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A Review on Agricultural Development and Irrigation Facilities after the Formation of Telangana State

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Abstract

This paper focuses mainly on the irrigation facilities provided by the government after the formation of Telangana State. Telangana, formed in 2014, is the youngest state in India. Agriculture remains the main source of income, with more than half of the population directly or indirectly dependent on it for their livelihood. To support this sector, the government has introduced numerous schemes aimed at agricultural development. The state's farmer-friendly policies, adoption of modern technologies, and investment in infrastructure have significantly transformed its agricultural landscape. A major focus has been on expanding and modernizing irrigation facilities to reduce dependency on rain-fed agriculture and over-exploited groundwater sources. However, much of the recent growth in irrigation has come from the expansion of well irrigation through private investments, which poses risks to groundwater sustainability. In response, the government launched Mission Kakatiya, a flagship program aimed at rejuvenating traditional irrigation tanks to enhance groundwater recharge and provide sustainable water sources. Irrigation plays a crucial role in agricultural development by ensuring a constant and reliable water supply to farms. Nearly 60% of Telangana's population depends on agriculture and allied activities, making it a vital sector for both livelihood and economic stability. Recognizing the need to diversify rural employment, the government has also promoted skill development and supported rural non-farm sectors, such as industries under programs like MGNREGP, ATMA, Raithu Bandu, Rythu Bheema.

Keywords: Groundwater, Mission Kakatiya, Skill development, MGNREGP, Rythu Bandu, Rythu Bheeme.

Introduction

Telangana, a state with deep agrarian roots, has witnessed significant progress in agriculture and irrigation over recent years. The sector remains the backbone of the state's economy, with a large portion of the population dependent on it for livelihood. The government's sustained focus on farmer-friendly policies, technology adoption, and infrastructure development has transformed the agricultural landscape.

The state has experienced a notable increase in cultivated area, food grain production, and overall agricultural output. A critical driver of this growth has been the enhancement of irrigation infrastructure. Over the past decade, Telangana has invested heavily in expanding and modernizing irrigation facilities, thereby reducing dependency on rain-fed and depleting groundwater sources. Despite this, a considerable portion of agriculture in the state remains rain-dependent, highlighting the ongoing need for efficient water management.

Historically, during the 1970s in the undivided state, Telangana was part of the Green Revolution in rice cultivation. However, post the formation of Telangana as a separate state, there have been remarkable shifts in both the structure and performance of its agrarian economy. The state has prioritized agricultural development not just to boost food production but also as a means of achieving inclusive socio-economic growth.

The government has also recognized the need to reduce over-dependence on agriculture by promoting skill development and creating opportunities in rural non-farm sectors such as rural industries. Schemes like the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and various farmer welfare programs have been instrumental in enhancing rural livelihoods, ensuring food security, and providing employment.

Moreover, rural Telangana plays a significant role in the state's economy, both as a consumer market for affordable goods and as a contributor to domestic savings, which are crucial for resource mobilization.

Of Telangana's total geographical area of 114.84 lakh hectares, 40.5% is under net area sown, 23.9% is covered by forests, 10.5% comprises current fallow lands, 7.7% is used for non-agricultural purposes, and 5.4% is categorized as barren and uncultivable land.

This study project aims to examine the intersection of irrigation development and agricultural growth in Telangana, evaluating how enhanced water resources have contributed to agrarian progress and socio-economic transformation in rural areas.

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Review of Literature

Koti Reddy and I.R.S. Sarma in their paper, 'Challenges to Agriculture Sector in Telangana Economy', examines the performance and challenges to the Telangana agricultural sector. The study using the annual data for the period 2004–05 to 2014–15 reveals that the structural change in the composition of Gross State Domestic Product by Industrial origin is the consequence of the process of economic growth during the last 10 years. In this paper, an attempt has been made to study the reasons for the backwardness of the agricultural sector in the Telangana economy. The key challenges documented are related to the small size of land holdings, low yields, and high risk,

Vamsi Vakulabharanam (2004) [11], in his study, found the development of agriculture and irrigation in Telangana, especially from the point of view of agricultural growth corresponding to growth in irrigation. There has been growth in irrigation levels in Telangana, during the past three decades, although the perception that the region suffers from insufficiency of irrigation resources may still be valid. Most of this growth however has come from the expansion of well irrigation using private capital, which has adverse implications for groundwater levels and is also contributing to the immiseration of small and marginal peasants.

