

## Analysis of Role of Irrigation in Cropping Pattern in Salem District

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**Abstract:** The cropping pattern, i.e., proportion of area under different crops, is a good indicator of the development of resource endowments and agricultural production. It can be simply said that suppose, the proportion of area is in favour of commercialised crops, the farm earns a sizable revenue and vice-versa. Cropping pattern is not fixed or given for any area. It is different for different areas and also different for same area over time. The factors motivating the change in cropping pattern may be classified as economic factors (input and output prices), technological factors (improved seeds and irrigation), institutional factors (market, road density and access to credit) and policy induced factors (fertilizer and irrigation subsidy, procurement prices, etc.). Among others, irrigation plays a significant role in the cropping pattern. In this connection, this study analyses the role of irrigation in determining the cropping pattern in Salem District.

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### Introduction

The term 'cropping pattern' denotes the sharing of agricultural area under various crops in a proportion in a particular area. The differential rate of technological change, the spread of irrigation, market intervention and government supports bring a change in the cropping pattern (Dantwala (1986)). Out of economic, technological and sociological factors, only a few could be quantified, that is, price, cost and yield in principle, motivated the supply response decision of farmers (Reddy and Reddy (2010)). According to Kumaravardan et.al. (2009), the decision of farmers to choose a particular crop in the current season depended on various price and non-price factors. Lagged area significantly influenced the current acreage of all the crops. The lagged price was also observed to have a positive and significant influence on the acreage. The rainfall was not a significant factor influencing the acreage response of commercial crops; however it had a role in choosing oilseeds and vegetables, as they are highly susceptible to water logging. In the case of commercial crops, farmers quickly adopted to these crops when their prices increased or when the price of the competing crops decreased. According to Kumar (1970), Krishna (1963) and Narain (1965), there was a strong positive relationship between the price trend of crops and the area under particular crops. That is, farmers gave importance to particular crops, which had higher price. However, Dantwala 1986, Gulati and Sharma 1990 emphasised that 'higher

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price' principle may lead farmers to cultivate crops or switchover to crops whose prices were high irrespective of the cost of cultivation and other aspects such as productivity.

According to review of literature, there is a set of factors to determine cropping pattern. Among them, the role of irrigation might be a significant role in the cropping pattern. But, some other says, price plays important role. In this connection, this paper analyse the significance of irrigation. River, groundwater, pond, lake are the sources of irrigation. River water is supplied through canal and groundwater is supplied by using well and borewell.

Primary data is used in the present study. For choosing geographical area, multi-stage random sampling method was adopted. Salem district was chosen and two blocks were selected within the district; one on the riverbank, namely Pallipalayam, which access irrigation facility through the canal system from the Stanley Reservoir, Mettur in Salem district and the other block away from the riverbank, namely, Pethanaickenpalayam. In these two blocks, four villages were selected, that is, two from each block on the basis of the type of irrigation. In Pallipalayam block, one village, namely, Alampalayam was selected as it had canal irrigation and another village, namely, Pappampalayam was selected as it access treated water through pipe line supplied by Ponni Sugar mill. Two villages, namely, Thumbal and Kalleripatti were selected in Pethanaickenpalayam block because they had well irrigation. There were 400 farmers in Alampalayam, 550 farmers in Pappampalayam, 640 farmers in Thumbal and 350 farmers in Kalleripatti. Either 10 per cent or a quota of 60 in number whichever is maximum was taken as the sample size in each village. Among the four villages, 60 farmers were chosen as respondents from each village, namely, Alampalayam, Pappampalayam and Kalleripatti. In Thumbal, 10 per cent of the farmers, which accounts to 64 (in number) were chosen at random as respondents. The grand total of the selected respondents was 244, which accounted to 12.58 per cent of the total farmers in all the four villages. The data was collected through personal interview by using a structured interview schedule.

Canal irrigation system is available in two villages, one from each block, namely, Alampalayam and Thumbal. But only in Alampalayam, canal irrigation is done fully and it is not so in Thumbal. Through the canal system, water is released for 135 days per annum, it is given continuously for agricultural operation in Alampalayam and is called the Mettur Left Side Irrigation Scheme. Half of Pappampalayam is a special case in terms of irrigation, it gets pipeline irrigation from the Sugar Mill, which provides treated waste water through the pipeline for sugarcane cultivation at the rate of Rs. 1,000 per acre, per annum. Other than these, well and borewell irrigation are used in all the villages. The operational holdings (acres) depending per well and borewell are explained for understanding the irrigation influencing cropping pattern.

### Objective

To examine the role of irrigation to determine the cropping pattern in study villages in Salem district.

### Hypothesis

Irrigation is an important factor in crop selection in study villages in Salem district.

