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The Role of State Government in for the Development of Irrigation and Agriculture – A Study

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Abstract:

The development of irrigation and agriculture is a crucial factor in the economic growth of any state. The state government plays a significant role in ensuring the growth of this sector by implementing policies that support the expansion and sustainability of irrigation and agriculture. The state government is responsible for providing the necessary infrastructure, such as irrigation facilities, roads, and storage facilities, to enable farmers to access markets and transport their goods efficiently. The state government can also create policies that encourage private investment in agriculture and irrigation. For instance, tax incentives can be provided to companies that invest in irrigation and agriculture, and regulatory frameworks can be developed to protect small-scale farmers from exploitation by large corporations. In addition, the state government can also promote research and development in agriculture by collaborating with academic institutions and other stakeholders to come up with innovative and sustainable farming methods. This can lead to increased productivity, higher yields, and reduced environmental impact. Furthermore, the state government can ensure food security by implementing policies that ensure a steady supply of food at affordable prices. This can be done by promoting local production of food and investing in the development of markets that connect farmers with consumers.

Keywords: Agriculture, irrigation, infrastructure, productivity, higher yields, food security

Introduction:

Irrigation is the application of controlled amounts of water to plants at needed intervals. Irrigation helps grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of inadequate rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation. In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed or dry land farming. Irrigation systems are also used for cooling livestock, dust suppression, disposal of sewage, and in mining. Irrigation is often studied together with drainage, which is the removal of surface and sub-surface water from a given area. Irrigation has been a central feature of agriculture for over 5,000 years and is the product of many cultures.

Irrigation in India has always been and will always remain the largest user of water as the agriculture consumes more than 80 percent of the water resources of the country. Therefore water resources development and management is largely dictated by the needs of irrigation. The irrigation sector in the country has been plagued by several problems. Firstly, the returns on the investment in the sector are not commensurate with the costs incurred for the projects and their maintenance and operations. Thus, financial sustainability of the irrigation sector has been a recurrent theme is examining the feasibility of the projects. Secondly, irritation sector being the largest user of water, the productivity and efficiency in the use of the resource and its influence on the environmental degradation had been a growing concern. Thirdly, the irrigation sector had been plagued with poor governance and management, characterized by lack of accountability, transparency, democratic participation, which impact issues of sustainability and equity in irrigation.

About Telangana:

The state of Telangana was formed in June 2, 2014 after a prolonged movement. It has 31 districts. The districts are divided into 68 revenue divisions and they are again divided into 221 mandals. Under the Medak Gulshanabad division, 6 districts are there – Hyderabad, Mahbubnagar, Medak, Nalgonda, Nizamabad and Ranga Reddy. Under the Warangal division, 4 districts are there – Warangal, Khammam, Karimnagar and Adilabad. Telangana is the 12th largest and 12th most populous state in India. The Telangana State government has initiated a number of measures in last one month to develop the rural sectors across the state. Right from irrigation to health issues, employment generation to ICT awareness, irrigation, power sector, community development the has implemented successful programmes. A month long study on the reporting of The Hindu, a national daily was made to find out what development programmes were taken up by the Telangana government to uplift its rural sectors.

Water scarcity is a major problem in Telangana. Every year, during summer, the State suffers a lot because of acute water shortage. It affects the state's agriculture, lifestyle and economy as well. Several projects have been taken up to meet the needs of people regarding drinking water and water for irrigation and household activities.

Agriculture in Telangana has attracted considerable attention in the past few years, mostly because of the suicides of hundreds of cotton farmers. Two perceptions have dominated the conventional wisdom. First, it is argued that agriculture in Telangana has long been both backward and stagnant. Second, it is argued that Telangana suffers from a serious insufficiency of irrigation resources, due to neglect of the region by the united Andhra Pradesh government. This latter is regarded as one of the causes of the lack of agricultural growth. These two aspects of agricultural development in Telangana. The growth rates at the district level and decompose these to throw light on the respective contributions of cropping pattern, yield, and area to agricultural growth. Despite the fact that Telangana has been neglected by the state government in the development of canal irrigation area, there have been substantial increases in groundwater irrigation. With the rapid spread of groundwater irrigation, Telangana districts have been witnessing high agricultural growth.

Types of irrigation

There are several methods of irrigation. They vary in how the water is supplied to the plants. The goal is to apply the water to the plants as uniformly as possible, so that each plant has the amount of water it needs, neither too much nor too little.