Vamsi Vakulabharanam, Agricultural Growth and Irrigation in Telangana: A Review of Evidence,

Economic and Political Weekly, Vol. 39, No. 13 (Mar. 27-Apr. 2, 2004), pp. 1421-1426 (6 pages)

Published By: Economic and Political Weekly.

Koti Reddy and I.R.S. Sarma, 'Challenges to Agriculture Sector in Telangana Economy' Productivity; New Delhi Vol. 57, Iss. 2, (Jul-Sep 2016): 132-140.

Gaps Identified

However, previous studies have not undertaken a comprehensive analysis of the Rythu Bandhu Scheme and other key agricultural and irrigation initiatives introduced in Telangana—particularly in the context of challenges faced by the sector and the policy shifts following the formation of the new state government.

Therefore, this study is aimed at gaining an in-depth understanding of the current state of agriculture and irrigation development in Telangana, with a special focus on:

- The effectiveness and impact of flagship schemes like Rythu Bandhu and Rythu Bima,
- MGNREGS and its role in rural employment and agricultural infrastructure,
- The progress and bottlenecks in irrigation expansion and water resource management,
- Emerging challenges such as climate variability, groundwater depletion, and market linkages,
- And the broader socio-economic implications of agricultural transformation in the state.

By addressing these areas, the study intends to bridge existing knowledge gaps and contribute valuable insights into policy effectiveness, grassroots outcomes, and future strategies for sustainable agrarian development in Telangana.

Significance of the Project

Since most of the farmers in Telangana are small and marginal, the financial assistance provided by the various agricultural development and farmers' welfare schemes will support farm investment and increase productivity. The objective of this study was to gain an in-depth understanding of the development of agriculture and irrigation in the state. Telangana is an interesting and special case for studying the implementation of an agriculture income support scheme. This is because, unlike the other states that have rolled out similar schemes, the state government of Telangana undertook a state-wide land records updation drive, which involved the rectification of errors, updating the land records and the issuance of digital and secured PPBs to the owners of agricultural land parcels.

Objectives

i). To analyze the agricultural development in the state of Telangana, with a focus on trends in crop production, land use, technology adoption, and the impact of various government schemes aimed at enhancing productivity and sustainability.

ii). To evaluate the development and implementation of irrigation infrastructure in the state, including the role of major and minor irrigation projects, and their contribution to agrarian growth.

iii). To assess the impact of key agricultural welfare schemes, particularly the *Rythu Bandhu* and *Rythu Bima* schemes, on farmer income, financial security, and cropping patterns.

iv). To identify the key challenges faced in the agriculture and irrigation sectors, such as climate change, groundwater depletion, land degradation, and institutional bottlenecks.

v). To summarize the key findings and suggest suitable measures and policy recommendations for improving the implementation and effectiveness of agricultural and irrigation initiatives in Telangana.

Hypothesis

The implementation and expansion of agricultural development schemes, along with continuous improvement of irrigation facilities, will significantly benefit landholding farmer families, regardless of the size of their landholdings. These measures will enhance agricultural productivity, ensure crop security, and contribute to the overall welfare and economic stability of farmers across Telangana.

Methodology

This study employed a survey-based research methodology, utilizing structured questionnaires to collect primary data from the field. The focus was primarily on small and marginal agricultural farmers, who constitute a significant portion of the farming community in Telangana. The selection of respondents was strategically guided by their representation in the state's agrarian economy, ensuring that the study reflects ground realities and local perspectives.

To facilitate data collection, students hailing from rural villages actively participated in the process by administering the questionnaires in their respective areas. This approach not only enhanced accessibility and communication with respondents but also ensured a more authentic and localized data-gathering process.

For data analysis, simple statistical techniques were employed. These included the use of percentages to understand general trends and distributions, as well as correlation analysis to examine relationships between key variables such as irrigation availability, crop yield, and scheme benefits.

This methodology ensured that the study captured both quantitative insights and contextual understanding necessary

for evaluating agricultural and irrigation development in Telangana.

Summary of Major Findings

Since its formation in 2014, Telangana has made remarkable progress in agricultural development, driven by proactive and farmer-friendly governance. The state's emphasis on infrastructure development, irrigation expansion, power supply, and direct farmer support has significantly boosted cultivation and production levels.

