International Journal of Multidisciplinary Research and Development
www.allsubjectjournal.com
ISSN Online: 2349-4182 ISSN Print: 2349-5979
Received: 21-01-2025, Accepted: 23-02-2025, Published: 12-03-20253
Volume 12, Issue 3, 2025, Page No. 19-23

Problems and prospects of irrigation in Telangana- A study on mission Kakatiya

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Abstract
Historically, thanks formed the primary sources of minor irrigation in Telangana. However, in the recent past, the minor irrigation under the tank received a setback for various reasons. The tanks are vital to irrigation and the local ecosystem in the study area. The problem is so severe that it has become a concern for researchers and the government to study and evaluate the situation to take remedial measures. Meanwhile, the tank provides multiple uses, such as drinking water sources for the countless rural and urban communities, livestock, fish culture, recharge of groundwater, control of floods, etc. However, after independence, the significant sources of tank irrigation have directly decreased due to several socio-economic and institutional factors. The study finds that out of 150 sample respondents, 21.5 per cent are between the ages of 51 and 60 in the study area. Of the 150 sample respondents, 77% are males. The majority of sample respondents, 56%, are literate. Nearly 91% of respondents are married. Almost 67% of farmers are small and marginal. More than 58% of respondents practise farming and cultivation. Among 150 sample respondents, 77.6% use tractors for cultivation. 64% of the sample respondents earn rupees below 20000 annually.

Keywords: Water, minor irrigation, cropping pattern, productivity and Telangana

Introduction

As the deliverer of life, water stands out as the most potent element on Earth. It effectively purifies and provides essential nutrients to all living organisms. Water has had the most significant impact on our culture and environment compared to any other element on Earth. Water has played a crucial role in shaping our civilisation from the earliest days of humanity. Our ancient predecessors were hunters who established tiny settlements near water sources for agricultural purposes. Therefore, ancient civilisations thrived exclusively along river banks due to the rivers' ability to replenish the soil through seasonal flooding and provide crop irrigation.

Tanks are crucial in supporting the people and agricultural lands, as they benefit tank irrigation. The majority of tanks naturally occur and do not require significant expenses for their construction. Throughout history, India has maintained its status as an agricultural nation. Uneven rainfall patterns are observed in different regions, with some places seeing little seasonal rainfall while others face flooding. This scenario can sometimes lead to chaos, pushing farmers to the brink of catastrophic hunger. In regions with insufficient monsoon rainfall, artificial irrigation is a crucial requirement. Investigate ancient irrigation methods in South India using artificial techniques, Lal (2024) [6].

Review of Literature

Panneerselvam (2022), Although the agriculture sector absorbs more than 60 per cent of the workforce, productivity continues to be lower. The shifts arising from agriculture and allied subsectors (irrigation) have an impetus effect on net irrigated and cropped areas. Overall, improvement in the net irrigated area is observed by 1.6 times (3.07 million ha to 5.1 million ha) with simultaneous growth in the canal and well irrigation sources. Madhnure & Lavanya (2021). The State receives annual normal rainfall of 942 mm and is the primary source of groundwater recharge. In the State, groundwater irrigation reached its 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.

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. 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.

Raju (2017) [12] 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.

Pingle (2011) [11] elucidated the shifts in irrigation supplies within Telangana state from 1875 to 2009. The study primarily concentrated on the Telangana region, analysing its three irrigation sources (canal, tank, and well) and how they have evolved. An analysis reveals a notable rise in well and canal irrigation and a sharp decrease in tank irrigation. Upon examining the current literature, it is evident that numerous studies have concentrated on the significance of irrigation in the development of agriculture in India and other regions.

There is a significant opportunity to enhance the performance of irrigation in Telangana, strengthen customer loyalty, and command a higher price. Green marketing is still in its infancy, and much research is needed to explore its potential fully. Final consumers and industrial buyers can also pressure organisations to integrate the environment into

their corporate culture and thus ensure all organisations minimise the detrimental environmental impact of their activities, Lal (2015) [3]. Lal and Ramana (2018) [5] propose that by implementing enhanced water control strategies that are tailored to specific resource conditions and socio-ecological factors, there is a significant opportunity to address the livelihood challenges faced by marginalised communities in India, including those in Telangana.