Surface irrigation

Surface irrigation is the oldest form of irrigation and has been in use for thousands of years. In *surface* (*furrow*, *flood*, or *level basin*) irrigation systems, water moves across the surface of an agricultural lands, in an order to wet it and infiltrate into the soil. Surface irrigation can be subdivided into furrow, *borderstrip or basin irrigation*. It is often called *flood irrigation* when the irrigation results in flooding or near flooding of the cultivated land. Historically, this has been the most common method of irrigating agricultural land and still used in most parts of the world. Where water levels from the irrigation source permit, the levels are controlled by dikes, usually plugged by soil. This is often seen in terraced rice fields (rice paddies), where the method is used to flood or control the level of water in each distinct field. In some cases, the water is pumped, or lifted by human or animal power to the level of the land. The water application efficiency of surface irrigation is typically lower than other forms of irrigation. Surface irrigation is even used to water landscapes in certain areas, for example, in and around Phoenix, Arizona. The irrigated area is surrounded by a berm and the water is delivered according to a schedule set by a local irrigation district.

Micro-irrigation

Micro-irrigation, sometimes called localized irrigation, low volume irrigation, or trickle irrigation is a system where water is distributed under low pressure through a piped network, in a pre-determined pattern, and applied as a small discharge to each plant or adjacent to it. Traditional drip irrigation using individual emitters, subsurface drip irrigation (SDI), micro-spray or micro-sprinkler irrigation, and mini-bubbler irrigation all belong to this category of irrigation methods.

Drip irrigation

Drip (or micro) irrigation, also known as trickle irrigation, functions as its name suggests. In this system water falls drop by drop just at the position of roots. Water is delivered at or near the root zone of plants, drop by drop. This method can be the most water-efficient method of irrigation, if managed properly, evaporation and runoff are minimized. The field water efficiency of drip irrigation is typically in the range of 80 to 90 percent when managed correctly. In modern agriculture, drip irrigation is often combined with plastic mulch, further reducing evaporation, and is also the means of delivery of fertilizer. The process is known as *fertigation*. Deep percolation, where water moves below the root zone, can occur if a drip system is operated for too long or if the delivery rate is too high. Drip irrigation methods range from very high-tech and computerized to low-tech and labor-intensive. Lower water pressures are usually needed than for most other types of systems, with the exception of low energy center pivot systems and surface irrigation systems, and the system can be designed for uniformity throughout a field or for precise water delivery to individual plants in a landscape containing a mix of plant species. Although it is difficult to regulate pressure on steep slopes, pressure compensating emitters are available, so the field does not have to be level. High-tech solutions involve precisely calibrated emitters located along lines of tubing that extend from a computerized set of valves.

Sprinkler irrigation

In sprinkler or overhead irrigation, water is piped to one or more central locations within the field and distributed by overhead high-pressure sprinklers or guns. A system utilizing sprinklers, sprays, or guns mounted overhead on permanently installed risers is often referred to as a *solid-set* irrigation system. Higher pressure sprinklers that rotate are called *rotors* and are driven by a ball drive, gear drive, or impact mechanism. Rotors can be designed to rotate in a full or partial circle. Guns are similar to rotors, except that they generally operate at very high pressures of 40 to 130 lbf/in² (275 to 900 kPa) and flows of 50 to 1200 US gal/min (3 to 76 L/s), usually with nozzle diameters in the range of 0.5 to 1.9 inches (10 to 50 mm). Guns are used not only for irrigation, but also for industrial applications such as dust suppression and logging. Sprinklers can also be mounted on moving platforms connected to the water source by a hose. Automatically moving wheeled systems known as *traveling sprinklers* may irrigate areas such as small farms, sports fields, parks, pastures, and cemeteries unattended. Most of these utilize a length of polyethylene tubing wound on a steel drum. As the tubing is wound on the drum powered by the irrigation water or a small gas engine, the sprinkler is pulled across the field. When the sprinkler arrives back at the reel the system shuts off. This type of system is known to most people as a "waterreel" traveling irrigation sprinkler and they are used extensively for dust suppression, irrigation, and land application of waste water. Other travelers use a flat rubber hose that is dragged along behind while the sprinkler platform is pulled by a cable.

Water sources

Irrigation water can come from groundwater (extracted from springs or by using wells), from surface water (withdrawn from rivers, lakes or reservoirs) or from non-conventional sources like treated wastewater, desalinated water, drainage water, or fog collection. A special form of irrigation using surface water is spate irrigation, also called floodwater harvesting. In case of a flood (spate), water is diverted to normally dry river beds (wadis) using a network of dams, gates and channels and spread over large areas. The moisture stored in the soil will be used thereafter to grow crops. Spate irrigation areas are in particular located in semi-arid or arid, mountainous regions. While floodwater harvesting belongs to the accepted irrigation methods, rainwater harvesting is usually not considered as a form of irrigation. Rainwater harvesting is the collection of runoff water from roofs or unused land and the concentration of this. Around 90% of wastewater produced globally remains untreated, causing widespread water pollution, especially in low-income countries. Increasingly, agriculture uses untreated wastewater as a source of irrigation water. Cities provide lucrative markets for fresh produce, so are attractive to farmers. However, because agriculture has to compete for increasingly scarce water resources with industry and municipal users, there is often no alternative for farmers but to use water polluted with urban waste, including sewage, directly to water their crops. Significant health hazards can result from using water loaded with pathogens in this way, especially if people eat raw vegetables that have been irrigated with the polluted water.