Key Highlights of Agricultural Growth

- The cultivation area has increased from 1.4 crore acres in 2014 to 2.3 crore acres in 2023–24, reflecting a major expansion in agricultural activity.
- Total crop production surpassed 5.92 crore tonnes in 2023–24, a testament to improved input support, irrigation, and farmer participation.
- Paddy production alone surged from 68 lakh tonnes in 2014–15 to 1.75 crore tonnes in 2022–23, establishing Telangana as a leading contributor to India's rice production.
- Cotton cultivation witnessed a 44.7% increase, expanding from 41.83 lakh acres in 2014–15 to 10.5 million hectares (approx. 1.05 crore acres) in 2023–24.
- Additionally, horticultural crops are now cultivated in 11.5 lakh acres, adding to agricultural diversification.

Major Government Initiatives Driving Growth

i). **Rythu Bandhu Scheme:** Direct farm investment support provided at the beginning of each agricultural season has empowered farmers to invest confidently in inputs and machinery.

ii). **Rythu Bima Scheme:** Life insurance coverage for farmers offers security to farming families and encourages continued participation in agriculture.

iii). **Procurement Support:** The state government has been procuring the entire paddy crop produced, transferring over ₹1.07 lakh crore directly into farmers' bank accounts for 6.06 crore tonnes of paddy procured over eight years.

iv). **Power and Irrigation Support:** Telangana has invested ₹36,703 crore in strengthening the power distribution network and provides ₹10,500 crore annually in subsidies for supplying uninterrupted free electricity to the agricultural sector.

v). **Budgetary Commitment:** Nearly ₹50,000 crore annually is allocated to agriculture and allied sectors, reflecting strong policy commitment toward rural and agrarian development.

These efforts have not only led to higher production and income for farmers but also strengthened food security, boosted rural employment, and laid the groundwork for long-term sustainability in Telangana's agricultural economy.

Rythu Barosa: With the formation of the new government in Telangana, the flagship Rythu Bandhu scheme has been renamed as Rythu Bharosa, reflecting continuity in farmer welfare with expanded support. This scheme aims to provide direct financial assistance to farmers for the purchase of critical agricultural inputs such as seeds, fertilizers, and pesticides, thereby encouraging sustained investment in both agriculture and horticulture.

Under the earlier Rythu Bandhu framework, the government provided ₹10,000 per acre annually (₹5,000 per season) to farmers. Over nine phases across five years, a total of ₹57,881 crore was disbursed as investment support, benefitting lakhs of farming households across the state.

In a significant upgrade, starting from last year, the annual support amount has been increased to ₹12,000 per acre, further strengthening the state's commitment to the welfare and financial empowerment of its agrarian community.

This enhanced version of the scheme not only reduces the dependency on credit but also enables timely procurement of quality inputs, ultimately contributing to higher productivity and better crop outcomes.

Rythu Bheeme: A critical component of Telangana's agricultural policy is the Rythu Bima (Farmers Group Life Insurance Scheme), which aims to provide financial relief and social security to the families of farmers in the unfortunate event of death. Recognizing that a large majority of Telangana's farmers are small and marginal, and that agriculture is often the sole source of livelihood, the scheme ensures immediate financial support to dependents during times of distress.

Under this scheme:

- A sum assured of ₹5,00,000 is provided to the nominee of the deceased farmer, regardless of the cause of death.
- As of now, approximately 88,963 bereaved families have received the insurance payout, demonstrating the scheme's wide coverage and effective implementation.

This initiative has significantly alleviated economic hardships for thousands of rural families and reinforced the state's commitment to farmer-centric governance.

Agricultural Diversification and Allied Sector Growth

Beyond traditional crop cultivation, Telangana has witnessed strong growth in the livestock sector, particularly in milk and meat production, providing additional income streams for rural households. At the same time, the state is expanding its horticultural base, promoting the cultivation of high-value crops like fruits and vegetables.

Telangana has also made substantial contributions to India's seed industry, with Nalgonda district emerging as a key hub for the production of quality rice and groundnut seeds. This has not only supported internal agricultural demand but also strengthened Telangana's position as a seed-exporting state.

Technology and Innovation in Agriculture

To further boost productivity and sustainability, Telangana is actively promoting the use of advanced technologies in farming:

- Adoption of precision farming techniques.
- Use of digital platforms like ADEx (Agricultural Data Exchange) for real-time decision-making, resource optimization, and data-driven interventions.

