse area (% of GCA) | 3.9% | ~1.5–2.0% | ~0.8–1.2% (near-collapse) |
| Millet area (% of GCA) | 1.15% | ~1.0–1.3% | ~0.8–1.5% (policy-dependent) |
| Vegetable area (% of GCA) | 0.56% | ~0.4–0.6% | ~0.3–0.5% |
| Total fertiliser consumption (LMT) | 18.79 | ~26–30 | ~40–48 |
| Per-hectare fertiliser (kg/ha) | 234 | ~240–260 | ~260–280 |
| Urea total use (LMT) | 12.8+ | ~18–22 | ~28–35 |
| Total pesticide consumption (MT) | 6,251 | ~9,500–10,500 | ~17,000–19,500 |
| Per-hectare pesticide use (g/ha) | 900 | ~1,100–1,300 | ~1,600–2,000 |

## Key Insights

- **Increased Paddy, reduced pulse cultivation and increase in urea use** - As mentioned earlier, pulse decline is not merely an agronomic shift — it is also a nitrogen cycle collapse. As Telangana's pulse area fell from 10.8% to 3.9% of GCA, the state lost a substantial share of biological nitrogen fixation (BNF) at 40-60 kg per ha.. This has directly increased urea demand, which has doubled from 6.5 to 12.8+ lakh tonnes in ten years. Under BAU, this loss continues: by 2047, at ~1% pulse area, the BNF contribution approaches negligible levels, making the state entirely dependent on synthetic nitrogen and further magnifying fertiliser import vulnerability (a particularly salient issue given supply chain disruptions caused by geopolitical conflict over the past few years). Under BAU, urea demand will increase to 28-35 LMT in 2047, a rise of more than 100% from the current demand.

- **Increased Pesticide Use** - By 2047, BAU projections show a massive increase of more than 100%, driven by the further expansion of cash crops such as paddy, cotton and chillies. The accelerated decline of crop diversity, as seen in the decline of vegetables and millets, would also suppress pollinator and beneficial insect populations and develop resistant strains among pest populations, ultimately increasing the vulnerability to pest attacks.

## CLIMATE VULNERABILITY

These projections incorporate published climate model findings, supplemented by observed 2025 data.

**Table 2.2.4: Climate Vulnerability Outlook for Telangana**

| Indicator | Current | Early 21st Century (~2030) | Mid-Century (~2047) |
|---|---|---|---|
| Vulnerable mandals (%) | 28% | ~45% | ~59% |
| Mean temperature rise above pre-industrial (°C) | +0.81°C (century avg) | +1.0–1.2°C | +1.4–1.7°C |
| Peak summer temperatures (hottest districts, °C) | Regularly 45°C+ | 46–48°C+ | 48–50°C+ |
| Crop failure events due to extreme weather | Significant 2025 events | Increasing frequency | Multiple events/year in most districts |
| Erratic monsoon distribution | Worsening | Further deterioration | High uncertainty; severe disruption likely |

# 2.3 FOOD AND NUTRITION PROJECTIONS

Nutrition projections for 2034 and 2047 have been included in Section 1.3. Telangana by 2047 faces what epidemiologists call a "nutrition transition triple burden" — persistent undernutrition (stunting at ~53%, underweight at 47%) and 'hidden hunger' (micronutrient deficiencies, anemia at 93%) co-occurring with explosive growth in overweight/obesity (men at ~62–65%) and non-communicable diseases (women's hypertension potentially reaching 80%+). This co-occurrence in the same population and often the same households reflects the dietary shift away from diverse, nutrient-rich foods (millets, pulses, vegetables) toward calorie-dense, nutrient-poor processed foods — a shift that is hastened by cropping pattern changes and increased dependence on imports to supplement the state's nutritional needs.