### Methodology

The present study aims at analysing the agricultural production and cropping pattern in Salem District. Salem district was selected for the study as the area under agricultural activities had the largest declining trend among the various districts in Tamil Nadu during the past decade. Multi-stage random sampling was adopted to select the blocks and villages, and ultimately the sample respondents. With the help of the District level and Block level Offices, Department of Economics and Statistics, Government

of Tamil Nadu, irrigation sources and predominant crops were identified. Totally, there are 35 blocks in the district and among them, eight blocks are located on the Cauvery river bank (left side). Water is supplied to these eight blocks through the canal system from the Stanley Reservoir, Mettur in Salem district. Thus, villages which are located on the river bank get canal irrigation. The remaining 27 blocks are located beyond the Cauvery river bank. In these 27 blocks canal irrigation system might be available, but, it is not sufficient for crop cultivation, i.e., water cannot be supplied regularly. In order to make a comparative analysis of the cropping pattern under canal irrigation and well irrigation, and also the increased area in the case of non-agricultural purpose, two blocks were selected; one, near the riverbank and the other away from the riverbank. In these two blocks, four villages were selected, that is, two from each block on the basis of the type of irrigation. The details of the selected blocks and villages are given below.

**Table 3.1: Details of Area Selection**

Block	Pallipalayam		Pethanaickenpalayam	
Village	Alampalayam	Pappampalayam	Thumbal	Kalleripatti
Type of Irrigation	Canal	Well	Well	Well

Out of the eight blocks in Salem district, which are located near the riverbank, Pallipalayam block was selected at random. In Pallipalayam block, one village, namely, Alampalayam was selected as it had canal irrigation and another village, namely, Pappampalayam was selected as it had well irrigation. Out of the remaining 27 blocks, Pethanaickenpalayam block was selected at random. In Pethanaickenpalayam block, two villages, namely, Thumbal and Kalleripatti were selected because they had well irrigation (major parts of Salem district have well irrigation). Out of the four selected villages, three villages were selected for well irrigation. There were 400 farmers in Alampalayam, 550 farmers in Pappampalayam, 640 farmers in Thumbal and 350 farmers in Kalleripatti. Either 10 per cent or a quota of 60 in number whichever is maximum was taken as the sample size in each village. Among the four villages, 60 farmers were chosen as respondents from each village, namely, Alampalayam, Pappampalayam and Kalleripatti. In Thumbal, 10 per cent of the farmers, which accounts to 64 in number were chosen at random, as respondents. The grand total of the selected respondents was 244, which accounted to 12.58 per cent of the total farmers in all the four villages. A structured interview schedule was prepared and the data was collected through personal interview. Before collecting the primary data, interactions and group discussions were made in each village.

The major crops in Salem district were identified through Secondary data taken from Season and Crop Report for Various Years, published by the Directorate of Economics and Statistics, Tamil Nadu on area, production and yield. The list of major crops is as follows, paddy, jowar, bajra, ragi, maize, sugarcane, turmeric, gingelly, groundnut, coconut, cotton, and fruits and vegetables.

## Results and Discussion

### Analysis of Units of Irrigation Sources

#### *Alampalayam and Pappampalayam*

In Pallipalayam block, the number of wells and borewells are lesser in Alampalayam than in Pappampalayam. There are 40 wells and 26 borewells in the former village and 69 wells and 39 borewells in the latter village. In terms of acres per well and acres per borewell, there are 6.4 acres per well and 9.8 acres per borewell in Alampalayam. It is higher compared to Pappampalayam. There are

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3.6 acres per well and 6.4 acres per borewell in Pappampalayam. The average depth of the well is 42 feet and 52 feet and the depth of the borewell is 395 feet and 370 feet in Alampalayam and Pappampalayam villages respectively. The above analysis shows that the irrigation intensity is higher in Pappampalayam than Alampalayam. Further, canal irrigation system is available for 135 days only in Alampalayam, whereas, the Ponni Sugar Mill supplies treated water for sugarcane cultivation throughout the year in Pappampalayam. Moreover, it can be understood from the analysis that the agriculture is intensively grater in Pappampalayam than Alampalayam. The reason is that this village is closely located to Pallipalayam town. It is known that in the western part of Tamil Nadu, namely in Coimbatore, Erode, Tirupur, Salem and Namakkal are developed districts in terms various industrial set-up. Further, the density of poultry, transport sector and Educational institutions is high in Salem and Namakkal districts. In this connection it can be said that landholders in Alampalayam allow to use their land to build up power loom units and they are not ready to improve the agriculture. Land conversion for housing facilities is also at occurring at a considerable level. But, it can be noted that landholders concentrate more on industrial sector and not much on agricultural development. So, they maintain agricultural activities in old conditions. Whereas, even though there are a few power units in Pappampalayam, agriculture is the predominant sector. The differentiation explains that the location impact is worked out to determine the size of agriculture in the villages.

### *Thumbal and Kalleripatti*

There are 67 wells and 74 borewells in Thumbal and 68 wells and 46 borewells in Kalleripatti in Pethanaickenpalayam block. In terms of acres per well and borewell, there are 4.2 acres per well and 3.8 acres are per borewell in Thumbal and 2.5 acres per well and 3.7 acres per borewell in the Kalleripatti. The depth of the well is 71 feet and 64 feet and borewell is 377 feet and 460 feet in Thumbal and Kalleripatti respectively. The number of well and borewell and borewell shows that agriculture has been followed intensively in Pethanaickenpalayam block's villages compared to Pallipalayam block's villages. Within Pethanaickenpalayam block, intensive agriculture has been followed in Thumbal compared to Kalleripatti.