These efforts are reflective of a modern, integrated approach to agricultural development, combining financial support, technology, diversification, and resource mobilization under a comprehensive agricultural policy framework.

Due to increased agricultural activity, the rural economy has been strengthened like never before and the per capita income of people of Telangana has incresed from Rs. 1,12,162 in 2014-15 to Rs 3,79,751 in 2024.. The State government took up numerous other initiatives by appointing an agricultural extension officer for every 5,000 acres, to monitor overall agricultural operations in the State, officials said.

Apart from waiving off transport tax on tractors benefiting Rs

273.5 crore to farmers, the government has also improved Godown space from 39 lakh tonnes in 2014-15 to 68.28 lakh tonnes in 2021-11, they added.

The agriculture sector is the backbone of the rural economy in Telangana. 4 key sub-sectors constitute the 'Agriculture & Allied Sectors' — Crops, Livestock, Forestry and Logging, and Fishing and Aquaculture. The sector is a principal source of employment for around 55% of the population in the state. Since state formation, the contribution of the 'Agriculture and Allied Sectors' to Telangana's Gross State Value Added at current prices has consistently improved from 16.3% in 2014-15 to 20.5% in 2020-21(PE). There was a 142% increase in the Gross Value Added by the sector between 2014-15 and 2020-21.

The Government of Telangana has undertaken several initiatives to boost the sector's growth, increase farmers' incomes, and improve farmers' welfare. To achieve these objectives, the Government has implemented policy initiatives such as the flagship Kaleshwaram Project and Mission Kakatiya to improve the irrigation infrastructure. Mission Kakatiya focuses on restoring minor irrigation tanks to increase the irrigated area crucial step in enhancing agricultural productivity.

The supply of 24x7 free power to farmers, investment support to farmers under the Rythu Bandhu scheme, access to inputs, markets, and credit, and provisioning of life insurance to farmers under the Rythu Bima scheme.

According to the Census of Landholdings (2015-16), there are 59.47 lakh landholdings in Telangana covering a total area of 147.56 lakh acres. a. Marginal farmers (24.7 acres) hold 0.2% of total landholdings, accounting for 2.3% of the area operated (333.6 acres).

The total production of rice in Telangana was 1.75 crore tonnes in 2022-23. The districts of Nalgonda and Nizamabad were the highest contributors to the production of cereals accounting for 8.4% and 8.3% of the total production respectively.

The total production of millets (Jowar, Bajra, maize, ragi, and Korra) in Telangana was 19.22 lakh tonnes in 2020-21. The districts of Warangal Rural and Khammam were the highest contributors to the production of millets accounting for 15.9% and 15% of the total production respectively. The total production of pulses was 6.69 lakh tonnes in 2020-21 in Telangana. Kamareddy and Vikarabad districts were the highest contributors to the production of pulses accounting for 13.8% and 12.7% of the total state production respectively. The total production of foodgrains (cereals, millets, and pulses) in Telangana was 171.76 lakh tonnes in 2020-21. Nizamabad and Nalgonda districts were the highest contributors to the production of pulses accounting for 7.6% and 7.1% of the total state production respectively.

Irrigation in Telangana

Irrigation is a vital backward linkage that supports and sustains agricultural growth. For a state like Telangana, where a large portion of cultivation is rain-fed and vulnerable to climatic fluctuations, assured irrigation plays a critical role in stabilizing and enhancing farm productivity. It not only safeguards farmers against erratic monsoons but also contributes to improved water use efficiency and the conservation of depleting groundwater resources.

Recognizing this, the Government of Telangana has adopted a comprehensive and ambitious irrigation development strategy aimed at bringing nearly 125 lakh acres of land under assured irrigation coverage across the state.

Key Features of Telangana's Irrigation Strategy:

- A six-pronged approach has been implemented to expedite the completion of pending irrigation projects on a fast-track basis.
- This includes modernization of existing systems, creation of new lift irrigation schemes, and optimization of water use through integrated water resource management.

Water Resources and Allocation

Telangana's irrigation potential is primarily derived from two major river systems:

- **Godavari River:** Assured allocation of 967.94 TMC
- **Krishna River:** Assured allocation of 299 TMC

Together, these rivers provide a total assured allocation of 1266.94 TMC, with an additional 500 TMC of surplus water available in both rivers. Harnessing this water through effective infrastructure and management is a top priority of the state's irrigation policy.