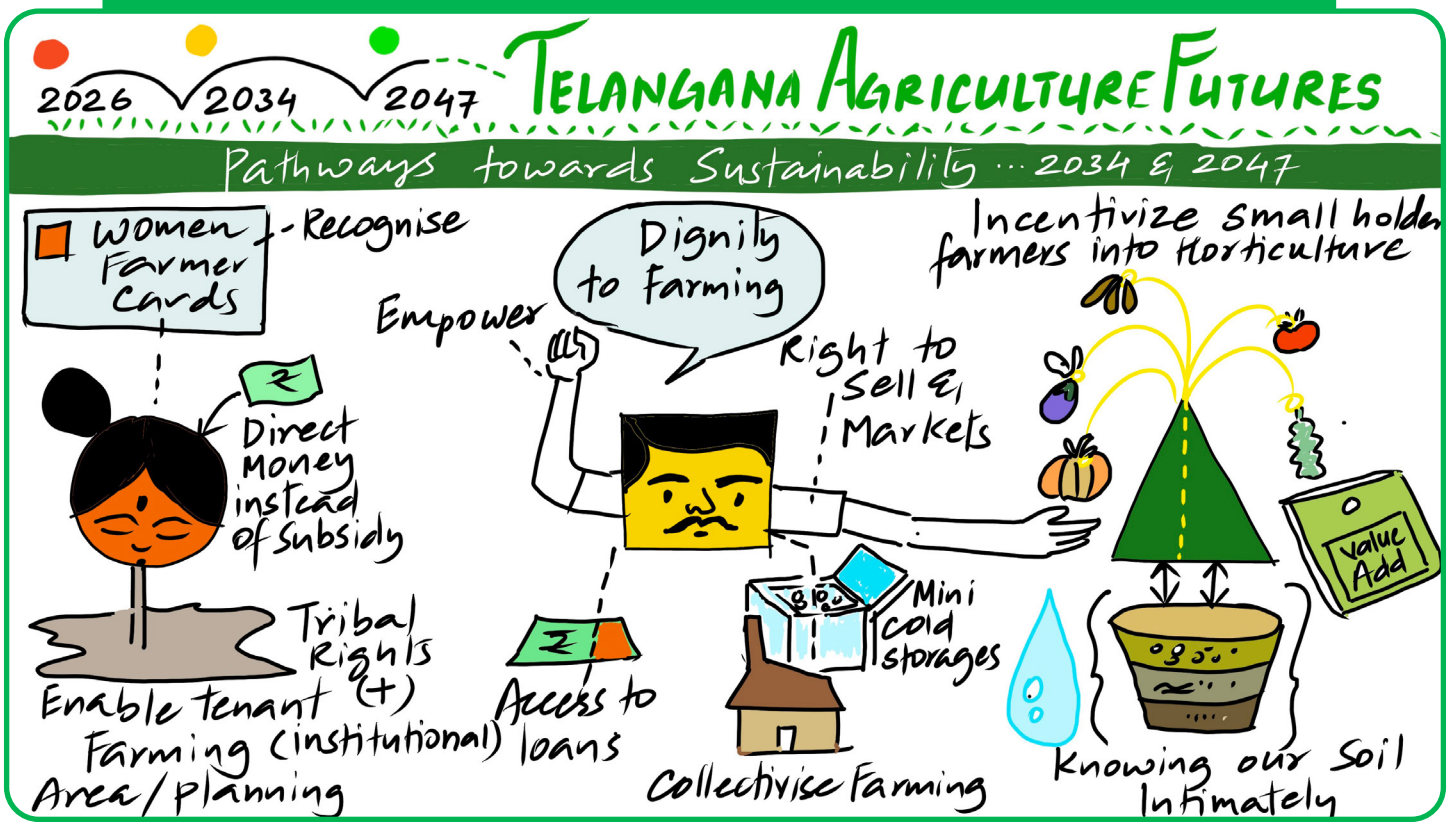
## CONCLUSION

Ultimately, the evidence on vital socioeconomic, ecological and nutritional indicators for Telangana shows that, if current trends continue, the state is likely to reach a threshold of irreversible social, ecological and nutritional damage in the long-term. By 2034, the state will reach an ecological tipping point: 2/3rds of the soil will be deficient in SOC, with some soils becoming biologically dead (<0.3 SOC). If groundwater extraction continues at the current rates, many districts could see Day Zero by 2034, where extraction exceeds recharge rates and groundwater reserves are functionally exhausted. The projections for socio-economic indicators show that rural-urban income disparities would further increase while the average rural household would face shrinking of their cultivable land and be kept afloat by unsustainable levels of debt. Natural resource declines and rural economic distress would compound to have devastating impacts on nutrition, with anemia and undernutrition coexisting with obesity and hypertension even in rural areas.

