



IRRIGATION SECTOR AND AGRICULTURE DEVELOPMENT IN TELANGANA STATE – AN OVERVIEW

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ABSTRACT:

This paper examines the state of agriculture development and irrigation sector in Telangana state, 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, this growth however has come from expansion of well irrigation using private capital, which has adverse implications for groundwater levels and is also contributing to the immiserisation of small and marginal peasants. The agricultural sector plays a pivotal role in the growth of the Telangana economy and lives of the people, and 60 percent of the state population depends on agriculture and allied activities and it is a major source of livelihood of the people, irrigation sector plays a vital role in the development of agriculture sector because it provides constant and assured water supply to the farm, The growth rate of Telangana's GSDP (at constant prices) has increased from 9.4 percent in 2016-17 to 10.5 percent in 2018-19. In 2018-19, agriculture, manufacturing, and services contributed to 16 percent, 20 percent, and 65 percent of the GSVA, respectively, these sectors grew by 8.1 percent, 5.8 percent, and 11.5 percent, respectively. The per capita GSDP of Telangana in 2018-19 (at constant prices) was Rs 1,61,669, which is 9.4 percent higher than that in 2017-18, the main objective of irrigation is to create 127.58 lakh acres irrigation potential in the state besides providing drinking water in the drought prone areas, upland areas and upkeep of the existing projects to enhance the agriculture productivity with increased water use efficiency. Total irrigation potential ayacut stabilized under major, medium, minor and IDC schemes in Telangana is 73.57 lakh acres stabilized ayacut is 31.50 lakh acres, all the irrigation projects are classified based on the irrigated ayacut under the projects are major irrigation projects ayacut above 25,000 acres (>10,000 ha.), medium irrigation projects ayacut above 5,000 acres (>2,000 ha.) upto 25,000 acres (<10,000 ha.), minor irrigation projects ayacut upto 5,000 Acres (<2,000 ha.).

Keywords: Role and Importance of Irrigation, Economic Development in Telangana State, Relationship Between Irrigation And Agriculture Development.

INTRODUCTION:

Agriculture plays a vital role in India's economy 43.0 percent of the total workforce is engaged in agriculture and allied sector activities in 2020-21 as well as Telangana state 47.0 percent and accounts for 18.4 percent of India's GVA and Telangana state is 17.3 percent at current prices during 2020-21. Given the importance of the agriculture sector, Government of India and state of Telangana has taken several steps for its development in a sustainable manner. Telangana state it came into existence on 2nd June 2014, situated in the central stretch of the Indian Peninsula on the Deccan Plateau, is the 29th state of southern India and 12th state in the country with an extent of 114,840 square kilometres and a population of 35,286,757 (2011 census). Telangana is bordered by the states of Andhra Pradesh to the south and east, Maharashtra to the north and north-west, Karnataka to the west and Chhattisgarh to the north-east. Telangana has the advantage of having most of the east flowing rivers in the heart of the state bringing in copious supplies from the Western and Eastern Ghats and the Deccan Plateau up to Bay of Bengal, most of the flows occur only in 3 to 4 months of South West monsoon i.e., June to September. The annual rainfall is between 900 to 1500 mm in northern Telangana and 700 to 900 mm. Telangana is a riverine state with major, medium and minor rivers, these two are major interstate rivers i.e., 1. Godavari and 2. Krishna. Godavari and Krishna flow through the heart of the state. Total water allocated to Projects in Telangana in Krishna basin is 299 TMC and Godavari basin is 954.23 TMC. Apart from the 2 major rivers, there are other 9 Nos. of small rivers such as Bhima, Dindi, Kinnerasani, Manjeera, Manair, Penganga, Pranahita, Peddavagu and Taliperu. Telangana has a heritage of cultivation and irrigation dating back to several centuries. In the past, ancient Kings and rulers-built lakes and reservoirs by constructing bunds and anicuts across rivers for creating irrigation potential as well as drinking water for the people, big lakes like Ramappa, Pakhal, Laknavaram, and Ganpur many other irrigation work of Kakatiya period have become names to remember and are serving till today. Irrigation means supply of water agriculture from canals, wells and tanks artificially or manually, Telangana has a variety of landscapes from hilly areas to flat plains,

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the climate is mostly dry with uneven rainfall to support farming, Telangana uses different irrigation methods suited to its unique geography and climate. The total geographical area of the state is 114.84 lakh ha with a gross cropped area of 62.88 lakh ha in the year 2013-14, total geographical area 114.84 lakh ha, gross cropped area 62.88 3 lakh ha, net cropped area 49.61 4 lakh ha, gross irrigated area 31.64 lakh ha, net irrigated area 22.89 lakh ha, no. of farm holdings 55.54 lakh nos, average farm holding size 1.12 ha, average annual rainfall 906.00 mm, cropping intensity 1.27 percent, irrigation intensity 1.38 percent.

