
A STUDY ON GROUND WATER RESOURCES USED BY FARMERS IN BOTH STUDY VILLAGES (VALADI AND SEVALUR) IN TIRUCHIRAPPALLI DISTRICT, TAMIL NADU

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ABSTRACT

Irrigation is the lifeblood of agriculture, rural livelihood and food security in Tamil Nadu. Centuries –old tanks, and reservoirs and canals were the dominant features in irrigation till the mid-twentieth century. Irrigation landscape however, began changing with private investments in minor irrigation, particularly in groundwater. Today, groundwater irrigation is becoming the cornerstone of providing water for agriculture, resulting in an overall exploitation rate of over 85 per cent of the total available resources. The other sources of groundwater irrigation system include bore wells, wells, canals, dug wells, tube wells and Tanks which have utilised by farmers for cultivating various varieties of crops such as Paddy, Maize, Urad, Horse Gram, Sugarcane, Coconut, Banana, Sesame, Cotton, Groundnut, Fruit and Vegetables in Valadi and Sevalur revenue villages of Tiruchirappalli District, Tamil Nadu.

Key words: Irrigation, Ground Water, Farmers, Livelihood, Food Security

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1. INTRODUCTION

Tiruchirappalli District is one of the 38 districts, located along the Kaveri River, in Tamil Nadu, India. It consists of three Municipalities namely Thuraiyur, Manapparai and Thuvakudi and 15 Town Panchayats. And also there are four divisions namely Tiruchirappalli division, Lalgudi division, Musiri division and Srirangam division, with 11 taluks.

Tiruchirappalli district forms part of Kaveri River basin. Kaveri is the major and the only perennial river in the district. The northern branch of Kaveri known as “Coleroon” (Kollidam) is mainly a flood carried, while the Southern branch retains the name Kaveri. It has numerous tributaries draining the district, the prominent one of which are Ayyar and Upper in the north and Koraiyar in the south. The river Kaveri and Kollidam state branching out to form the Kaveri delta irrigating vast tracts of land in the district. Most of the rivers are structurally controlled (Gopinath & Shibu, 2015a). The major crops are rice (vast tracts), Sugarcane (vast tracts), banana/plantain, coconut cotton (small tracts), betel, corn and groundnut. Tiruchirappalli district is well known for all varieties of banana cultivation. So, irrigation is a vital input for food security in the Tiruchirappalli district, Tamil Nadu State.

2. IRRIGATION SOURCE – IMPORTANT RIVERS/CANALS IN TRICHIRAPPALLI DISTRICT

The river Kaveri and its branch Coleroon are the most important rivers in the district. The other notable rivers are Nandhiyar, Ponnaniyar. The important Canals are Pullambadi canal, Pudukkottai canal, Kattalai Vaikkal, Uyyakondan, Iyyan Vaikkal and Peruvalai Vaikkal.

The Kaveri and Coleroon River

Kaveri one of the major rivers of South India and Tamil Nadu flows splits in to two branches, the northern branch being called the Coleroon (Kollidam) and the Southern branch is called river Kaveri. The total length of the river in this district is 125 kms, and the area of river basin extends to 17,200 hectares of land. Ponnaniyar, Uppanadai and Siddhayall reservoir are mainly used for irrigation purpose (Gopinath & Shibu, 2015b).

Ariyar River

Ariyar River rises in Manapparai area from Pallivelli Mukku at an elevation of about 700. The river carries water from Kadavur and Semmalai reserved forests, Vairampattai, Kulattur and Manapparai areas. The Catchment area of the river is about 832 sq.km.

Upper Anicut (Mukkambu)

A dam known as Upper Anicut was constructed in 1836 at a place where the Cauvery branches off into two at the West end of Srirangam to regulate the flow of water in the Cauvery and Coleroon rivers. In its original form, the Upper Anicut consisted of a simple masonry dam of 230 meters in length divided into three parts. Below the Grand Anicut, the Cauvery further splits into two, one being called the Cauvery and the other, the Vennar River. These Channels are utilised as the main canals of irrigation.

Grand Anicut (Kallanai)

Karikala Cholan, an early Chola King, Constructed the grand Anicut. It is situated on the northern bank of Cauvery about 16 k.m. east of Tiruchirappalli town and mainly used for irrigation purpose. With regard to water spread area, 75 system tanks and 99 seasonal/rainfall tanks were found to exist and then covered 5751.14 ha in the district (Gopinath & Kalpana, 2020). This is 1000 ft. Irrigation dam built across the Kaveri by Karikalachola during second century A.D. is an amazing engineering feat – a great achievement.