However, a different, regenerative future could also exist, if the window of opportunity for facilitating a managed, sustainable transition is effectively utilised. The policy window for Telangana is likely to close by 2030, the last point at which transformation can still be initiated and achieve meaningful impact. The next section outlines the recommendations for policy driven transition that could put Telangana on the path towards a regenerative and prosperous future.

PART 3

# Policy Recommendations



The following policy recommendations were discussed and finalised by participants at the **Telangana Agriculture Futures Workshop (2034 & 2047)**, organised on 27th January at Hyderabad by the Telangana Agriculture and Farmers Welfare Commission (TGAFWC); Centre for Sustainable Agriculture (CSA); Deccan Development Society (DDS) and the University of Hyderabad.

1. **Transitioning from rice-centric incentives to diversified assured procurement:** Currently, paddy dominates in Telangana, driven by increased MSP procurement, free 24×7 electricity and tubewell expansion. However, farmers have shown willingness to grow other crops if there is an assured MSP. Hence, assured procurement and bonuses for non-paddy crops, especially millets, pulses and oilseeds, would support farmers in diversification.

    - **Procurement Parity (State Marketing Departments)**

        1. **Assured Buy-back:** Institutionalise mandatory procurement targets for non-paddy crops (Millets, Pulses, and Oilseeds) at the state level, matching the logistical efficiency of the paddy procurement system.
        2. **Decentralised Collection:** Utilise Primary Agricultural Credit Societies (PACS) to set up dedicated collection centres for diversified crops to reduce "farm-to-mandis" transport costs for smallholders.
        3. **Transition Bonuses:** Implement a per-acre "Diversification Bonus" paid directly to farmers who shift land from paddy to water-efficient alternatives.
        4. **Input Subsidies:** Redirect a portion of fertiliser/power subsidies toward providing high-quality seeds and bio-stimulants specifically for oilseeds and pulses.
        5. **Public Procurement Synergy:** Integrate procured millets and pulses into the Mid-Day Meal (MDM) scheme and the Integrated Child Development Services (ICDS). This creates a guaranteed "captive market" that justifies state procurement expenses.

2. **Establishment of a dedicated Telangana FPO Policy:** To transition Farmer-Producer Organisations (FPOs) from fragmented entities into robust, commercially viable enterprises through a unified state-level institutional framework. NABARD, in strategic collaboration with the government of Telangana, should formulate a comprehensive “Telangana FPO Policy”. The key policy pillars are Institutional governance, credit & financial inclusion, market & infrastructure integration, and digital & export enablement. This policy will formalise the FPO ecosystem across the state.

    1. By implementing a statewide initiative to build and support FPOs to give small and marginal farmers better economic leverage and collective bargaining power.
    2. Conducting a comprehensive mapping of FPO coverage and functionality in Telangana to identify priority regions.

3. **Institutional recognition of women farmers:** Despite contributing 60–70% of total agricultural labor, women farmers remain "invisible" within official policy frameworks and financial systems. This lack of formal status prevents access to credit, subsidies, and land rights.

    1. **Recommendation:** The department of agriculture must issue mandatory women farmer ID cards, direct benefit transfer (DBT) integration, gender sensitive lending from banks. This formal recognition will shift women from “invisible labor” to “independent economic actors,” driving higher productivity and equitable growth in the agricultural sector.

4. **Reform of tenancy and cultivator recognition frameworks:** The current legal and administrative framework ties agricultural benefits exclusively to land ownership. To decouple agricultural support systems from land ownership, ensuring tenant farmers gain equitable access to credit, insurance, and state-led welfare schemes.

    1. Rising informal tenancy reflects cultivators' limited access to land ownership, driven by high land prices and a lack of institutional credit. Owner-centric systems exclude actual cultivators, rendering them invisible to state revenue and agriculture departments.
    2. **Recommendation:** Update the **Telangana Land Licensed Cultivators Act 2011** and design schemes based on cultivator identity rather than land ownership.

5. **Strengthening soil health infrastructure and regenerative practices:** The productivity of Telangana's agricultural sector is currently bottlenecked by acute soil degradation. Evidences are infrastructure deficit, degradation trends (systemic depletion of macro and micro nutrients across major agro climatic zones), and economic impact (imbalanced fertilizer application, driven by a lack of data, is inflating cultivation costs and damaging local ecosystems). In addition, the use of heavy machinery for farm operations such as ploughing and puddling, especially in paddy cultivation, is leading to soil compaction and reduced water percolation, and thus impacting long term soil health.