Initiatives of Irrigation Projects:

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

Priyadarshini Jurala Project:

Situated at a distance of 10 km from Kuravapur in Mahabubnagar district, this project was named after the former Prime Minister of India, 'Priyadarshini' Indira Gandhi. The foundation stone of this project was laid by Mrs Gandhi for the welfare of the people here and the project was completed in 1995. The Jurala has a full reservoir level of 1045 ft and has a full capacity of 11.94 TMC. Under this project, the Srisailam reservoir at Mahabubnagar district would receive water up to 2 lakh cusecs in this monsoon. This is an inter-State project and is also considered as the lifeline of many other projects based on the Krishna river water in Telangana, Rayalaseema and coastal Andhra zones of Andhra Pradesh areas including the Nagarjunasagar. Such a remarkable incident is going to be happened for the first time after the formation of Telangana in 2014. Last year, the reservoir dried up completely due to poor monsoon. This reservoir meets the needs of irrigation facilities.

The Telangana Drinking Water Supply Project as a part of the Mission Bhagiratha plan was launched by Prime Minister Narendra Modi at Komatibanda in Medak district on August 7, 2016. Treated drinking water would be supplied to over 66000 households across 243 villages in Gajwel, the home constituency of the Chief Minister K Chandrasekhar Rao. It was also a poll promise made by the Chief Minister. Rao earlier implemented successful drinking water project in Siddipet constituency in 1996-97 by bringing water from the Lower Manair dam to 180 villages. To overcome the problems related to water scarcity, the State government conceived the drinking water gird project to provide treated water to 25000 rural and 67 urban habitations within six months after they had come to power in 2014 at an estimated cost of Rs 34600 crore. Later, the expenditure increased up to Rs 43000 crore. Ignoring stark criticism by the opposition parties, the Telangana government is all about to complete its first phase of the project for providing water to nine constituencies in four districts. For this reason, the Telangana Rashtra Samithi government has also received a lion's share of loan i.e. Rs 19200 crore from the HUDCO.

Sripada Yellampalli Project:

It is an irrigation project located at Yellampalli village at Ramagundam mandal, between Karimnagar and Adilabad districts. It is the fourth largest project on the Godavari river in Telangana aand was named after late legislator, D Sripada Rao. The foundation stone was laid by former Chief Minister of erstwhile Andhra Pradesh, Y S Rajasekhara Reddy on July 28, 2004.

It was designed to utilise about 63 tmc of water at a cost of Rs. 900 crores in the first phase. In the second phase, about 49.5 tmc water was lifted to highland areas in Karimnagar, Adilabad, Nizamabad, Warangal and Medak districts. 6 tmc water was allotted for NTPC Ramagundam project. After installation of the sluice gates, the project can store now about 20 TMC ft of water.

The Mallannasagar reservoir in Thoguta mandal of Medak district is an attempt by the Telangana government for upgrading the irrigation system. It is a part of the Kaleshwaram project. With a huge capacity of 160 tmc of water under the Kaleswaram Lift Irrigation Scheme, this project aims to store water for irrigation purpose as part of the redesigned Pranahita Chevella project. An estimated 18 lakh acres of irrigated dry crops in kharif season is under the target of this proposed irrigation. The State government faced vehement protest by opposition political parties, environment activists, writers, academicians, residents and farmers of the targeted villages whose lands were said to be acquired for this project. Eight villages are in the list to be submerged in this project. Under the GO 123, the land owners of the villages would have to sell their land at the rate of Rs 6 lakh per acre to the government. The villages are Etigaddakishtapur, Vemulaghat, Pallepahad, Erravalli and Singaram. Only Singaram has 1088 acres of land and 150 houses.

Yellampally Barrage:

The Yellampally barrage, built in 2014 in Karimnagar district now has become a rich source of water for the first phase of Telangana Drinking Water supply Project, under the Mission Bhagiratha at nine assembly constituencies in Medak, Ranga Reddy, Nalgonda and Warangal districts. It has the capacity of holding 20 TMC ft of water. The project was named after the former speaker of erstwhile undivided Andhra Pradesh Assembly D Sripada Rao. It aims to meet the drinking water needs of the State capital to the tune of 10 TMC ft and to supply 6.5 TMC ft water to the interstate power project of the National Thermal Power Corporation at Ramagundam. It can supply water to 30000 acres gap ayacut of Kaddam project in Adilabad district and help in irrigation facilities to 25000 acres under Gudem Lift Irrigation Scheme. It also supplied water to 40000 acres in Manthani area last year. The idea of the project was taken up in 2004 with an estimated cost of Rs 5300 crore.

