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# Empowering Agriculture: The Crucial Role of State Government in Irrigation and Water Supply, with a Focus on Mission Kakatiya

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**Abstract:**

The state government plays a pivotal role in promoting the development of this sector through the implementation of policies that facilitate the expansion and long-term viability of irrigation and agriculture. It is accountable for furnishing the essential infrastructure, including irrigation amenities, road networks, and storage facilities, to facilitate farmers in accessing markets and efficiently transporting their produce. Itcan establish policies that promote private investment in agriculture and irrigation. For example, tax incentives can be offered to firms that make investments in irrigation and agriculture, while regulatory frameworks can be established to safeguard small-scale farmers from being exploited by major enterprises. Furthermore, the state government can facilitate research and development in agriculture through partnerships with academic institutions and other relevant parties, to generate inventive and enduring farming techniques. This can result in enhanced production, greater yields, and diminished environmental impact. In addition, the state government can guarantee food security by enacting regulations that ensure a consistent provision of food at accessible rates. This can be achieved by fostering domestic food production and allocating resources to the establishment of market systems that facilitate the connection between farmers and consumers. This research paper looks into the role of state government in irrigation and water supply and into the aspect of how people are benefitted with a special focus on Mission Kakatiya.

K**eyword**s: state government, environmental impact, irrigation, infrastructure, food production, farmers, consumers etc.

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**Introduction:**

Irrigation is the deliberate and precise supply of water to plants at specific intervals. Irrigation is a method used to cultivate crops, preserve landscapes, and restore vegetation in arid regions and during seasons of little rainfall. Irrigation serves additional purposes in crop cultivation, such as safeguarding against frost, inhibiting weed proliferation in cereal fields, and averting soil compaction. Conversely, agriculture that solely depends on precipitation is known as rain-fed or dry-land farming. Irrigation systems are additionally employed for animal cooling, dust abatement, sewage disposal, and mining operations. Irrigation is frequently examined in conjunction with drainage, which involves the elimination of both surface and sub-surface water from a specific region. Irrigation, a fundamental aspect of agriculture, has been practised for more than 5,000 years and has been developed by various civilizations.

Irrigation in India is the primary consumer of water, with agriculture utilizing over 80 percent of the country's water resources. Consequently, the growth and management of water resources are predominantly determined by the requirements of irrigation. The irrigation sector in the country has been afflicted by numerous issues. Firstly, the financial gains from investing in the sector do not match the expenses involved in the projects and their ongoing upkeep and management. Therefore, the long-term financial viability of the irrigation sector has consistently been a topic of discussion when assessing the practicality of the projects. Furthermore, the textile industry, which is the primary consumer of water, has been facing increasing concerns regarding its productivity, efficiency, and impact on environmental deterioration. Furthermore, the irrigation sector has been afflicted by inadequate governance and management, marked by a dearth of accountability, transparency, and democratic engagement. These factors have a detrimental effect on the sustainability and fairness of irrigation practices.

**About Telangana:**

Telangana was established on June 2, 2014, following an extended period of agitation. There are a total of 31 districts. The districts are partitioned into 68 revenue divisions, which are further subdivided into 221 mandals. The Medak Gulshanabad division comprises six districts: Hyderabad, Mahbubnagar, Medak, Nalgonda, Nizamabad, and Ranga Reddy. The

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Warangal division has four districts: Warangal, Khammam, Karimnagar, and Adilabad. Telangana ranks as the twelfth largest and twelfth most populous state in India. In the past month, the Telangana State administration has implemented several initiatives to enhance the development of rural areas around the state.

The organization has successfully executed programs in various areas such as irrigation, health, employment generation, ICT awareness, the power sector, and community development. A comprehensive investigation was conducted over one month to analyze the coverage of The Hindu, a prominent national newspaper. The objective was to identify the specific initiatives undertaken by the Telangana administration to improve the conditions of its rural areas.Water scarcity is a significant issue in Telangana. Every year, during summer, the State suffers a lot because of acute water deficit. It has an impact on the agriculture, lifestyle, and economics of the state. Multiple initiatives have been undertaken to address the needs of individuals in terms of potable water and water for agricultural and domestic purposes.