The observation on canal irrigation shows that it was the basic source for paddy cultivation in Alampalayam and pipe line irrigation is the determining source of sugarcane cultivation in Pappampalayam. With these existing irrigation sources, farmers do not concentrate to improve and increase their well and borewell. As for Alampalayam, the increasing non-agricultural activities have a negative impact on the development of agriculture. Sugarcane is annual as well as plantation crop in Pappampalayam. Here also, there is no scope for further development in agriculture. But, in the case of the remaining two villages, the observations on the number of well and borewell, units of well and borewell per acre and the depth of there shows that the agricultural activities are very deep. It leads to diversified cropping pattern for cereals, cotton, oil seeds, spices fruits and vegetables and some other food crops in these two villages.

### **Role of Irrigation in Cropping Pattern**

It can be found that the availability of one unit of groundwater source (well as well as borewell) is for 0.5 acre of paddy, 0.6 acre of turmeric, 0.4 and acre of cotton in combined Thumbal and Kalleripatti. One unit of ground water source is for 0.8 acre of sugarcane in Thumbal. If these situations are compared to the situation of the following crops, the significance of sources of irrigation availability can be found in the crop selection. One unit source is available for 0.9 acre of maize, 1.0 acre of tapioca, 1.2 acres of jowar and 1.3 acres of gingelly. So, the sources of irrigation availability for these

crops are relatively less significant in cultivation. In another terms, it can be seen that the areas of paddy, sugarcane, turmeric and cotton are irrigated by 100 per cent. Whereas, 83.3 per cent area of gingelly, 86.7 per cent area of maize, 86.4 per cent area of tapioca and 83.3 per cent area of jower of areas are irrigated and the remaining portion of area do not irrigation access. Apart from that eventhough the area under tapioca and jower access the well and borewell irrigation, the sources are not as rich as the sources availability for paddy, sugarcane, arecanut, turmeric and cotton. It can be said from the above analysis that there is a strong relationship between crops selection and conditions of irrigation availability. So, irrigation is the major factor that determines the cropping pattern in the study villages.

### Conclusion

Water is a component of land and land is one of the factors of production in economics, in this respect, with the evidence of results of present study, irrigation is most important factor that determines the cropping pattern in the study villages in Salem district. In this regard, the hypothesis of the present study that is, 'Irrigation is an important factor in crop selection in study villages in Salem district' is accepted. Area under paddy, sugarcane, turmeric and seed cotton is irrigated fully, whereas, the area under maize, gingelly, tapioca and jower is irrigated partially. Area dependency per unit of well and borewell is more intensive for former crops compared to latter crops. Moreover, wherever intensity of irrigation is high, intensity of agriculture is high and diversification of cropping pattern is high among the study villages.

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**Table 1: Details of Irrigation Sources**

Source	Alampalayam			Pappampalayam			Thumbal			Kalleripatti		
	No. of farmers	No. of Unit	Acre per unit of Source	No. of farmers	No. of Unit	Acre per unit of Source	No. of farmers	No. of Unit	Acre per unit of Source	No. of farmers	No. of Unit	Acre per unit of Source
Well	32	40	6.4	50	69	3.6	58	67	4.2	54	68	2.5
Borewell	22	26	9.8	29	39	6.4	45	74	3.8	30	46	3.7
Canal	60	N.A	135 days	-	-	-	-	-	-	-	-	-

Source: Computed from Primary Data.

Note: - denotes Not Applicable.

**Table 2: Details of Depth of Well and Borewell**

Source (depth)	Alampalayam	Pappampalayam	Thumbal	Kalleripatti
Well	42	52	71	64
Borewell	395	370	377	460

Source: Computed from Primary Data.

Note: Figures noted in feet.

**Table 3: Role of Irrigation in Cropping Pattern**

Crop	No. of Farming	Sum of Well and Borewell	Acres	Acre per Source	Well and Borewell Used	Without Irrigation
Paddy	17	38	18.8	0.5	17 (100)	0
Sugarcane (Pappampalayam)	51	100	166.5	1.7	51 (100)	0
Sugarcane (Thumbal)	22	53	43.8	0.8	22 (100)	0
Turmeric	73	166	95.4	0.6	73 (100)	0
Gingelly	12	25	31.5	1.3	10 (83.3)	2 (16.7)
Maize	15	22	19	0.9	13 (86.7)	2 (13.3)

Tapioca	22	44	42.5	1.0	19 (86.4)	2 (4.5)
Cotton	12	24	9	0.4	12 (100)	0
Jower	12	15	18.2	1.2	10 (83.3)	2 (16.7)

*Source: Computed from Primary Data.*

*Figures in Parentheses are Percentage.*