International Journal for Novel Research in Economics , Finance and Management
www.ijnrefm.com
ISSN:3048-7722
Volume 4, Issue 5, Sep-Oct-2026, PP: 01-4

Elnino' Climate Effect on Agricultural Economics in Telangana Region

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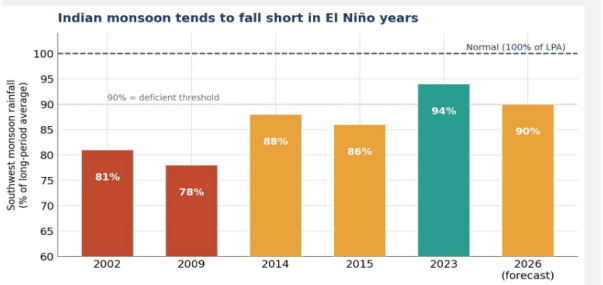
***Abstract* – El Niño is a buzzword in year 2026 which is a climatic phenomenon characterized by the periodic warming of the central and eastern equatorial Pacific Ocean, leading to substantial global changes observed in weather patterns. The effects of El Niño in India are profound, influencing various aspects of the country's climate, agriculture, and economy. The Telangana government has declared 365 mandals across 31 districts drought-affected for the 2026 kharif season, as the state recorded a 17% rainfall deficit during the southwest monsoon amid the impact of El Niño. The government order classifies 111 mandals as "severely" drought-affected and 254 as "moderately" affected. The notification will remain in force for six months unless withdrawn earlier. Nalgonda and Sangareddy are among the worst-affected districts, with 28 drought-hit mandals each, followed by Suryapet with 23, and Adilabad and Vikarabad with 20 each. Rangareddy and Nizamabad have 18 each, while Yadadri and Khammam have 17 each. El Niño is often associated with higher-than-average temperatures, leading to severe heat waves across India. These heat waves can have serious health impacts, causing heat-related illnesses and fatalities. The overall increase in temperature variability can affect both human health and the environment. In this summer of 2026, we are observing highest temperature ever recorded in the history of human being in various part of the country. However, the year 2026 is not the first El Niño year for India rather it's a regular climatic phenomenon but its severity is an alarming condition.**

***Keywords* - El Niño, Climate Change, Climate Variability, Agricultural Economics, Telangana Agriculture, Rainfall Variability, Monsoon Rainfall, Drought, Agricultural Productivity, Crop Yield**

I. INTRODUCTION

Climate change and its variability have become significant concerns for Indian agriculture in recent years. Global climate change projections indicate an increase in extreme events such as heat waves, cold waves and flooding, along with higher atmospheric carbon dioxide and ground-level ozone concentrations. Additionally, a rise in sea levels is expected to inundate coastal areas, among other impacts (Raghavan et al., 2020).

Studying Farmer's issues and challenges is essential for several reasons. Firstly, it provides insights into the specific climatic risks faced by different agricultural regions, helping to tailor adaptive measures effectively. Secondly, it aids in understanding the socio-economic factors that influence farmer's capacity to adapt, such as access to resources, knowledge and technology. Thirdly, it supports the development of policies and programs that enhance the resilience of the agricultural sector, ensuring food security and economic stability.



Source: Business Standard (2026)

A major policy change was made in May 2018 when the Telangana government introduced the Rythu Bandhu Scheme (RBS) to address these problems and improve agricultural results. In order to alleviate the financial burden of input costs such as labor, seeds, fertilizer, and pesticides, the program offers farmers direct investment support at a rate of ₹5,000 per acre per season. Rythu Bandhu is intended as a preventive and enabling mechanism to encourage farmers to become self-sufficient, in contrast to loan waiver schemes that provide short-term relief (Amitha et al., 2021; Padmavatahi, 2024). The first of its kind in India, the Rythu Bandhu Scheme has influenced other models, including the PM-KISAN scheme of the central government. Regardless of income, crop type, or land size, it is a universal transfer to all farmers who own land. Although it has received a lot of praise for its broad reach and prompt disbursement, it has come under fire for leaving out tenant farmers and neglecting to take into consideration variations in farm size and input requirements (Sneha et al., 2021; Kumar, 2022). Opponents also highlight the financial strain that these programs place on states, particularly when they have to strike a balance between short-term subsidies and long-term infrastructure investments (Zafar et al., 2023; IJSE, 2022).