The state's large-scale irrigation infrastructure, including projects like Kaleshwaram Lift Irrigation Scheme (KLIS), has enabled the expansion of irrigated area, improved cropping intensity, and stabilized rural incomes, contributing significantly to Telangana's agrarian transformation.

The Government of Telangana has Undertaken the Following Measures

i). Speedy completion of ongoing projects, which had earlier been neglected for years, in the erstwhile combined state of Andhra Pradesh.
ii). Modernization of old Projects like Nagarjuna Sagar, Nizam Sagar, and Sri Ram Sagar Projects, etc step by step.
iii). Restoration of all Minor Irrigation Tanks and water Bodies in the state under 'Mission Kakatiya'.
iv). Linking MI tanks with major and medium projects by constructing sluices and checking Dams to rejuvenate streams and rivers flowing through the project command areas.
v). Taking up Irrigation Projects which were in the pipeline before Telangana state formation, like Palmuru Ranga Reddy LIS and Sita Rama Lift Irrigation Projects.
vi). Effective operation and maintenance of irrigation systems for achieving better water use efficiency and crop productivity.

An irrigation potential of 21.32 lakh acres has been created in the state through 9 completed Major Irrigation Projects.

Sri Ramasagar Stage I project with an IP of 9.68 lakh acres is the largest Existing Major irrigation project, followed by the Nagarjuna Sagar Project with an irrigation potential of 6.40 lakh acres. There are 24 ongoing major irrigation projects in the state with a contemplated ayacut of 69.02 lakh acres, and so far, an IP of 17.85 lakh acres has been created.

The Kaleshwaram (P) Project, with a contemplated irrigation potential of 18.25 lakh acres and stabilization of 18.82 lakh acres, is the largest ongoing major irrigation project in the state.

So far, 13.20 lakh acres is stabilized under SRSP–I & II, and an IP of 0.88 lakh acres has been created. There are 27 medium irrigation projects with an existing IP of 3.04 lakh acres.

Mission Kakatiya has been implemented across the state with the objective of restoring the water bodies to their original standard across the state. A total of about 46,531 minor tanks

have been identified for restoration, out of which 27,665 tanks have been restored and an area of 15.05 Lakh acres is stabilized. 8.93 TMC of storage capacity is restored under the MI tanks.

The total contemplated ayacut for 663 Small LI Schemes is 5.05 lakh acres, and so far, an IP of 4.59 Lakh Acres has been created under 640 L.I. Schemes, and 23 LI Schemes are contemplated a total IP of 0.46 Lakh acres, which are in progress.

Scheme-wise, Khammam district has the highest number of LI Schemes (139 schemes, i.e.20.96% of the total schemes) with an IP of 0.506 lakh acres. Khammam, Bhadradri Kothagudem, Suryapet, Nizamabad, and Nirmal –Districts together account for more than 59% of the total LI schemes in the state. Based on Irrigation potential, Nizamabad district, with an IP of 0.64 lakh acres (12.68% of the total Contemplated IP), with 44 schemes, has the highest Irrigation potential. Nizamabad, Suryapet, Khammam, Nirmal, and Wanaparthy-Districts together account for more than 51% of the total irrigation potential in the state.

Social security protection is recognized in the International Labour Organization conventions and United Nations instruments as a basic human right. According to the United Nations Department of Economic and Social Affairs, social protection is a set of measures that help reduce the gaps in inequality, eradicate poverty, and remove social exclusion.

The Government of Telangana has prioritized social security programs for the vulnerable sections of society. The key objective is to ensure that there are no deprived communities in the state. The Government introduced Asara pensions to help vulnerable groups live life with dignity. Another major intervention is the distribution of essential food and non-food items through the Public Distribution System. These measures to ensure social security and welfare are supplemented by the creation of employment opportunities through the Mahatma Gandhi National Rural Employment Guarantee Act.