Telangana agriculture sector has considerably improved. The barren land of Telangana has turned green. The growth of gross value added at constant prices from agriculture from 2015-16 to 2021-22 is 7.4 per cent in contrast to the Indian growth rate of 4 per cent (Sri Harish, 2023). Additionally, the area under cultivation has risen from 131.33 lakh acres in 2014-15 to 215.37 lakh acres in 2021-22. This dip comes despite the overall budget rising by nearly Rs 20,000 crore and capital expenditure increasing by over 20 per cent, raising concerns about prioritisation amid competing demands like welfare and urban development. the irrigation sector in Telangana, vital for the state's agrarian economy, faces growing concerns over funding and execution of ongoing projects, allocations have stabilised in the Rs 23,000 crore range under the current administration, following an initial high post-transition, however, critics argue this moderation is inadequate given historical delays, siltation losses, and ambitious targets to expand irrigated area to over 127 lakh acres, nearly 55 percent of the irrigation budget is consumed by non-capital heads such as loan repayments, power bills for lift operations, salaries and maintenance, this leaves only Rs 10,000 to Rs 12,000 crore annually for tangible works like canal construction, tunnels and ayacut development.

REVIEW OF LITERATURE:

1. **Madhouse & Lavanya (2021):** The State receives annual normal rainfall of 942 mm and is the primary source of groundwater Orecharge. In the state, groundwater irrigation reached it maximum of 23.35 lakh ha during 2017-18 from 0.46 lakh ha during 1875 and presently has a healthy density of 13 wells/ km.
2. **Rao (2018):** states that irrigation in Telangana, which has been neglected in previous decades, is now under construction and has a prominent role in

irrigation in India. This can be evident by the kind of projects they have started in recent years. These projects can remove decades of backwardness in irrigation and make Telangana number one in irrigation through various schemes.

3. **Adimalla (2018):** The present study confers the chemical quality of groundwater and surface water of the Mothkur region, Telangana State, for drinking and irrigation purposes. The Mothkur region is occupied by Archaean crystalline terrain. Most of the population depends on groundwater for daily needs, especially for drinking, housing, and irrigation.
4. **Raju (2017):** states that structural changes in irrigation sources significantly impact the farm economy. The development of irrigation facilities positively impacts the State's rural economy, particularly the farm sector. Irrigation has been playing a more significant role in the development of the agricultural industry in Telangana.

Telangana's irrigation is based on two large rivers, the Godavari and Krishna, which have a combined allocation of 1266.94 TMC (967.94 TMC and 299 TMC, respectively) of guaranteed water and 500 TMC of surplus water in each river. Nine Major Irrigation Projects that have been finished have increased the state's irrigation potential by 21.32 lakh acres, a comprehensive irrigation development strategy has been devised by the Telangana government in order to provide irrigation facilities for around 125 lakh acres of land throughout the state, the government has also launched a number of initiatives and developed a six-pronged strategy for the expedited completion of outstanding irrigation projects, one of the most significant connections between irrigation and agriculture, it increases productivity and shields farmers from unfavourable monsoons, guaranteed irrigation are essential for crop production and farmer incomes, additionally, guaranteed irrigation can preserve groundwater levels and increase water usage efficiency India is the second-most populous country in the world and has an agriculture-based economy, agriculture output supports India's food requirement and accounts for 17 percent of its GDP, crucial element in the development of agriculture is irrigation, irrigation is currently neither in a suitable state nor does is there a progressive strategy, the government must take the appropriate action to improve irrigation system effectiveness in order to fully enhance water demand for rich crop patterns, the main irrigation methods are canal irrigation, tank irrigation, and well (energized) irrigation. Canal irrigation,