3. SOURCES OF IRRIGATION IN THE STUDY REVENUE VILLAGES

Water is a determinant factor for production of crops agriculture sector (Gopinath, 2016a). Intensive and extensive cultivation of land depend mainly on the availability of water. Irrigation

by different sources are – Dug wells, Tube wells, Tanks, Canals, Wells and Bore Wells. In the present study the major sources of irrigation are Wells, Canals and Bore Wells. It is found in both the selected revenue villages namely Valadi and Sevalur.

Table 1.1 Sources of Irrigation among beneficiaries’ non-beneficiaries in both the Revenue villages (Valadi and Sevalur)

S. No	Sources of Irrigation	Beneficiaries	Non-Beneficiaries	Total
1	Bore Wells	27	03	30
2	Wells	11	19	30
3	Canals	22	08	30
	TOTAL	60	30	90

Source: Compiled from primary data.

From this data, the Chi-Square test is applied between sources of irrigation such as Bore Wells (BW), Wells and Canals and the farmers (Beneficiaries and Non-Beneficiaries).

Table 1.2

Sources of Irrigation	Bore Wells	Wells	Canals	Total
Beneficiaries	27	11	22	60
Non-Beneficiaries	03	19	08	30
TOTAL	30	30	30	90

Source: Compiled from primary data.

On the basis of the hypothesis testing, the expected frequencies corresponding to (a) and (b) are –

$$\beta_{11} = \frac{60 \times 30}{90} = 20$$

$$\beta_{12} = \frac{60 \times 30}{90} = 20$$

Expected Frequencies are –

20	20	20	60
10	10	10	30
30	30	30	90

O	E	(O – E) ²	$\frac{(O - E)^2}{E}$
27	20	49	2.45
03	10	49	4.90
11	20	81	4.05
19	10	81	8.10
22	20	4	0.20
08	10	4	0.40
			$\frac{\sum(O - E)^2}{E} = 20.1$

Chi-Square value = 20.1

$V = (r-1)(c-1) = (2-1)(3-1) = 1 \times 2 = 2$, For $V=2$, Chi-Square table value at 5 per cent level of significance is 5.99. The calculated value of Chi-Square (20.1) is greater than the table value of Chi-Square (5.99) at 5 per cent level of significance and so Null hypothesis (H_0) is rejected. Hence, it is concluded that there is association between sources of irrigation facilities and farmers (beneficiaries and non-beneficiaries) in both the study revenue villages namely Valadi and Sevalur. The crops cultivated in these two study revenue villages are Paddy, Maize, Banana, Groundnut, Horse Gram, Urad, Sesame, Sugarcane, Cotton, Flower, Fruits, Vegetables, Coconut and Teakwood. The principal purpose of irrigation is to increase agricultural production by cropping more areas (Gopinath, 2016b). The sources are the Canals from the river Kaveri ordinary wells, tanks and tube wells/ bore wells.

4. IMPORTANCE OF RAINFALL FOR AGRICULTURE IN TIRUCHIRAPPALLI DISTRICT

Access to sufficient water supplies is essential for successful and sustainable farming. Without water, crops die, farmers lose their income or profit and people go hungry. The rainfall water out to 818 mm and the district receives better rainfall from North East monsoon. There are four period of season-wise rainfall in this district – South West monsoon, North East monsoon, Winter season and Summer season or Hot-Weather season. But, the district is maximum benefited by the South West Monsoon (ie) June to September every year.

Rainwater is an important part of how water cycles itself on earth, water from oceans travels around and is evaporated into the atmosphere. After enough water is stored in the sky, It eventually comes back down to earth as rain, feeding plants, animals and people. Rainfall provides as environment with fresh water (Gopinath, 2014). Rain is necessary to around keep water moving around, replenishing lakes, river and oceans and moving nutrients along via run off. Rain become part of ground water that keeps ecosystem in check. When rain water falls on the soil surface, some of it infiltrates into the soil, some stagnates on the surface, while some flows over the surface as run off (Gopinath & Shibu,2014). The factors influencing rainfall are climate, soil texture, soil structure, depth of the root zone and initial soil moisture content. Thus, rainfall is a dynamic weather parameter having a significant role in the agriculture livelihood. Growth in agriculture and other related sectors depends mainly on the adequate amount of rainfall.

Table 1.3 Rainfall Status in Tamil Nadu (202 and 2021)

S.No	Season	Normal (mm)		Actual (mm)	
		2020	2021	2020	2021
1	Winter	27.8	28.0	10.6	29.8
2	Summer	125.5	125.5	75.8	76.5
3	SWM	341.9	336.0	424.4	374.6
4	NEM	447.1	448.0	467.7	474.6
	TOTAL	943.3	937.5	978.5	955.5

Source: Season and Crop Report, 2019-2020.