According to Naik (2013) [8], numerous countries in Asia have not prioritised addressing alcohol-related issues to the same extent as they have with other addictive substances like opioids and nicotine. Given the lack of urgency in addressing the alcohol issue, there is an immediate need for thorough data on alcohol consumption and its overall impact on society, particularly in many emerging and low-income nations. This urgency is also reflected in the need to address the irrigation issues in Telangana. The majority of Telangana farmers consume alcohol, and they spend their support price, which the government provides.

Objectives

1. To study the Socio-Economic condition of farmers.
2. To study the cropping pattern of farmers under minor irrigation.
3. To assess the problems of farmers under Mission Kakatiya.

Hypotheses

1. There is no significant relationship between economic conditions (income) and crop cultivation of farmers.
2. There is no significant relationship between the Mission Kakatiya Programme (MKP) and the primary source of livelihood.

Sources of Data

The study uses primary and secondary data. Primary data were collected through personal interviews and a structured questionnaire among the selected farmer households of sample respondents in the Telangana Districts.

Design of Sample

A sample design was adopted to increase the study's potential. A multi-stage sample design is adopted. In the first stage, 150 sample households are randomly chosen from Khammam districts. Each village has 75 sample respondents in one Mandal, which has been selected. In the second stage. In the third stage, two villages have been chosen to collect primary data**.**

Tools of Analysis

The statistical tools used made the study more accurate. First, the data were analysed, considering the study's objectives. The statistical tools used were frequency counts, averages, and percentages analysis.

Area of the Study

Sl No	Name of the District	Name of the Mandal	Name of the Villages	Universal Sample	Study Sample
1	Khammam	Nelakondapally	1.NelakondapallyGP 2.Cheruvu Madharam GP	2156 3618	75 75
1	1	1	2	5774	150

Sources: Field data

Table 1: Demographic Information of Sample Respondents

Variable	Indicators	Frequency	Percentage / Total
		Nelakondapally	
Age Group	31-40 Years	15 (5)	15 (5)
	41-50 Years	40 (13.3)	40 (13.3)
	51-60 Years	65 (21.6)	65 (21.6)
	Above 60 Years	30 (10)	30 (10)
	Total	150 (100)	150 (100)
Sex	Male	115 (76.6)	115 (76.6)
	Female	35 (23.3)	35 (23.3)
	Total	150 (100)	150 (100)
Literacy	Illiterate	46 (30.6)	46 (30.6)
	Literate	85 (56.6)	85 (56.6)
	Inter	10 (6.6)	10 (6.6)
	Graduate	9 (6)	9 (6)
	Total	150 (100)	150 (100)
Marital Status	Single	7 (4.6)	7 (4.6)
	Married	137 (91.2)	137 (91.2)
	Divorced	6 (4.0)	6 (4.0)
	Total	150 (100)	150 (100)
Type of Family	Joint	55 (36.6)	55 (36.6)
	Nuclear	95 (63.3)	95 (63.3)
	Total	150 (100)	150 (100)
Size of the Family	Below-3 members	45 (30)	45 (30)
	4-6 Members	82 (54.6)	82 (54.6)
	Above -6	23 (15.3)	23 (15.3)
	Total	150 (100)	150 (100)
Housing Pattern	Tin Shed- Tiles	18 (12)	18 (12)
	RCC- Pucca House	132 (88)	132 (88)
	Total	150 (100)	150 (100)
Type of Farmer	Small Farmer	57 (38)	57 (38)
	Marginal Farmer	43 (28.6)	43 (28.6)

	Medium Farmer	42 (28.0)	42 (28.0)
	Large Farmer	8 (5.2)	8 (5.2)
	Total	150 (100)	150 (100)