The agriculture sector in Telangana has garnered significant scrutiny in recent years, mostly due to the high number of suicides among cotton farmers. Two prevailing perceptions have been widely accepted as conventional wisdom. Firstly, it is contended that the agricultural sector in Telangana has historically exhibited both underdevelopment and lack of progress. Furthermore, it is contended that Telangana is plagued by a severe dearth of irrigation resources, primarily resulting from the neglect of the region by the unified Andhra Pradesh administration. This factor is considered to be one of the reasons for the absence of agricultural development. Due to the rapid expansion of groundwater irrigation, the districts of Telangana have experienced significant agricultural growth.

**Types of irrigation**

There are various methods of irrigation. The methods of supplying water to the plants differ. The objective is to distribute the water evenly among the plants, ensuring that each plant receives the appropriate amount of water, avoiding both excessive and insufficient watering.

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**a. Surface irrigation**

Surface irrigation, the most ancient kind of irrigation, has been employed for millennia. Surface irrigation systems involve the movement of water across the agricultural land's surface, such as by furrows, flooding, or level basins. The purpose is to moisten the land and allow the water to seep into the soil. Surface irrigation can be categorized into furrow, borderstrip, or basin irrigation. When irrigation causes the cultivated land to flood or nearly flood, it is sometimes referred to as flood irrigation. Traditionally, this has been the prevailing approach for irrigating agricultural land and remains widely employed across the globe. When the water levels from the irrigation source are allowed, they are regulated by dikes, typically sealed with dirt. This phenomenon is frequently observed in terraced rice fields, also known as rice paddies, where it serves the purpose of inundating or regulating the water level in each field. Occasionally, water is mechanically propelled or elevated by human or animal force to match the height of the surrounding land. Surface irrigation generally exhibits inferior water application efficiency compared to alternative irrigation methods. Surface irrigation is employed for watering landscapes in specific regions, such as in and around Phoenix, Arizona. The irrigated region is encircled by a raised bank, and the water is distributed based on a predetermined timetable established by a nearby irrigation district.

b. **Micro-irrigation**

Micro-irrigation, also known as localized irrigation, low-volume irrigation, or trickle irrigation, is a method of distributing water at low pressure through a network of pipes in a specific pattern. The water is supplied in small amounts directly to each plant or near it. Traditional drip irrigation, subsurface drip irrigation (SDI), micro-spray irrigation, micro-sprinkler irrigation, and mini-bubbler irrigation are all examples of irrigation technologies in this category.

c. **Drip irrigation**

Drip irrigation, commonly referred to as micro irrigation or trickle irrigation, operates by its descriptive title. This technique facilitates the gradual release of water directly at the location of the roots. Water is supplied to the root zone of plants by a drip irrigation system. If properly maintained, this approach has the potential to be the most water-efficient kind of irrigation, as it minimizes evaporation and runoff. When properly managed, drip irrigation

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typically achieves a field water efficiency ranging from 80 to 90 percent. In contemporary agriculture, drip irrigation is frequently integrated with plastic mulch to further minimize evaporation and serve as the conduit for fertilizer distribution. The technique is referred to as fertigation. Excessive infiltration of water below the area where plant roots are present, known as deep percolation, can happen if a drip irrigation system is run for an extended period or if the rate at which water is delivered is too high.

The variety of drip irrigation methods varies from highly advanced and computerized systems to simple and labour-intensive ones. Typically, lower water pressures are required for this system compared to other systems, except for low-energy centre pivot systems and surface irrigation systems. The system can be designed to ensure consistent water distribution across a field or to deliver water precisely to individual plants in a landscape with a variety of plant species. While it may be challenging to control pressure on steep inclines, there are pressure-compensating emitters that can be used, allowing for irrigation in areas that are not always flat. High-tech methods utilize accurately calibrated emitters positioned along tubing lines that extend from a controlled array of valves.