    1. Focus on **Soil Health and Organic Matter:** Shift the policy focus from merely distributing chemical fertilisers to restoring organic matter in the soil to improve declining yields. By focusing on decentralised testing labs, mobile soil clinics, and systematically integrating traditional regenerative techniques.
    2. Promote effective and **regenerative soil health management techniques** such as mulching, cover cropping, green manuring, and application of Farm Yard Manure (FYM), among others.

6. **Revitalising state seed systems:** Seed systems have become highly privatised in the state, especially in commercial crops such as paddy, maize, cotton and horticulture. These seeds are also bred to prioritize yield over pest and disease resilience. Cases of large scale seed production failure, as seen in Mulugu district for maize in 2025, are also recurring. To eliminate farmers' dependence on unreliable private seed providers and mitigate the risks of seed adulteration and germination failure, the following measures are suggested.

    1. Strategic investment in **public sector seed research** and development, by redirecting funding toward Agricultural Universities specifically for the development of high-yielding, climate-resilient non-paddy varieties (pulses, oilseeds, and millets).
    2. Utilise unused lands of the Department of Agriculture (1600 acres) to establish **seed farms** and conduct seed research into diverse varieties.
    3. **Decentralised seed production models** need to be established, and subsidised distribution of diversified varieties needs to be introduced
    4. **Targeted subsidies** for the adoption of public-bred non-paddy seeds to incentivise farmers to move away from private-sector paddy monopolies.
    5. By bringing **seed control back to public institutions**, the state can ensure a reliable seed supply, support better crop yields, and protect farmers from unstable and unregulated private markets.
    6. Promote **traditional seed varieties** and certify them. Encourage traditional systems of seed exchange and community seed banks.

7. **Decentralised storage and marketing infrastructure:** Establish decentralised marketing infrastructure such as community and FPO-managed mini godowns and cold storages for perishables. Provide decentralised markets through building effective linkages to village and local marketplaces.

8. **Integrate agriculture with nutrition and public food schemes:** Institutionalise decentralised procurement by linking millets and diverse crop procurement from local farmers to Mid-Day Meals, Anganwadi (ICDS), and PDS. By this policy change, the following are the expected outcomes.

    1. **Health:** Reduction in stunting, wasting, and prevalence of anemia among children and lactating mothers.
    2. **Agriculture:** Enhanced soil health through crop rotation and reduced water consumption (via millets).
    3. **Economic:** Increased income for smallholder farmers through direct institutional demand.

9. **Address water stress through crop planning and regulation:** Current agricultural practices rely on unsustainable groundwater extraction, driven by the cultivation of water-intensive crops in water-scarce regions. Projections indicate that primary aquifers are nearing critical thresholds, threatening long-term food security and rural stability.