Climate agencies and weather models are indicating a high probability of El Nino conditions developing during 2026, with concerns that India may experience a weaker-than-normal monsoon. Since nearly half of India's agricultural land still depends on rainfall, this is not just a weather event. It is a challenge that could impact food security,

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farmer incomes, water availability, and rural livelihoods. Possible impacts on Indian agriculture include:

- Reduced monsoon rainfall, especially across rainfed farming regions
- Lower yields of rice, pulses, oilseeds, cotton, and soybean
- Declining soil moisture affecting both Kharif and Rabi crops
- Increased irrigation demand and groundwater stress
- Rising food prices and pressure on rural economies

II. TELANGANA AGRICULTURAL ECONOMICS

According to government assessment, the dry spell has threatened the state's water security. By mid-October, the state recorded a nearly 28 per cent rainfall deficit. It is now at such a dire state that the state's drinking water need is threatened for the next eight to 10 months.

The state's reservoirs have just 200 thousand million cubic (TMC) feet of water, against the normal of 462 TMC for this time of year. Reddy's strategy is to use this limited available water till the next monsoon. To achieve this, the biggest water user, agriculture, must sacrifice to prioritise the drinking water need.



Source: www.ipcc.in "Intergovernmental Panel on Climate Change"

Despite drawing only 47% of its annual extractable groundwater, Telangana's hard-rock aquifers store limited reserves and can deteriorate rapidly after a poor monsoon, making the state more vulnerable to prolonged rainfall deficits than the numbers alone indicate.India's drought assessment framework, revised over the years and expanded in 2020, relies on multiple indicators including rainfall, soil moisture, vegetation, cropped area and hydrological parameters such as groundwater, reservoir levels and stream flows. It is therefore not based on rainfall alone, and groundwater forms a key component of the overall drought assessment.However, experts argue that groundwater indicators need to be interpreted differently in states such as Telangana, particularly when rainfall remains deficient for a prolonged period.

The Transition

Agriculture Department Secretary K. Surendra Mohan said that the El Nino contingency plans were prepared in April and awareness about alternative crops were spread during the Praja Palana Pragatiki Pranalika programme. Seeds to cultivate pulses, vegetables and others were provided at subsidised prices. Officers concerned were asked to train farmers during the transition as not all may have cultivated fruits, spices, flowers or others earlier Agriculture Department Secretary K. Surendra Mohan said that the El Nino contingency plans were prepared in April and awareness about alternative crops were spread during the Praja Palana Pragatiki Pranalika programme. Seeds to cultivate pulses, vegetables and others were provided at subsidised prices. Officers concerned were asked to train farmers during the transition as not all may have cultivated fruits, spices, flowers or others earlier

Shifts in Crop Choices and Sowing Patterns

- **Reduction in Paddy:** Due to low reservoir levels in the Krishna and Godavari basins and warnings from the government, farmers avoided long-duration, water-intensive paddy on roughly 1.3 million hectares
- **Rise in Horticulture**: Farmers shifted lands toward less water-intensive alternatives. The area under vegetables, fruits, spices, flowers, and horticulture surged by 1.28 million acres (reaching 3.54 million acres).