d. **Sprinkler irrigation**

Water is conveyed by pipes to specific central points in the field in sprinkler or overhead irrigation systems. From there, it is dispersed using high-pressure sprinklers or guns that are positioned above the ground. A solid-set irrigation system is a type of system that uses sprinklers, sprays, or guns that are positioned overhead on risers that are permanently installed. Sprinklers with increased pressure that rotate are referred to as rotors and are powered by a ball drive, gear drive, or impact mechanism. Rotors can be engineered to rotate in a complete or incomplete circular motion. Guns are comparable to rotors, but they typically function under significantly higher pressures ranging from 40 to 130 lbf/in² (275 to 900 kPa) and flows of 50 to 1200 US gal/min (3 to 76 L/s). Additionally, their nozzle diameters typically fall within the range of 0.5 to 1.9 inches (10 to 50 mm). Firearms are utilized not only for irrigation purposes but also for industrial uses such as dust suppression and logging.

Sprinklers can be affixed on mobile platforms that are linked to the water source via a hose. Travelling sprinklers, which are wheeled systems, may automatically water various

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locations such as small farms, sports fields, parks, pastures, and cemeteries without the need for human supervision. The majority of these employ a coil of polyethene tubing wrapped around a steel drum. The tubing is coiled around the drum, which is driven by either the irrigation water or a tiny gas engine. This motion causes the sprinkler to move across the field. Upon the sprinkler's return to the reel, the system automatically deactivates. Most individuals are familiar with this device as a "waterreel" roving irrigation sprinkler, which is widely employed for dust suppression, irrigation, and the disposal of wastewater on land. Some other passengers employ a taut rubber hose that is towed behind while the sprinkler platform is propelled by a cable.

**Water sources**

Irrigation water can be sourced from groundwater, obtained by the extraction of springs or the use of wells, or from surface water, withdrawn from rivers, lakes, or reservoirs. Additionally, non-conventional sources such as treated wastewater, desalinated water, drainage water, or fog collecting can also be utilized. Spate irrigation, also known as floodwater harvesting, is a unique method of irrigation that utilizes surface water. During a flood event, water is redirected to often arid river channels (wadis) through a system of dams, gates, and channels, and distributed throughout expansive regions. The soil's moisture will thereafter be utilized for crop cultivation. Spate irrigation areas are primarily found in places that are semi-arid or arid and have mountainous terrain. Although floodwater gathering is recognized as a valid irrigation technique, rainwater collection is typically not regarded as a form of irrigation. Rainwater harvesting involves gathering and consolidating runoff water from rooftops or unoccupied areas.

Approximately 90% of wastewater generated worldwide is left untreated, resulting in extensive water pollution, particularly in low-income nations. There is a growing trend in agriculture to utilize untreated wastewater as a means of obtaining irrigation water. Cities offer profitable opportunities for the sale of fresh goods, making them appealing to farmers. Nevertheless, due to the growing scarcity of water resources, agriculture is compelled to vie with industry and municipal users for access. Consequently, farmers frequently have little choice but to employ water contaminated with urban waste, such as sewage, directly for irrigating their crops. Using water contaminated with pathogens in this manner can lead to

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substantial health risks, particularly if individuals consume fresh vegetables that have been watered with contaminated water.

**Projects for the development of Irrigation in Telangana**

A few of the projects for the development of Irrigation in Telangana are discussed below:

**a. Priyadarshini Jurala Project:**

This project, named after the former Prime Minister of India, 'Priyadarshini' Indira Gandhi, is located 10 km away from Kuravapur in Mahabubnagar district. Mrs Gandhi laid the foundation stone of this project to promote the welfare of the local population. The project was subsequently finished in 1995. The Jurala reservoir has a maximum water level of 1045 feet and a total capacity of 11.94 Thousand Million Cubic feet (TMC). As part of this project, the Srisailam reservoir in Mahabubnagar district would be filled with water up to a flow rate of 2 lakh cusecs during this monsoon season. This project is an interstate initiative that serves as a crucial component for several projects reliant on the Krishna River water in Telangana, Rayalaseema, and coastal Andhra regions of Andhra Pradesh, including the Nagarjunasagar area.

An unprecedented event is set to occur for the first time since the establishment of Telangana in 2014. The reservoir experienced complete desiccation last year as a result of inadequate monsoon rainfall. This reservoir fulfils the requirements of irrigation facilities.