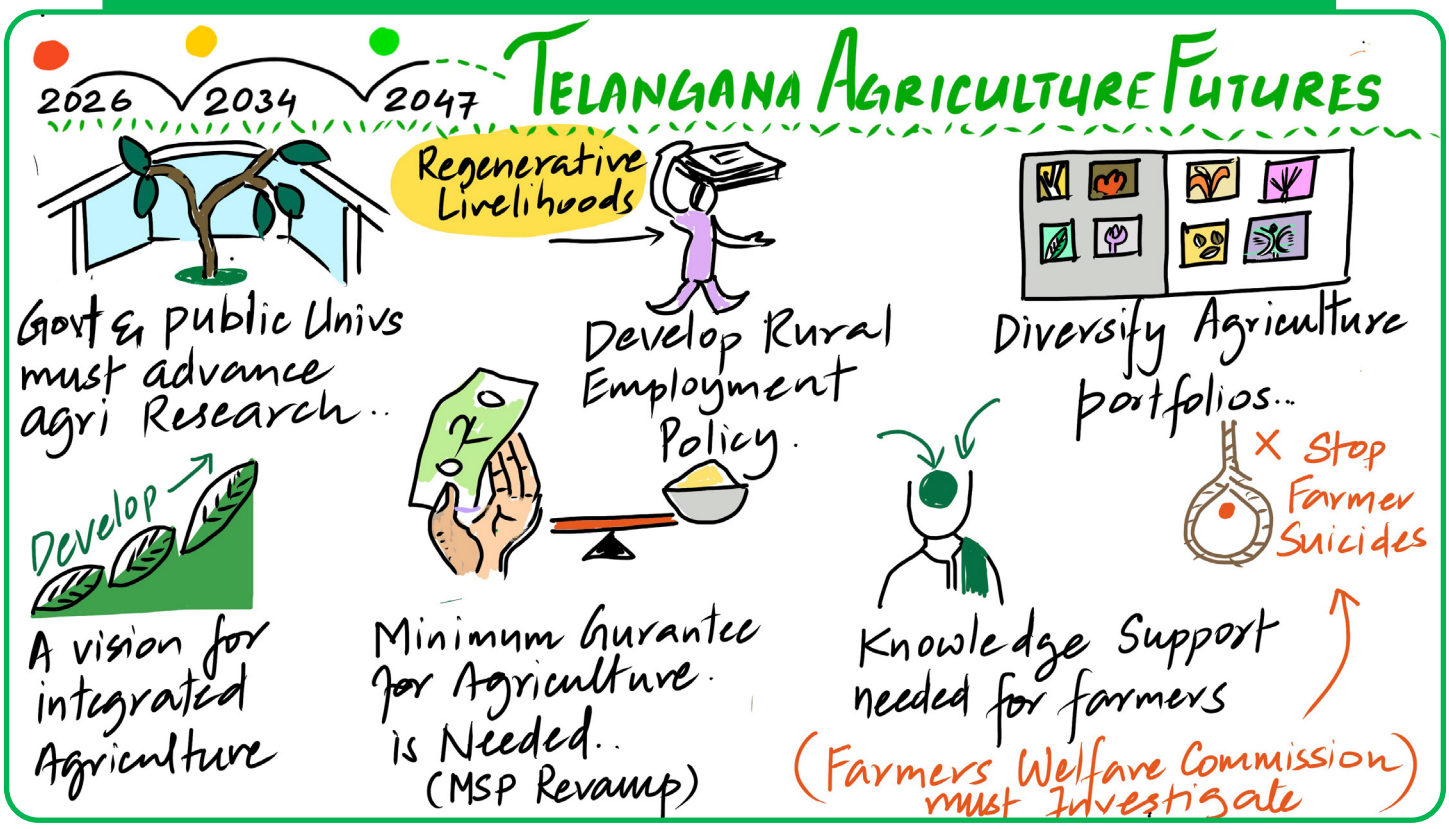
    1. Recommendation: Promote agro-ecologically suitable crops and regulate water-intensive cultivation. The policy should focus on agro-ecological mapping & crop zoning, regulatory measures on water extraction, licensing, and incentive realignment towards climate resilient crops (millets, pulses, oilseeds)

10. **Establish a Comprehensive Land Use Policy:** Agricultural land, especially near Hyderabad and state highways, are coming under increased pressure from rapid commercial development. Develop a comprehensive land use policy to streamline regularization for agricultural lands, prevent the loss of agricultural land to real estate and ensure that land is used sustainably.

11. **Address climate change vulnerability:** Climate change related erratic weather (especially heat stress) and irregular rainfall have led to crop failures in several districts in 2025. Measures to mitigate climate risk can include:

    1. **Crop planning** based on climate risks and vulnerability mapping
    2. **Risk mitigation** through development of climate-resilient crop varieties and promotion of sustainable agriculture practices
    3. Address the critical absence of crop insurance mechanisms in Telangana by instituting a comprehensive **compensation and insurance coverage policy** in cases of crop failure.

# Conclusion


TELANGANA AGRICULTURE FUTURES
2026
2034
2047
Regenerative Livelihoods
Govt & public Univs must advance agri Research..
Develop Rural Employment Policy.
Diversify Agriculture portfolios..
Develop
A vision for integrated Agriculture
Minimum Gurantee for Agriculture is Needed.. (MSP Revamp)
Knowledge Support needed for farmers
(Farmers Welfare Commission must Investigate)
X Stop Farmer Suicides

Telangana's agricultural crisis is not primarily a story of inadequate effort. The state has invested massively in agriculture — through the Kaleshwaram project, Mission Kakatiya, Rythu Bharosa, free power, and aggressive paddy procurement. In production terms, this investment has delivered spectacular results: from being a food-deficit state in 2014, Telangana became the fifth-largest paddy producer in India by 2025-26, procuring a record 70.82 lakh metric tonnes.