is man-made channels that carry water from rivers to fields, there are two types inundation canals these canals take water directly from rivers without any control structures, they work best during the rainy season, perennial canals these canals take water from rivers with the help of dams or barrages, ensuring a year-round supply, major canals in Telangana include the Nagarjunasagar canal, SRSP canal, and Nizamsagar canal, geographical and climatic suitability, these canals are good for flat areas with fertile soil, dams help manage water flow, providing a steady supply even when river levels change. Percentage contribution, canal irrigation made up 10.28 percent of the total irrigated area in Telangana, well and tube well irrigation wells are holes dug into the ground to access groundwater, tube wells are deeper and use pumps to bring water to the surface, geographical and climatic suitability well irrigation works well in areas with soils that allow water to seep in, like alluvial and black soils, tube wells are useful in areas where the water table is high. Percentage contribution, well and tube well irrigation covered about 55 percent of the total irrigated area in Telangana, tank irrigation tanks are reservoirs that store rainwater for later use in irrigation, geographical and climatic suitability, tank irrigation is common in hilly and rocky areas where building canals or wells is difficult, these tanks store rainwater, making it available for dry periods, percentage contribution, tank irrigation accounts for about 6 percent of the irrigated area in Telangana, the Ghanapur Anicut across Manjira with two canals called Fathenahar and Mahabobnagar, Pocharamlake, Osmansagar, Himayatsagar, Nizamsagar Project, Mannair Project, Dindi Project, Palair Project, Wyra Project and Sarlasagar Projects are some of the magnificent contributions of the eminent engineers of Hyderabad state in Telangana. Groundwater based irrigation, which was started in India as early as Indus Civilizations got impetus during 3rd five-year plan in India, at present 78 m ha of irrigation potential is created and 80 percent is utilized, one of the world's highest users of groundwater is India with 63 percent of its dynamic groundwater resources, similarly, Telangana state is also utilizing the dynamic groundwater resources up to 65 percent, groundwater a reliable source of irrigation with high yields and brings equity among its users as ~99 percent of structures are owned by individuals. in the state, well irrigation increased from ~0.46 lakh ha from 1875 to 23.35 lakh ha during 2018–19 and well density increased to ~13 wells/km² leading to decrease in irrigation potential under each well to < 1 ha. As a result of it many

challenges like water logging and salinity in canal command areas, over-exploitation leading to de-saturation of shallow aquifers, underutilization in north eastern part, groundwater pollution (both geogenic and anthropogenic) and sustainability, etc have cropped up, the management steps taken up in water sector like water transfer through KLIP, providing protected water supply through Mission Bhagiratha, de-siltation through Mission Kakatiya, forest rejuvenation through Haritha Haram, construction of various ARS, modernization of canals, conjunctive use of surface and groundwater, user centred aquifer level groundwater management, tank management, IEC activities etc brought positive changes in water availability in the state more particularly surface water. In order to sustain these efforts, formation of WUA at watershed/village level for agricultural planning, change in cropping pattern from highly intensive paddy to ID crops more particularly from non- command areas, conjunctive use of water, warabandhi (on/off) method of releasing irrigation water, developing intercepting drains, soil treatment, declaring crop holidays, separate electric grids for agriculture and domestic supply, legally separating water and land rights and strict implementation of regulatory measures, the other measures suggested are policy interventions that involve regulatory mechanisms and linking village-based institutions to government departments that manage groundwater etc. Agriculture plays a pivotal role in the economy of Telangana and the better performance of this sector is vital for inclusive growth. Telangana went in for the Green Revolution in rice cultivation in the 1970s, there have been significant changes in the structure and performance of the agrarian economy in the state in the recent years, Telangana state is endowed with bountiful resources having good soils, diversified cropping pattern and major irrigation systems fed by rivers like Godavari and Krishna. Agriculture is a way of life or culture, a tradition that has shaped the culture and economic life of the people of Telangana, therefore, it will continue to be central to all strategies for planned socio-economic development of the state, the state Government has emphasized the need to achieve 6 percent growth rate and increased returns on investment to farmers through improved technology, effective extension reach, efficient input delivery, increase in crop productivity, increase in livestock productivity, resource use efficiency reduction in cost of production, increase in cropping intensity, diversification to high value

agriculture, remunerative prices on farmers' produce, shift of surplus manpower from farm to nonfarm occupations.