On August 7, 2016, Prime Minister Narendra Modi inaugurated the Telangana Drinking Water Supply Project at Komatibanda, Medak district. This project is a component of the Mission Bhagiratha initiative. Over 66,000 residents in 243 villages in Gajwel, Chief Minister K Chandrasekhar Rao's home constituency, will receive treated drinking water. Additionally, it was a pledge made by the Chief Minister during the election campaign. In 1996-97, Rao successfully executed a drinking water project in Siddipet constituency by channelling water from the Lower Manair dam to 180 villages. To address the issues surrounding water scarcity, the State administration devised the drinking water grid project to supply treated water to 25000 rural and 67 urban settlements within six months of assuming power in 2014. The projected cost of this project was Rs 34600 crore.

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Subsequently, the expenditure escalated to Rs 43000 crore. Despite facing strong criticism from opposition parties, the Telangana administration is on the verge of completing the initial phase of a project aimed at supplying water to nine constituencies across four districts. Due to this reason, the Telangana Rashtra Samithi government has obtained a significant portion of the loan, specifically Rs 19200 crore, from the HUDCO.

**b. Sripada Yellampalli Project:**

The irrigation project is situated in Yellampalli hamlet, within the Ramagundam mandal, between the districts of Karimnagar and Adilabad. The project on the Godavari river in Telangana is the fourth largest and is named after the late politician, D Sripada Rao. The former Chief Minister of the former Andhra Pradesh, Y S Rajasekhara Reddy, placed the foundation stone on July 28, 2004.

The initial phase of the project aimed to utilize around 63 thousand million cubic feet of water, with a budget of Rs. 900 crores. During the second phase, approximately 49.5 thousand million cubic feet of water was transported to elevated regions in the districts of Karimnagar, Adilabad, Nizamabad, Warangal, and Medak. A total of 6 thousand million cubic feet of water was allocated for the NTPC Ramagundam project. Following the completion of the sluice gates, the project is now capable of storing around 20 TMC feet of water.

The Mallannasagar reservoir in Thoguta mandal of Medak district is a strategic initiative undertaken by the Telangana government to enhance and modernize the irrigation infrastructure. It is an integral component of the Kaleshwaram project. The Kaleswaram Lift Irrigation Scheme has a substantial capacity of 160 tmc of water. Its primary objective is to store water for irrigation purposes, which is a key component of the revised Pranahita Chevella project. This proposed irrigation project aims to cover around 18 lakh acres of irrigated dry crops during the kharif season. The State government encountered fierce opposition from opposing political parties, environmental activists, writers, academicians, locals, and farmers of the affected communities whose lands were reportedly being seized for this project. There are a total of eight communities that are included in the list of areas that will be submerged as part of this project. According to GO 123, the landowners in the villages are required to sell their land to the government at a fee of Rs 6 lakh per acre. The

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villages include Etigaddakishtapur, Vemulaghat, Pallepahad, Erravalli, and Singaram. Singaram is the only owner of 1088 acres of land and possesses 150 dwellings.

**c. Yellampally Barrage:**

The Yellampally barrage, constructed in 2014 in the Karimnagar district, has now become a significant water resource for the initial phase of the Telangana Drinking Water Delivery Project. This project, known as Mission Bhagiratha, serves nine assembly constituencies in Medak, Ranga Reddy, Nalgonda, and Warangal districts. It can store 20 thousand million cubic feet (TMC ft) of water. The project was named in honour of D Sripada Rao, the former speaker of the former undivided Andhra Pradesh Assembly. The objective is to fulfil the water requirements of the State capital, amounting to 10 TMC ft, and provide 6.5 TMC ft of water to the interstate power project of the National Thermal Power Corporation in Ramagundam. The Kaddam project in Adilabad district can provide water to irrigate 30,000 acres of land, known as the gap ayacut. Additionally, it can provide irrigation for 25,000 acres of land through the Gudem Lift Irrigation Scheme. Last year, it provided water to an area of 40,000 acres in the Manthani region. The project was initiated in 2004 with an estimated budget of Rs 5300 crore.