The paradox is that this success has been achieved at enormous and accelerating ecological, nutritional, and fiscal cost. A state that procures 60% of the country's Yasangi paddy also has 61% of its children anemic. A state with the most aggressive irrigation expansion programme in India also has the fastest-growing groundwater red zones. A state whose agricultural subsidies consume ₹33,000+ crore annually also has the highest rural indebtedness in the country at 92%.

This is not coincidence — it is the predictable outcome of a policy architecture that optimised for production volume and short-term farmer income support without accounting for ecological sustainability, dietary diversity, or fiscal limits. The vision for a flourishing Telangana in 2047 can only be navigated if policymakers, farmer organisations, and civil society are willing to honestly confront the structural lock-ins that make change difficult: the subsidy architecture that rewards water-intensive monoculture, the procurement system that guarantees rice but not nutrition, and the credit architecture that excludes the most vulnerable.

The window for managed transition is narrowing. Groundwater depletion in the most stressed districts is approaching irreversible thresholds within 8–12 years. At that point, crop diversification will not be a policy choice — it will be a physical compulsion, imposed by the land itself. The difference between managed and forced transition will be measured in farmer incomes, children's cognitive development, and state fiscal health for a generation. The policy recommendations in this report, implemented with the urgency and coherence they deserve, represent Telangana's best available pathway to agricultural futures that are ecologically viable, nutritionally adequate, and economically just.

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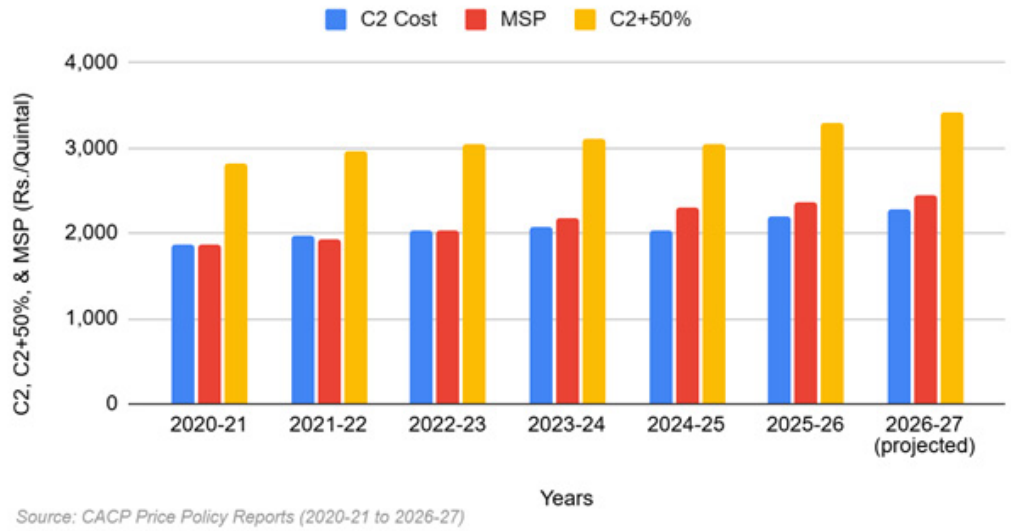
## ANNEXURE: MSP AND COST DISPARITY

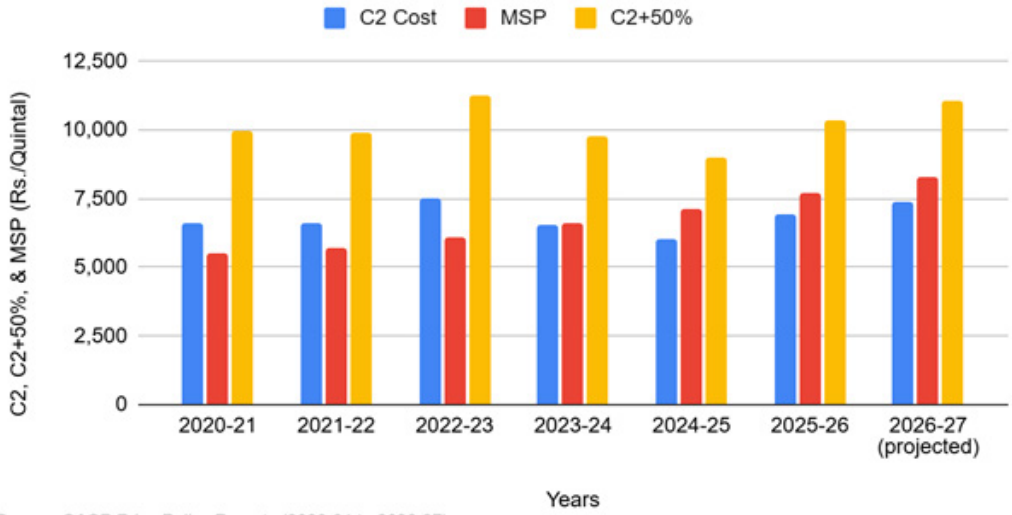
The below graphs represent the shortfall between costs and MSP for major crops in Telangana according to the CACP's own estimates for the state.