TYPES OF IRRIGATION IN TELANGANA:

There are several types of irrigation systems used in Telangana to provide water to crops, uses a combination of these irrigation methods to cater to the diverse agricultural needs of the state, the government has implemented various projects to improve irrigation infrastructure, conserve water, and increase the irrigation potential of the state, here are some of the most common types of irrigation methods used in the state, surface irrigation is the most common type of irrigation in Telangana, where water is applied to the surface of the soil using flood or furrow irrigation, the water is allowed to seep into the soil and reach the roots of the crops, drip irrigation is water is delivered directly to the roots of the plants through a network of tubes with emitters, this method is suitable for areas with water scarcity, as it conserves water and reduces evaporation losses, sprinkler irrigation is a method where water is sprayed over the crops using sprinklers, this method is suitable for areas with high wind speeds and uneven terrain. Subsurface Irrigation In this method, water is supplied to the roots of the plants through buried pipes or tiles, the water is released into the soil through small openings in the pipes, allowing the roots to absorb it. Lift irrigation is a system where water is lifted from a lower level to a higher level using pumps or other lifting devices, this method is commonly used in Telangana to irrigate areas that are situated at a higher elevation. Tank irrigation is a traditional method of irrigation, where water is stored in tanks and used for irrigation purposes. Mission Kakatiya is a program implemented by the Telangana government to rejuvenate the traditional water bodies in the state. Wells are main source of irrigation in the State, irrigating about (84 percent the total net irrigated area in 2014-15. The share of canal and tank irrigation is confined to mere 10 percent and 4 percent respectively. The tank irrigation shows a declining trend over the years and the well irrigation shows a faster growth rate. The well irrigation which was 16 percent in 1955-56 was increased to 37 percent in 1985-86 and further increased to 81 percent in 2015-16. The tank irrigation was three times higher than the well and canal irrigation in 1955-56, over a period of time, it has declined significantly. In the year 1955-56 the percentage share of tank irrigation was 64 percent which declined to 28

percent in 1985-86 and further to 8 percent in 2012-13, this is a clear indicator of deliberate neglect of thousands of tanks in the Telangana area during the United Andhra Pradesh state, high dependency on wells has adverse effects on cost of cultivation and groundwater levels, therefore, there is a need to increase tank and canal irrigation sources in the state, hence, the Government of Telangana has launched Mission Kakatiya to revive and rejuvenate tank irrigation, in 2018-19, the highest net area sown was reported in Nalgonda district with 3.78 lakh hectares, followed by Khammam with 2.64 lakh hectares, top ten districts account for almost 50 percent of the total net sown area. Three districts namely Nagarkurnool, Sangareddy, Adilabad along with Nalgonda and Khammam districts have net area sown of more than 2 lakh hectares in each district. 8 districts viz. Siddipet, Suryapet, Vikarabad, Nizamabad, Nirmal, Rangareddy, Jogulamba Gadwal and Kamareddy have a net area sown between 1.5–2 lakh hectares, another 11 districts viz., Mahabubnagar, Warangal rural, Kuuram Bheem, Bhadrachalam, Yadadri Bhuvanagiri, Jangaon, Mancherial, Karimnagar, Jagtial, Narayanpet, Mahabubnagar area sown between 1.0 and 1.5 lakh hectares. 8 districts viz Peddapalli, Wanaparthy, Rajanna Sircilla, Warangal Urban, Jayashankar Bhupalpally, Medak, Mulugu, Medchal-Malkajgiri have a net area sown less than 1 lakh.

OBJECTIVES:

1. To analyze the irrigation sector and agriculture development in Telangana state.
2. To examine the various factors influenced the agriculture development in the state of Telangana.

SIGNIFICANCE OF THE STUDY:

The present paper throws light on the irrigation sector growth and agricultural development in the Telangana state, the paper also systematically highlights the importance of irrigation sector and development of Telangana, the structural changes in the sources of irrigation and future implications of the ground water levels have also been analysed in the paper.

METHODOLOGY:

This study is completely based on the secondary sources of data, which data collected from the books, publications, journals, articles, news papers, and various organizations viz. the Department of Agriculture and Irrigation (TS), Directorate of Economics and Statistics, Hyderabad, various Socio-economic outlooks, statistical year books, agriculture census Ministry of Agriculture, Government of India, growth rates have been used in the analysis part of the study.