**d. Telangana Water Grid Project:**

The objective is to provide 100 litres of potable water to each person in rural areas. The Telugu word for this expedition is 'Jala Haram'. The mission is also appropriate in urban areas. The objective in urban areas is to ensure that each citizen has access to 150 litres of potable water.

**e. Special Focus on Mission Kakatiya:**

Commenced in July 2014, this endeavour seeks to enhance and revitalize 46300 reservoirs throughout the state for irrigation. The Telangana Government has already expended Rs 20000 towards this mission. The city was christened in honour of the Kakatiya monarchs, who sought to enhance the irrigation infrastructure for the betterment of the state's inhabitants. As part of the Mission Kakatiya Programme, the Sircilla Police took responsibility for the Mandepalli village in Sircilla mandal, located in the Karimnagar district, in May 2016. Their objective was to restore the non-functioning minor irrigation pond called Timmannakunta. The tank became filled with sediment and little plants. The

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local law enforcement, in collaboration with social workers, thoroughly emptied the entire reservoir. Approximately 4000 trucks were required to transport the silt and vegetation from the tank. The cops constructed a bund around the tank with a width of three meters. During the current monsoon season, the tank has accumulated a substantial amount of rainwater. This water will prove beneficial for irrigating a total of 150 acres of land throughout the hamlet.

Mission Kakatiya, while commendable in its aim to revitalize water resources and benefit farmers, has faced criticism on several fronts. One key concern revolves around the sustainability of the initiative. The short-term focus on tank restoration and repair may not be sufficient to address the broader issues of water management, especially in the face of changing climatic conditions and increasing water demand. A more holistic and long-term strategy that integrates modern water conservation practices and technologies might be necessary to ensure enduring success.

Another critical aspect is the need for robust monitoring and evaluation mechanisms. The effectiveness of Mission Kakatiya relies heavily on the efficient implementation of its objectives. Adequate measures for monitoring progress, assessing the impact on agricultural productivity, and ensuring the equitable distribution of water resources are essential. Without a rigorous evaluation framework, it becomes challenging to measure the initiative's success and make informed decisions for future improvements.

Furthermore, concerns have been raised about the inclusivity of community participation. While Mission Kakatiya emphasizes community involvement, there is a need to ensure that the decision-making process is transparent and inclusive. In some instances, local communities may not have sufficient representation or voice in the planning and execution phases, potentially leading to challenges in the sustained management of restored water bodies.Financial sustainability is another area of critique. The sheer scale of Mission Kakatiya requires substantial financial investments. Questions have been raised about the long-term financial commitment and whether the allocated resources are adequate to cover maintenance costs and future expansion. A clearer financial roadmap and transparent budgeting mechanisms could address these concerns and instill confidence in the initiative's longevity.

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Thus, while Mission Kakatiya represents a significant step towards water resource rejuvenation in Telangana, critical reviews underscore the importance of addressing issues related to sustainability, monitoring, community participation, and financial planning. Addressing these concerns would not only enhance the impact of the initiative but also contribute to its enduring success in transforming the agricultural landscape of the region.

The highly esteemed project, Mission Kakatiya, with the tagline "mana or mana cheruvu," will be inaugurated by the Chief Minister Kalvakuntla in the newly formed state of Telangana. Chandra Shekar Rao. The Mission Kakatiya Project aims to restore water tanks at the Sadashivanagar mandal headquarters in Nizamabad District on March 12th, 2015. The allocated budget for Mission Kakatiya for the upcoming four years is Rs. 25,000 crore. KCR will arrive at the venue at Patha Cheruvu (formerly known as the old water tank) via helicopter around 10:30 am. Subsequently, the program would be officially launched by Uma Bharati, the Union Minister for Water Resources. 85% of the agricultural area in Telangana relies on rainwater, with tank irrigation being the primary method of supplying water for agriculture. Agriculture plays a crucial role in promoting rural employment, reducing poverty, controlling floods, mitigating droughts, supporting livestock and domestic needs, and contributing to soil and water conservation, microclimate regulation, and environmental protection.