Telangana Water Grid Project:

It aims to deliver 100 litres of safe drinking water to every individual at the rural places. The Telugu name of this mission is 'Jala Haram'. In urban areas too, the mission is applicable. In urban areas, it is aimed to provide 150 litres of safe drinking water to every individual.

Mission Kakatiya:

Started in July 2014, this mission aims to develop and rejuvenate 46300 tanks across the state for irrigation purpose. The Government of Telangana has already spent Rs 20000 after this mission. It has been named after the Kakatiya rulers of the state who wanted to develop the irrigation system for the welfare of the residents of this state. Under the Mission Kakatiya Programme, the Sircilla Police adopted the Mandepalli village in Sircilla mandal under Karimnagar district in May, 2016 to rejuvenate the defunct minor irrigation tank namely Timmannakunta. Silts and shrubs filled up the tank. The local police along with social workers cleared the entire tank. Around 4000 trucks were needed to carry the silt and plants from the tank. The police also built a three metres width bund around the tank. In this monsoon, the tank got filled with rain water which would be helpful for the irrigation purpose in 150 acres of land across the village. The Most Prestigious Project Ever in Newly Formed Telangana State Mission Kakatiya with tagline mana ooru mana cheruvu would be launched/Inaugurates by the Chief Minister Kalvakuntla. Chandra Shekar Rao. The Mission Kakatiya Project aim's to restoration of water tanks, at Sadashivanagar mandal headquarters Nizamabad District on March 12th 2015. The Budget For Mission kakatiya for next four years was stated as Rs. 25,000 crore. KCR will reach the venue at Patha Cheruvu (old water tank) by helicopter at 10.30 am. later the programm would be inaugurated by the Union minister for water resources Uma Bharati. In Telangana 85% of cultivated area is rainfed, and only tank irrigation system is the main source for agriculture. It is critical for agricultural growth, generation of rural employment, poverty reduction,flood control, drought mitigation, livestock and domestic uses,contributes to soil and water conservation, microclimate and protection of environment.

In the state, there are 46,531 minor irrigation sources irrigating a total area of 7.63 lakh hectares. Considering all the aforementioned issues related to the tank irrigation, the Government of Telangana state has taken up the massive programme of restoring all the 46,531 minor irrigation sources under the name "Mission Kakatiya" (mana ooru-mana cheruvu) in a decentralized manner through community involvement. The Government is aiming to complete the restoration of all the tanks in next five years @ 20% of the tanks each year

Issues and Challenges:

The most important challenge that most reviews of India's irrigation and agricultural scene put forward is that of exploding population. After the independence the significant source of tank irrigation drastically decreased due to several socio-economic and institutional factors, the most factors have been changes in land ownership pattern and changes in caste and class configuration. The minor irrigation was decreased after independence due to importance given to canal systems and over exploitation of ground water. The decline of tank irrigation due to particularly massive diffusion of private wells and pumps has spread to tank command area. Emergence of wells is influenced by many factors such as the advent of green revolution technology, the farmers were switched over to well irrigation due to its quality irrigation which provides more

yield and more crop. Due to this change farmers are able to cultivate multiple crops in a year. So the cropping pattern was changed meanwhile the traditional irrigation system such as tanks got disintegrated. Materialization of wells in the tank ayacut has led to the decline of interest in the tank management among farmers who own wells at the same time well is a private resource whereas a tank is a common property, moreover well irrigation is more stable and reliable than tank irrigation.

Technical challenges

Irrigation schemes involve solving numerous engineering and economic problems while minimizing negative environmental impact. Today, many are abused or in a state of disuse, their potential and original purpose all but forgotten. The problems due to poor maintenance, encroachment, lack of money etc. In the present scenario of tank degeneration, and tank use and management, the major deficiencies noticed in the tank complexes are

- Lack of community involvement in tank management and maintenance
- Inadequate and unreliable water supply to the tank
- Absence of local institutions for management
- Large-scale infestation of weeds and loss of grazing land in the tank bed
- Encroachment of tank bed and supply channel by the government, public, private people
- silting of tank water spreads and supply channels
- Choked or leaky sluices and damaged weirs
- Sluices with missing shutters
- Dilapidated and weak or cut-down tank bunds
- Meagre resource allocations for maintenance
- Urbanization and extinction of tanks
- No sustainable large-scale groundwater development and decline in gravity flow in tank-fed irrigated area

Conclusion

The role of the state government in the development of irrigation and agriculture is critical. By providing the necessary infrastructure, creating policies that support private investment, promoting research and development, and ensuring food security, the state government can contribute to the growth and sustainability of this sector, thereby promoting economic growth and development.

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