S.no	Crop name	Area in Kharif 2025-26 (acres)	Area in Kharif 2026-27 (acres)	Increase in area (acres)
1	Fruits	7,820	7,917	97
2	Vegetables	48,491	80,379	31,888
3	Red chilli	94,998	1,70,838	75,840
4	Turmeric	42,068	50,728	8,660
5	Oil Palm	28,412	32,109	3,697
6	Flowers	2,448	7,303	4,855
7	Other spices	1,633	4,762	3,129
		2,25,870	3,54,036	1,28,166

- Source: https://www.thehindu.com/news/national/telangana/

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Impact on Farm Economics and Prices

Higher Crop Prices for Selling Farmers: Lower overall production and restricted availability caused market prices for paddy, cotton, maize, dry chillies, turmeric, and sesame to spike well above the Minimum Support Price (MSP). Farmers who successfully harvested produce gained higher per-unit returns.

Escalating Input and Cultivation Costs: Depleted surface water forced heavy reliance on groundwater extraction and borewells, driving up irrigation, power, and seed/fertilizer expenses.

Livestock and Fodder Stress: Reduced rainfall and drying grazing lands created fodder scarcity, increasing the cost of dairy and livestock maintenance.

III. CONSUMER IMPACT AND FOOD INFLATION

Higher Market Costs: Reduced crop yields and tight supplies pushed up retail food prices, hitting middle-class and low-income households hardest as a larger share of their budget goes toward food.

Vegetable and Staple Volatility: Supply constraints in seasonal vegetables and grains amplified broader food inflation trends across urban and rural markets.

Independent variables	Farmers of Nizamabad district (n_1=120)	Farmers of Adilabad district (n_2=120)	Overall farmers (n=240)
Experience in farming	8.021 *	7.085 *	7.862 *
Annual income	8.263 *	8.120 *	8.189 *
Social participation	8.467 **	8.866 **	8.662 *
Mass media exposure	7.369 *	7.985 *	7.729 *
Extension contact	8.109 *	7.863 *	8.000 *
Extension participation	8.010 *	8.197 *	8.000 *
Farm mechanisation	3.259 NS	2.968 NS	3.189 NS
Innovativeness	7.210 *	7.928 *	7.762 *
Risk orientation	8.061 *	8.163 *	8.102 *
Scientific orientation	7.296 *	7.000 *	7.169 *
Economic motivation	14.329 **	13.728 **	13.926 **
Management orientation	7.320 *	7.892 *	7.518 *
Credit orientation	8.169 *	8.012 *	8.129 *
Cosmopoliteness	7.139 *	7.368 *	7.261 *
Deferred gratification	1.635 NS	2.356 NS	1.539 NS
Knowledge about climate smart technologies	26.367 **	25.936 **	26.296 **

NS- Non-Significant, *- Significant at 5 per cent level, **- Significant at 1 per cent level

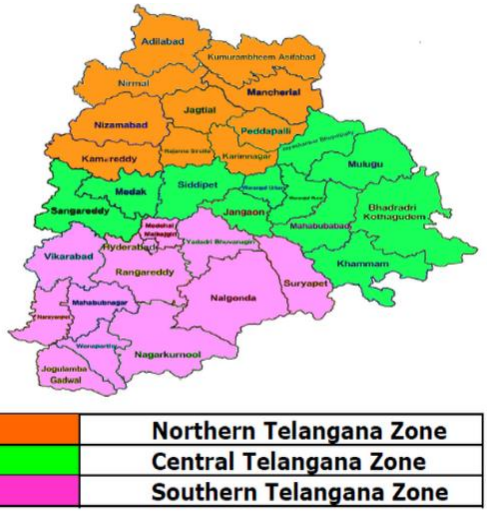
Source: M. Udaya Sindhu et.al (2024)

- **Efficient water management practices** Water conservation is critical under El Niño-induced drought conditions. Drip irrigation:
- **Drip irrigation** delivers water directly to the root zone, improving water-use efficiency and reducing losses through evaporation and runoff. Water savings of 40–60 percent can be achieved compared with conventional irrigation methods.
- **Mulching:** Organic and plastic mulches help conserve soil moisture, suppress weed growth, moderate soil temperature, and improve crop productivity.
- **Rainwater harvesting**: Farm ponds, check dams, percolation tanks, and field bunding can effectively capture and store rainwater for supplemental irrigation during dry periods.
- **Improving soil health through organic inputs**: Healthy soils possess greater waterholding capacity and resilience against drought stress.