Sources: Field data

Table 1 provides demographic information about the farmers, depicting the age-wise distribution of the sample respondents in the study area. The high literacy rate, among 150 sample respondents, 21.6 per cent (65) of respondents are between the age group of 51-60 years, the age group of 41-50 years, 13.3 per cent (40) of respondents, 5 per cent of respondents are between the age group of 31-40 years. The study inferred that there are more working-age group respondents. Those above sixty years old are considered dependents. The age group from thirty-one to sixty is regarded as the working respondents. The study inference is that the male count dominates the female in the study area. The study concluded that the literacy rate of the respondents is high in the study area. This helps the respondents to be in a good position in the future. The study inferred that the married count is dominant compared to the respondents who are unmarried and divorced. The nuclear type family is seen more often in the study area. Most respondents have family members between 4 and 6. The majority of the respondents have good housing facilities.

Table 2: Socio-Economic-Related Information of the Sample Respondents

Variable	Indicators	Frequency	Percentage/ Total
		Nelakondapally	
Occupation	Agriculture- Cultivation	87 (58)	87 (58)
	Allied Agricultural Activity	24 (16)	24 (16)
	Labours	13 (8.6)	13 (8.6)
	Business	18 (12)	18 (12)
	Service	8 (5.3)	8 (5.3)
	Total	150 (100)	150 (100)
Income per year	Below-5000	23 (15.3)	23 (15.3)
	Rs 5000-10000	25 (16.6)	25 (16.6)
	Rs 10000-15000	26 (17.3)	26 (17.3)
	Rs 15000-20000	14 (9.3)	14 (9.3)
	Rs Above-20000	47 (31.3)	47 (31.3)
	Not Applicable	15 (10)	15 (10)
	Total	150 (100)	150 (100)
Expenditure	Food Items	125 (90.0)	125 (90.0)
	Non-Food Items	15 (10.0)	15 (10.0)
	Total	150 (100)	150 (100)

Sources: Field data

Table 2. Socio-Economic- related information of farmers. Occupations in the study area include agriculture, allied agricultural activities, labourers, businesses, and services like RMP and staff nurses. Most of the respondents' occupations are agriculture—cultivation, accounting for 87(58%) respondents. The study reveals that most respondents in the study area spend money on food items.

Table 3: Land and Crops Related Information of Sample Respondents

Variable	Indicators	Frequency	Percentage / Total
		Nelakondapally	
What variety do you Cultivate Most?	Local Varieties (BPT, Samba)	91 (60.6)	91(60.6)
	Other varieties (1010, Jejelu, Teja)	59 (39.3)	59 (39.3)
	Total	150 (100)	150 (100)
How Much Did You Get Productivity Per Acre	0-5 Quintals	30 (20)	30 (20)
	6-10 Quintals	13(8.6)	13(8.6)
	11-15 Quintals	32(21.3)	32(21.3)
	16-20 Quintals	30 (20)	30 (20)
	21-25 Quintals	45 (30)	45 (30)
	Total	150 (100)	150 (100)
Why Prefer the Varieties	More yield	53(35.3)	53(35.3)
	More profit	56(37.3)	56(37.3)
	Others	41(27.3)	41(27.3)
	Total	150 (100)	150 (100)
Does (MKP) Help for Increased Production	Yes	94 (62.6)	94 (62.6)
	No	56(37.3)	56(37.3)
	Total	150 (100)	150 (100)
What has contributed to the increase	Availability of Extension Service	17 (11.3)	30 (20)
	Availability of Improved irrigation facilities seeds	25 (16.6)	25 (16.6)

	Good Rainfall Distribution	10 (6.6)	10 (6.6)
	Others	4 (2.6)	4 (2.6)
	Not Applicable	94 (62.6)	94 (62.6)
	Total	150 (100)	150 (100)

Sources: Field data

Table 3. Land and crops, related information. The study inferred that the majority of the respondents did benefit from MKP. It was the complete responsibility of the government to look after the respondents who were getting such facilities and provide them to the respondents. Most respondents prefer to cultivate things like BPT and Samba. The reason might be the heavy demand or the need for better profit in the study area. The majority of the reasons preferred by the respondents were due to getting higher yields. Getting more yield means getting better profit by selling the products. The study inferred that the respondents' production was increasing for a few reasons, but the decreasing productivity was higher for most respondents. Such respondents should be noticed and provided with more facilities that increase their productivity. The study inferred that the respondents are getting very average profits for the production.