Within the state, there are a total of 46,531 minor irrigation sources that provide water to irrigate a combined area of 7.63 lakh hectares. In response to the aforementioned concerns regarding tank irrigation, the Telangana state government has initiated a large-scale project called "Mission Kakatiya" (mana ooru-mana cheruvu) to restore all 46,531 minor irrigation sources. This restoration effort is being carried out in a decentralized manner, with active participation from the local community. The Government's objective is to fully restore all tanks within the next five years, allocating 20% of the tanks for restoration each year.

**Issues and Challenges:**

The primary concern highlighted in the majority of evaluations of India's irrigation and agricultural landscape is the issue of a rapidly increasing population. Following independence, the primary source of tank irrigation experienced a substantial decline as a result of many socio-economic and institutional issues. The most prominent factors are

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alterations in land ownership patterns and shifts in caste and class dynamics. Minor irrigation experienced a decline following independence as a result of the prioritization of canal networks and the overuse of groundwater resources.

The decrease in tank irrigation can be attributed to the widespread adoption of private wells and pumps, which has also affected the tank command area. The emergence of wells is affected by various factors, including the introduction of green revolution technology. Farmers have moved to good irrigation due to its superior quality irrigation, resulting in increased yield and crop production. As a result of this alteration, farmers can cultivate various crops in a single year. The farming pattern was altered as the conventional irrigation system, such as tanks, dissolved.

The manifestation of wells within the tank ayacut has resulted in a diminished enthusiasm for tank management among farmers who possess wells. It is important to note that whereas wells are privately owned resources, tanks are communal properties. Furthermore, well irrigation is more consistent and dependable compared to tank irrigation.

**Shortcomings and Technical challenges in the Process**

Irrigation schemes necessitate resolving many engineering and economic challenges while mitigating adverse environmental consequences. Today, numerous objects are subjected to abuse or neglect, causing their potential and original function to be mostly lost. The issues stemming from inadequate upkeep, invasion, financial scarcity, and other related factors. In the current context of tank deterioration, utilization, and administration, the primary shortcomings observed in tank complexes are

1. Insufficient participation from the community in the management and upkeep of tanks.
2. Insufficient and irregular water supply to the tank Lack of local institutions for management

There is a significant problem with weeds taking over and causing a loss of grazing land in the tank bed. Additionally, the government, public, and private individuals are encroaching on the tank bed and supply channel. The tank water and supply channels are becoming filled with sediment. The sluices are either clogged or leaking, and the weirs are

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damaged. Some of the sluices are missing shutters. The tank bunds are in a state of disrepair, either weak or partially destroyed. Lastly, there is insufficient funding allocated for maintenance.Urbanization has led to the extinction of tanks. Additionally, there has been a lack of sustainable large-scale groundwater development, resulting in a drop in gravity flow in areas that rely on tanks for irrigation.

**Conclusion**

To conclude, the challenges facing irrigation schemes, particularly in the context of tank complexes, are multifaceted and demand immediate attention. The primary obstacles include insufficient community participation in tank management, irregular water supply, the absence of local institutions for effective administration, weed infestation, encroachment by various entities, sedimentation of tank water and supply channels, malfunctioning sluices and weirs, deteriorating tank bunds, and inadequate funding for maintenance. Furthermore, urbanization has led to the decline and extinction of tanks, exacerbating the challenges faced in sustaining agricultural practices.

The detrimental consequences of these challenges extend beyond the agricultural sector, impacting environmental sustainability and the livelihoods of communities dependent on irrigation. Addressing these issues requires a comprehensive approach that involves active community engagement, the establishment of local institutions for effective management, and increased financial allocations for maintenance.The conclusion draws attention to the pivotal role of the state government in the advancement of irrigation and agriculture. To ensure economic growth and development, the government must prioritize the restoration and maintenance of critical water infrastructure, implement policies that encourage private investment, support research and development initiatives, and safeguard food security in the agricultural sector. Sustainable large-scale groundwater development and strategic interventions are imperative to reverse the decline in gravity flow, especially in regions reliant on tanks for irrigation. In navigating these challenges, a collaborative effort involving government, communities, and private stakeholders is essential for fostering resilience, sustainability, and prosperity in the agricultural landscape.

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