IV. CONCLUSION

Agriculture in Telangana is largely dependent on monsoon rainfall, with a significant proportion of cultivated land being rainfed. Variations in rainfall distribution and intensity directly affect crop productivity and farm income. In recent years, climate change has increased the frequency and intensity of extreme weather events, including El Niño, which poses a major challenge to agricultural sustainability. El Niño is often associated with below-normal rainfall, prolonged dry spells, higher temperatures, and moisture stress conditions in many parts of India. Under such circumstances, farmers relying solely on water-intensive crops such as rice and cotton are exposed to greater production risks.

Climate variability and recurring El Niño events are likely to become increasingly significant challenges for agriculture in Telangana. Sustainable farming under such conditions requires a shift from monocropping to diversified production systems. Integrating horticultural crops, millets, pulses, and oilseeds with efficient water management practices can substantially reduce production risks and improve farm profitability. Crop diversification is not merely an adaptation strategy for drought years; it is a pathway towards resilient, sustainable, and climatesmart agriculture. By adopting diversified farming systems, Telangana farmers can enhance income security, conserve natural resources, and build long-term resilience against climate uncertainties.



These projections are based on a paddy area of 22.62 lakh hectares, down 16.25% from 27.01 lakh hectares last year, with yields expected to be around 2% lower than the previous season.The bigger uncertainty lies in the yasangi crop. Paddy production is projected at 91 LMT under low water availability, 98 LMT in the base case, and 106 LMT if irrigation conditions improve. The corresponding acreage assumptions are 18 lakh hectares, 19 lakh hectares, and 20 lakh hectares.With Telangana requiring around 100 LMT of rice annually for consumption, public distribution and seed requirements, the state is expected to remain surplus even under adverse conditions. However, the surplus could narrow significantly if water availability weakens.The assessment identifies the Oct-March period as critical for the yasangi crop. Reservoir storage levels, Krishna basin water allocations, groundwater recharge and irrigation releases are expected to determine both acreage and yields.Prof Aldas Janaiah, vice-chancellor of PJTAU, said Telangana's rice policy must increasingly focus on supply management alongside farmer welfare and food security. He noted that the Civil Supplies Corporation, originally designed to manage demand through the public distribution system, now needs to adapt to changing supply dynamics as well.The assessment says Telangana will continue to remain structurally rice-surplus, but the size and timing of the surplus will have implications for procurement, milling, storage, inter-state movement and exports.

The pressure could intensify if rainfall remains deficient. The Reserve Bank of India's household survey indicated that consumers expect inflation to reach 10 per cent over the next year. The RBI has also raised the repo rate by 0.25 percentage point to 5.5 per cent, signalling a shift towards calibrated tightening. Costlier borrowing could increase loan repayments and restrain spending, adding to the strain on families and small businesses. Employment offers little comfort. Telangana's unemployment rate stood at 5.7 per cent in August, above the national rate of 5 per cent. Youth unemployment was 19.3 per cent, rising to 24.9 per cent among women aged 15–29. The State's higher labour force participation rate of 58.2 per cent, against 54.6 per cent nationally, indicates greater participation in the job market but does not guarantee adequate employment.

Annual data also point to a worsening trend during the final years of the previous BRS regime. Telangana's unemployment rate among those aged 15–59 rose from 4.6 per cent in 2022–23 to 5.1 per cent in 2023–24, while the national rate increased from 3.4 per cent to 3.5 per cent. These annual estimates use a different methodology from the latest monthly figures and are not directly comparable.

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