Table 4: Mission Kakatiya Related Information of Sample Respondents

Variable	Indicators	Frequency	Percentage/ Total
		Nelakondapally	
Do You Have a Minor Irrigation Project Production	Yes	98 (65.3)	98 (65.3)
	No	52(16.6)	52(16.6)
	Total	150 (100)	150 (100)
What has contributed to the increase	Below-100TMC	53 (35.3)	53 (35.3)
	101-200 TMC	40 (26.6)	40 (26.6)
	201-300 TMC	5 (3.3)	5 (3.3)
	Not Applicable	52 (34.6)	52 (34.6)
	Total	150 (100)	150 (100)
How Many Acres of Land Under Cultivation	Below-2 Acres	42 (28)	42 (28)
	3-5Acres	46 (30.6)	46 (30.6)
	5-10Acres	25 (16.6)	25 (16.6)
	Above -10 Acres	37 (24.6)	37 (24.6)
	Total	150 (100)	150 (100)
Do You Know About MKP	Yes	108 (72)	108 (72)
	No	42(28)	42(28)
	Total	150 (100)	150 (100)
MKP showing Effects	Positive	66(44)	66(44)
	Negative	59(39.3)	59(39.3)
	Not Applicable	25(16.6)	25(16.6)
	Total	150 (100)	150 (100)
Groundwater levels	Increased	32(21.3)	32(21.3)
	Decreased	101(67.3)	101(67.3)
	No change	17(11.3)	17(11.3)
	Total	150 (100)	150 (100)

Sources: Field data

The study inferred that the majority of the respondents did benefit from MKP. It was the complete responsibility of the government to look after the respondents who were getting such facilities and provide them to the respondents. The study also shows that most respondents are satisfied with their water sources, with 151 (50.3%) expressing satisfaction and 149 (49.6%) indicating otherwise. The study inferred that most respondents belong to marginal farmers as they possess land of between 2 and 5 acres.

Conclusions

Some of the conclusions drawn from the study are given below. The study inferred that the respondents have been cultivating agriculture for a long time, as their complete lifestyle depended on agriculture as their primary occupation. The study concluded that the literacy rate of the respondents is high in the study area. This helps the respondents to be in a good position in the future. The study concludes that the majority of the respondents have RCC-pucca houses. This also concludes that the respondents have good housing facilities. Most of the respondents depend on agriculture in these areas. This might be due to having the less educated people in the family. The majority of the respondents possess land below 3 acres. These will result in less profit for the sample respondents. Most respondents have irrigated acres. Such respondents have many facilities by the government, like Mission Kakatiya, and use the nearby canals as water sources for the crops.

Most farmers face problems with infrastructure facilities for marketing their produce. In India's MSME sector, tiny enterprises are deprived of stable infrastructure facilities such as electricity, roads, communication services, transportation structures, and market access, which hinders business operations' efficiency and demoralises advancement (Lal, 2020) [4].

Sustaining agriculture production through a tank irrigation system in rural areas by Mission Kakatiya is an excellent approach. There is no doubt that minor irrigation is needed, and various strategies for agriculture management and social and economic development are required. It will help the irrigation agriculturalists or farmers improve the crop output and increase the financial condition of the people. Improved irrigation facilities help increase the production rate of agriculture, which helps reduce migration, farmer suicide and the changing lifestyle of the village, which are critical factors for strengthening the rural economy and social status. Mission Kakatiya helps farmers remove sediment from the tank, which is the perfect option for producing and enhancing nutrients. The study suggests that applying silt to fields will result in savings on fertiliser and pesticides ranging from Rs. 2,500 to Rs. 3,750 per hectare in the case of cotton crops, while the increase in yield will be to the tune of 1,000 kg a hectare.

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