Supporting Schemes for Sustainable Agriculture in Telangana

In addition to flagship schemes like Rythu Bharosa, Rythu Bima, and major irrigation projects, the Government of Telangana has implemented several other strategic initiatives aimed at improving productivity, sustainability, and resilience in agriculture. These efforts target soil health, seed quality, farm mechanization, and agricultural extension services, all of which are essential for transforming the rural agrarian landscape.

i). Soil Health Card Scheme

The Soil Health Card Scheme was launched with the primary goal of promoting climate-resilient and sustainable farming. By assessing soil fertility and nutrient levels, the scheme helps farmers make informed decisions regarding:

- Fertilizer and manure application
- Crop selection
- Soil management practices. This has led to more efficient input use, reduced costs, and improved yields.

ii). Subsidized Seed Distribution Programme

To ensure timely access to quality seeds, the government has initiated a subsidized seed distribution programme. Under this initiative, farmers receive seeds of important crops such as:

- Paddy
- Jowar
- Maize
- Redgram
- Greengram

These seeds are distributed at subsidized rates to encourage crop diversification and enhance productivity, particularly among small and marginal farmers.

iii). Farm Mechanization Initiative

To address labor shortages and reduce the cost and time of cultivation, the government is actively promoting the mechanization of agriculture. Key benefits include:

- Timely completion of farming operations
- Reduced dependency on manual labor
- Increased efficiency and productivity

Farm machinery such as tractors, harvesters, and tillers are provided at subsidized rates, making them accessible to rural farmers.

iv). Agricultural Technology Management Agency (ATMA)

The ATMA Scheme is operational in all 33 districts of Telangana, implemented with a 60:40 Centre-State funding model. The scheme's main objective is to build a:

- Demand-driven,
- Research-integrated, and
- Financially sustainable public extension system.

ATMA Focuses On

- Strengthening farmer training and awareness
- Demonstrating best agricultural practices
- Bridging the gap between research and field-level application

These comprehensive efforts reflect the state's commitment to holistic agricultural development, focusing not just on growth but also on long-term sustainability and farmer empowerment.

Areas need to be emphasized

- More focus on small farm economy
- Market Intelligence
- State Government's involvement in fixing the MSP possibility of differential MSP for different states are to be explored.
- Increasing the production of pulses, millets, and oilseeds not only through biotechnological tools but also through other measures viz. incentives, inputs supply, and bonus prices to farmers.
- Strengthening the National Agricultural Research system by allocating a budget of at least 3% of GSDP
- Integration of agriculture and allied sectors
- Focus on farming systems approach

Suggestions

- Mechanization of agriculture will help in increasing productivity, reducing the cost of cultivation and enabling the farmer to complete farming operations in time. Farm mechanization in the State is accentuated by the shortage in agricultural labour due to the increased migration of rural workers to urban areas.
- Land reforms: Collectivization, consolidation of holdings, cooperation, and abolition of zamindari.
- Agricultural reforms: The Green Revolution and White Revolution are to be innovated and implemented for a long time.

- Land development programmes like Provision for crop insurance against drought, flood, cyclones, etc. are needed.
- The availability of water resources and irrigation facilities. Having access to high-quality seeds that are readily available. Supply of high-quality fertilizer at the right moment will improve the welfare of the farmers.
- To increase farm productivity, the following measures are needed: Implementation of land reforms. For improving production, land reforms are the first and predominant point, interplanting, planting more densely, planting many crops, raised beds, Smart water management, Tolerant Varieties, Use of nitrogen, and Adoption of new technologies, and Enhancement of soil quality.

Conclusion

Improving agricultural efficiency in Telangana requires a strategic blend of modernization, sustainability, and farmer-centric innovations. The introduction and widespread use of latest agricultural implements is essential to ensure the smooth and timely cultivation of land, reduce manual labor dependency, and enhance operational efficiency on farms.

Equally important is field and crop management, which plays a critical role in ensuring crop health, optimal yields, and resource conservation. Sustainable agricultural practices are central to long-term agrarian growth and include:

- Efficient management of natural resources such as water and soil
- Promotion of local and improved seed varieties
- Integration of traditional knowledge with modern technologies
- Reduction in the use of harmful agrochemicals
- Maintenance of soil fertility through renewable bio-resources

To further boost productivity, crop improvement through cross-breeding and hybridization is key. These techniques not only enhance yield but also build resilience against biotic and abiotic stresses, such as pests, diseases, drought, and salinity. For crops with short growth durations, the development and adoption of early-maturing varieties can enable multiple cropping systems, increasing the cropping intensity and income potential per unit of land.

By aligning policy support, scientific innovation, and farmer participation, Telangana can continue to evolve as a model agricultural state, sustaining farmer interests while advancing toward a more resilient and sustainable agricultural future.

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