Fig A.1: Paddy Cost and MSP (CACP Estimates)



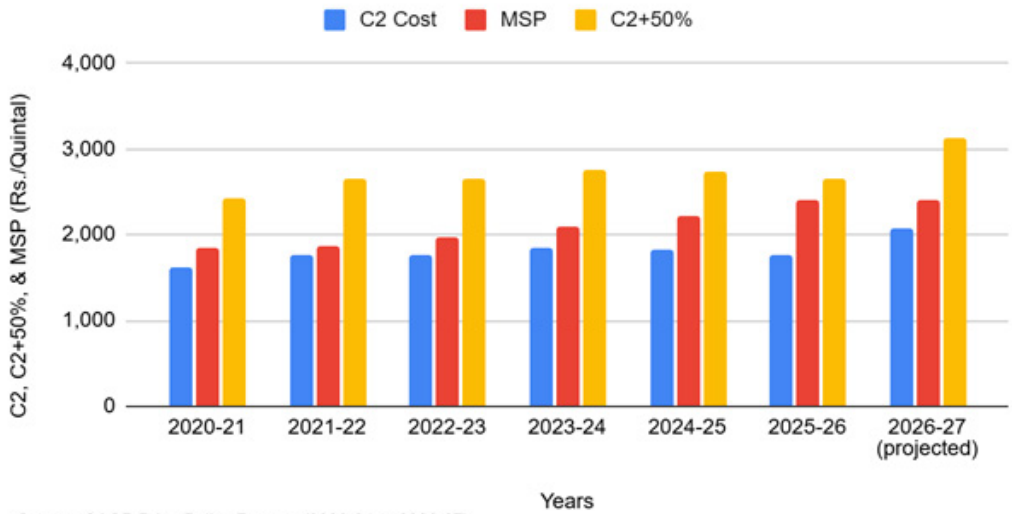

Source: CACP Price Policy Reports (2020-21 to 2026-27)

Fig A.2: Telangana Cotton Cost and MSP (CACP Estimates)



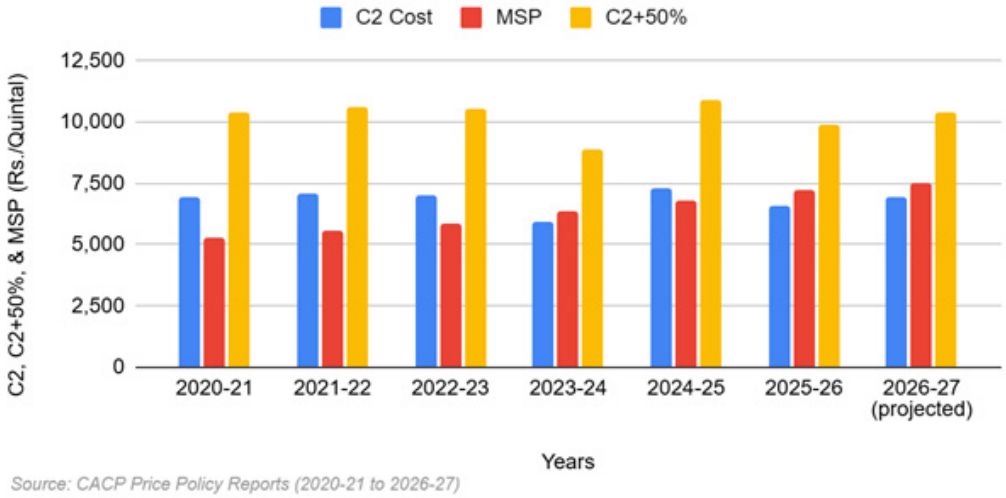

Source: CACP Price Policy Reports (2020-21 to 2026-27)