ANALYSIS AND DISCUSSION IN THIS AREA:

Government policies at the national, state and local levels significantly influence every step of the agricultural value chain, from farmland to market. These policies can impact what crops farmers grow, where farms are located, transportation and processing of products, commodity trading, and the prices farmers receive. Therefore, it is crucial for government policies to strike a balance between the costs and benefits to farmers, consumers, the environment, government budgets, and competing interests to sustain and develop the agricultural sector. The above data shows that the agriculture sector has grown in terms of contribution towards gross value added and production, especially in paddy and cotton. The following section will examine the various government initiatives attributed to their improvement in this short period. Recently, structural reforms such as promoting crop diversification through oil palm cultivation and adopting technology-enabled approaches to improve animal husbandry services have been initiated to address the challenge of surplus production. Farmers' income primarily depends on crop yields and access to markets, which are determined by various factors such as water, power, fertilisers, seeds, labour, and mechanisation, providing investment support through Rythu Bandhu, and offering life insurance under Rythu Bima. The Government's idea in Telangana has been that 'everything can wait but not agriculture', emphasizing the need for farmers to have timely access to funds for investment and credit facilities. Streamlining the availability of farm inputs such as seeds and fertilisers and providing timely extension services for improved yields are critical priorities. In response to increased agricultural production in the state over the years, the Government has implemented post-

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harvest management practices, including additional storage facilities and market linkages, to transform agriculture into a sustainable and profitable industry, the Telangana government has introduced several initiatives that have yielded positive results. In the following sections, we will delve into the key policies and initiatives implemented by the Telangana government to enhance the agricultural sector in the state. The modern agricultural inputs is the foundation of any agricultural revolution. These inputs include improved seeds, fertilisers, crop protection chemicals, machinery, irrigation, and knowledge. Seeds are crucial for successful crop production and farm productivity. The comprehensive set of programmes to address different issues faced by the agriculture sector such as integrated pest management, soil testing, farm mechanisation, e-NAM for improving marketing institutions for agricultural produces, purchase of perishable commodities under market intervention schemes, creation of additional godowns, encouraging farmers towards horticultural crops, crop insurance and other schemes are expected to enhance farmers' income, increasing irrigation facilities is critical for ensuring drought-proofing of agriculture sector.

INDIA AND TELANGANA STATE AGRICULTURAL INITIATIVES:

Telangana economy has farmer-friendly initiatives, is setting new benchmarks in terms of cultivation and agricultural production, the cultivation area has shot up to 2.3 crore acres in 2021-22 against 1.34 crore acres in 2014, while the total paddy production alone escalated from 68 lakh tonnes in 2014-15 to a whopping 2.49 crore tonnes in 2021-22. The total crop production has surpassed 3.5 crore tonnes. agriculture as a priority sector and initiated multiple measures to improve the infrastructure as well as supply of power and irrigation water without any disruption. Further, Rythu Bandhu farm investment support, Rythu Bima farmer life insurance, supply of fertilisers and seeds, have encouraged more farmers to take up agriculture as a serious and remunerative occupation, in addition to 2.3 crore acres of agricultural cultivation area, the horticultural crops are being cultivated in another 11.5 lakh acres, the cotton cultivation area has increased by 44.7 percent from 41.83 lakh acres in 2014-15 to 60.53 lakh acres in 2020-21, according to an official statement here, the state government is procuring the entire paddy crop cultivated by farmers in Telangana, around Rs 1.07 crore have been deposited directly into the bank

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accounts of farmers to purchase about 6.06 crore tonnes of paddy over the last eight years, it has spending nearly Rs 50,000 crore from its annual budget on agriculture and related schemes over the last a few years, to provide uninterrupted power to farm sector, the state government strengthened the power distribution network with Rs 36,703 crore and has been providing another Rs 10,500 crore every year towards subsidy against power supplied to the farm agriculture sector, officials said, the state government had deposited around Rs 10,000 per acre to farmers for the last nine phases over five years i.e. a total expenditure of Rs 57,881 crore as investment support to farmers. Further, about 88,963 bereaved families received Rs 5 lakh insurance amount following the demise of farmers covered under Rythu Bima scheme, due to increased agricultural activity, the rural economy has been strengthened like never before and the per capita income of people of Telangana has doubled from Rs 1,12,162 in 2014-15 to Rs 2,78,833. 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. The central government initiates Pradhan Mantri Kisan Samman Nidhi (PMKISAN), Pradhan Mantri Kisan MaanDhan Yojana (PMKMY), Pradhan Mantri fatal Bima Yojana (PMFBY)/ Restructured Weather Based Crop Insurance Scheme (RWBCIS), Modified Interest Subvention Scheme (MISS), Agriculture Infrastructure Fund (AIF), Formation and Promotion of 10,000 Farmers Producers Organizations (FPOs), Pradhan Mantri annotate away sanrakshan abhiyan (PM-AASHA), Agri Fund for Start-Ups and Rural Enterprises' (AgriSURE), Per Drop More Crop (PDMC), Sub-Mission on Agriculture Extension (SMAE), Sub-Mission on Agriculture Mechanization (SMAM), Sub-Mission on Seed and Planting Material (SMSP), Paramparagat Krishi Vikas Yojana (PKVY), National Food Security and Nutrition Mission (NFSNM), Digital agriculture mission, Integrated scheme for agriculture marketing (ISAM)-National agriculture market (ISAMeNAM), Integrated Scheme for Agriculture Marketing (ISAM)-others (ISAM-others), Mission for Integrated Development of Horticulture (MIDH), Soil Health Card (SHC), Rainfed area development (RAD), National Mission on Edible Oils (NMEO)-Oil Palm, National Mission on Edible Oils (NMEO)- Oilseeds, National Beekeeping