★ = Projected figure

Rainfall data in Tamil Nadu during the period 2020 and 2021 shows an increasing trend especially in North West monsoon (ie) 447.1 and 467.7 (2020) and 448.0 474.6 (2021). Tamil Nadu is getting adequate amount of rainfall and farmers can be able to cultivate crops in this season (NEM). The SWM is also showing an increasing trend in Tamil Nadu (Gopinath, 2020a).

Table 1.4 Sources of Irrigation in Valadi and Sevalur Revenue Villages by the Farmers

S.No	Sources	Total Number of Farmers		% of Total	
		Valadi	Sevalur	Valadi	Sevalur
1	Bore Wells	27	03	45.00	10.00
2	Wells	11	19	18.33	63.33
3	Canals	22	08	36.67	26.67
	TOTAL	60	30	100.00	100.00

Source: Compiled from primary data.

It is understood from the above Table 1.4 regarding the sources of irrigation in Valadi and Sevalur Revenue Villages by the farmers that, nearly 45 per cent of the farmers in Valadi are using Bore Wells, 18.33 per cent are using Wells and 36.67 per cent have benefitted by using Canals for their cultivation purpose. But, this is opposite in the case of farmers in Sevalur Revenue Village. Only 10 per cent are using bore wells, 26.67 per cent are using canals and 63.33 per cent are having their own wells for cultivation purpose.

Table 1.5 Cultivation of different varieties of crops in both the Revenue Villages of Valadi and Sevalur

S.No	Varieties of Crop	Total Number of Farmers		% of Total	
		Valadi	Sevalur	Valadi	Sevalur
1	Paddy	22	02	36.67	6.67
2	Maize	05	06	8.33	20.00
3	Groundnut	03	04	5.00	13.33
4	Urad	-	04	-	13.33
5	Sesame	-	03	-	10.00
6	Sugarcane	13	-	21.67	-
7	Cotton	-	02	-	6.67
8	Fruits & Vegetables	05	03	8.33	10.00
9	Horse Gram	-	06	-	20.00
10	Coconut	02	-	3.33	-
11	Banana	10	-	16.67	-

Source: Compiled from primary data.

It is found from the Table 1.5 that, 36.67 per cent of the farmers are cultivating Paddy in Valadi village, followed by Sugarcane (21.67 per cent) and Banana (16.67 per cent). In Valadi village, Maize (8.33 per cent), Groundnut (5 per cent) Fruits & Vegetables (8.33 per cent) Coconut (3.33 per cent) have cultivated by very few percentage of farmers. But, in Sevalur village majority of the farmers are cultivating Maize (20 per cent) (Gopinath, 2020b), Horse Gram (20 per cent), Urad (13.33 percent) Groundnut (13.33) and Sesame (10 per cent).

5. FINDINGS OF THE PRESENT STUDY

The following are the findings of the present study on source of irrigation on ground water used by farmers in both the study villages namely Valadi and Sevalur in Trichirappalli District, Tamil Nadu.

- The major sources of irrigation for cultivation purpose are wells, bore wells and canals (Gopinath, 2020c).

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- The rainfall status in Tamil Nadu during the period 2020 and 2021 are favourable for the farmers and showed positive trend (ie) 943.3 mm and 955.5 mm respectively.
- The total number of farmers using bore wells in Valadi village is 45 per cent and it is only 10 per cent in the case of Sevalur village.
- In Sevalur village majority of the farmers are using wells (63.33 per cent) for cultivation purpose.
- In Valadi village 36.67 per cent and 26.67 per cent in Sevalur village are using canals.
- Very few percentage of farmers (18.33) per cent) are using wells water for cultivation purpose in Valadi village.
- According to the availability of water crops like Paddy, Maize, Groundnut, Sugarcane, Fruits and Vegetables, Coconut and Banana have in Sevalur village. Maize, Groundnut, Urad, Sesame, Cotton, Fruits & Vegetables and Horse Gram are cultivated by the farmers.

6. CONCLUSION

From the present study it is clear that the farmers have benefitted by using various sources of water such as wells, canals, and bore wells in both the study villages. They used to cultivate the crops only on the basin of availability of water and they also depend upon monsoon and status of rainfall especially during SWM and NEM. The cultivation of crops in both the study villages differ become of availability of water, soil type, marketing facilities, profit, and absence of transport facilities, monsoon and non-remunerative price. So it is concluded that irrigation is one of the vital roles in the agriculture cultivation.

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