Fig A.3: Telangana Maize Cost and MSP (CACP Estimates)



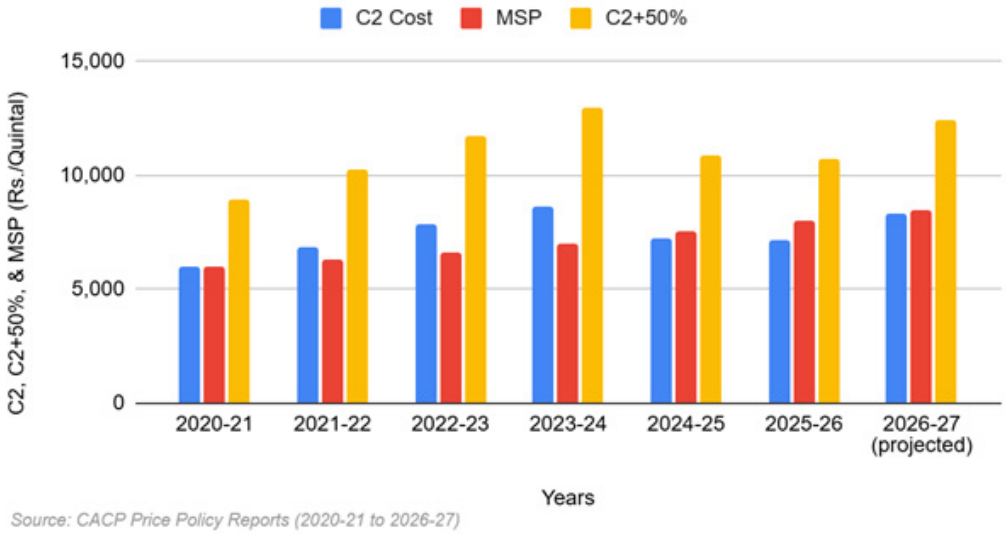

Source: CACP Price Policy Reports (2020-21 to 2026-27)

## Fig A.4: Telangana Groundnut Cost and MSP (CACP Estimates)



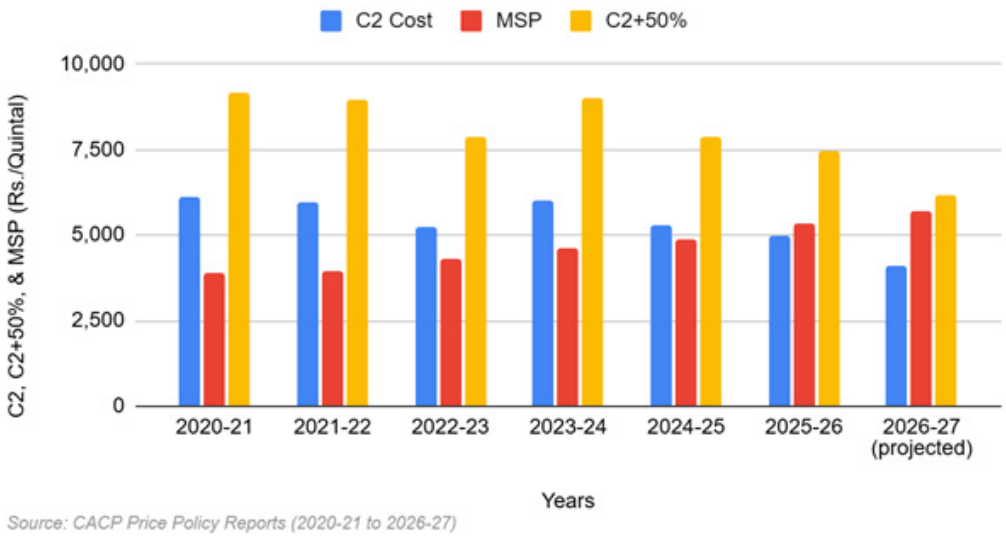

Source: CACP Price Policy Reports (2020-21 to 2026-27)

## Fig A.5: Telangana Redgram Cost and MSP (CACP Estimates)




Source: CACP Price Policy Reports (2020-21 to 2026-27)

## Fig A.6: Telangana Soybean Cost and MSP (CACP Estimates)

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