and Honey Mission (NBHM), Mission Organic Value Chain Development for North Eastern Region, Agroforestry, Crop Diversification Programme (CDP), National Bamboo Mission, Purchase of drones, putting up specialized sensors on field, blockchain and AI in agriculture etc. Remote sensing and Internet of Things (IOT) such as automatic weather station, Farm advisory services through GIS applications, Farm/harvest automation, integrated production and processing unit for sericulture, apiculture and spirulina plant quarantine unit, PM Kusum, hydroponic farming, mushroom farming, vertical farming, poly house/Greenhouse, projects identified for providing supply chain infrastructure for clusters of crops including export clusters, projects promoted by central/state/local governments or their agencies under PPP for building viable farming.

CONCLUSION:

I conclude in my paper state of Telangana is growing in the primary sector. The agriculture sector plays a vital role in development of the Indian economy, to augment the sector's contribution to the nation's growth, India's central and state governments are implementing several schemes to benefit the nation's farmers, taking into cognizance the role of technology in providing better services to the citizens of the country, Telangana uses a mix of canal, well, and tank irrigation methods to meet its agricultural water needs, each method is suited to different parts of the state, depending on the landscape and climate, these irrigation practices help make sure that farmers have enough water to grow their crops, as the state develops, combining new technologies with traditional methods will be important for sustainable water use and better farming outcomes, the structural changes in sources of irrigation have a significant impact on farm economy, development of irrigation facilities has the positive impact on the state's rural economy particularly farm sector, from the above analysis, it is clear that irrigation has been playing a greater role in the development of the agriculture sector in Telangana state, it is clear that over the period irrigation facilities increased but there is a need to expand more irrigation facilities in future, the emphasis for the research should be to bring the importance of irrigation in agricultural development and also need for the development of irrigation in the state, the strategies implemented by the government should be passed in goal reaching objectives.

REFERENCE:

1. Socio-economic outlook in Telangana state 2020-21.
2. CGWB. Groundwater Exploration in Andhra Pradesh (March 2010) Southern Region, Hyderabad: Government of India; 2010.
3. Indian economy latest edition-2021.
4. CGWB. National Compilation on Dynamic Ground Water Resources of India, Government of India, 2019, p.298.
5. Department of Agriculture., Agriculture Action Plan, Government of Telangana, 2019, p.24.
6. Dhawan, B.D., Groundwater Depletion, Land Degradation and Irrigated Agriculture in India, New Delhi, 1995.
7. Department of Agriculture & Farmers Welfare Ministry of Agriculture & Farmers Welfare Government of India Annual report 2020-21.
8. FAO. The State of the World's Land and Water Resources for Food and Agriculture: Managing Systems at Risk. Oxfordshire, UK, Earthscan, Abingdon, 2011.
9. Foster T, Brozovic N, Butler A.P. Analysis of the Impacts of Well Yield and Ground Water Depth on Irrigated Agriculture, Jour. Hydrol. 2015; 523: 86–89. doi: 10.1016/j.jhydrol.2015.01.032.
10. Gandhi, V.P. and Bhamoriaya, V., Groundwater Irrigation in India Growth, Challenges and Risks. India Infrastructure Report, 2011, pp.90–117.
11. Giordano, M.Global Groundwater? Issues and Solutions, Annu. Re Environ. Resource. 2009;34:7.1–7.26. doi: 10.1146/annurev.envIRON.030308.100251.