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Factors Affecting Inactive Land Transactions in a Semi-arid Area: Case of Tank-irrigated Village in Tamil Nadu

Takahiro Sato (Hirosaki University)

人間文化研究機構プロジェクト地域研究推進事業「南アジア地域研究」
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Abstract

The factors and mechanism underlying inactive land transaction in a semi-arid area were examined by studying a tank-irrigated village in the state of Tamil Nadu. Although a gradual shift of land ownership from communities belonging to a higher caste to those from a lower caste was observed, agricultural production in the study village declined not only in the dryland, but also the tank command area. This might be caused by the low groundwater availability in the hard rock area and a deterioration in the functioning of the tank management body caused by domestic out-migration. Government promotion of crops requiring less water, such as millets, might be the only way to secure their livelihood if rapid economic development has to continue in Tamil Nadu.

Keywords: land transaction, caste groups, water availability, migration

Introduction

The Indian economy has maintained a growth rate of approximately 6% per annum since the beginning of the 1980s (Yanagisawa, 2008). It is well-known that this economic development is based on the agricultural development since the mid-1960s through "Green Revolution," whereby yield of rice and wheat per unit of land increased dramatically. After new rice and wheat varieties that required adequate irrigation facilities were released, the government promoted well irrigation during this period (e.g. Esho, 2008; Sivasubramaniyan, 2006). An economic appraisal of Tamil Nadu state, which was one of the success stories of the Green Revolution, proudly described that "The State of Tamil Nadu has been transformed from a food-deficit to a surplus State in a short period. The achievement has been made possible by the agricultural strategy adopted by the Government in recent years." (GOTN, 1972)

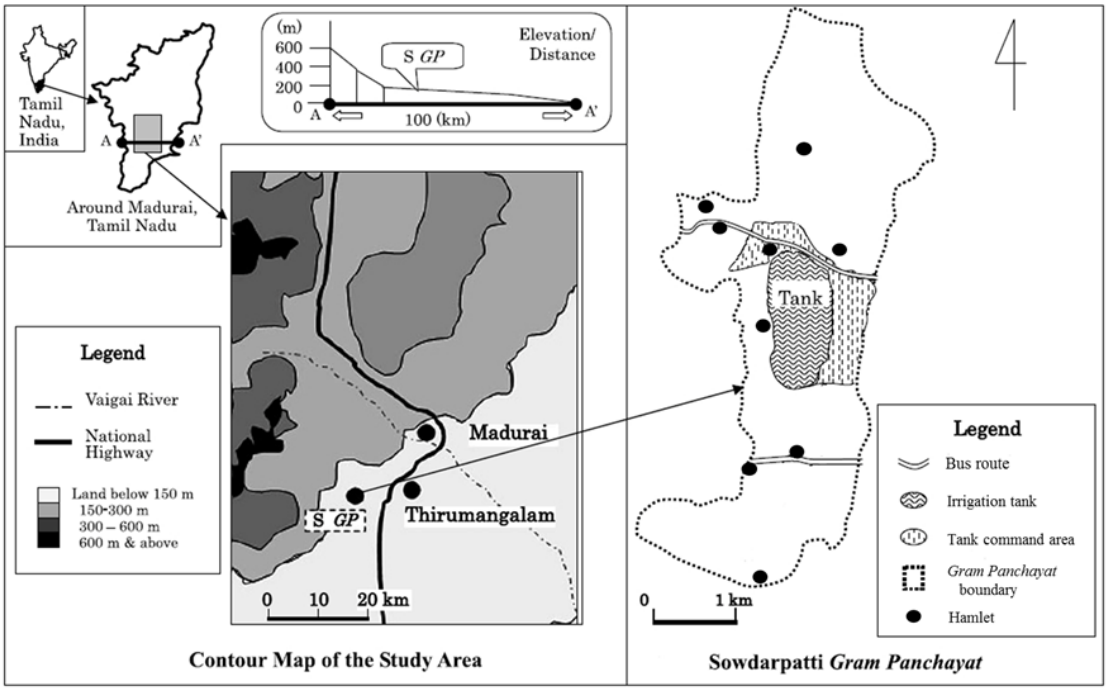
The ideal combination of irrigation, agricultural growth, and reduction in poverty is unlikely to be available during the next phase, when agricultural growth must increasingly come from the less-favored regions, where water scarcity is a limiting factor (Shah, 2001). Water shortages threaten the livelihoods of farmers and agricultural wage laborers in various parts of India. Seasonal movement of the labor force from water-scarce regions to irrigated and/or economically developed regions has been a common survival strategy, but long-term or permanent out-migration has also been increasing (e.g. Shah, 2009; Sundari, 2005; Venot et al., 2010).

This situation also holds in the Gundar river basin, located in the southern part of Madurai, Tamil Nadu. Tamil Nadu has been experiencing rapid economic development since 1991 (Sato 2013). This area is known as a rain shadow area; peak rainfall is observed not in the wetter southwest monsoon season (June to September), but during the dryer northeast monsoon (October to December). To utilize the limited rainfall effectively, tank irrigation system has been used from time immemorial (Palanisami, 2000). However, disparity in irrigation water access within the river basin has accelerated, especially after the 1990s, because of the rapid expansion of well irrigation in the upper part of the basin. Farmers in the upper part of the basin have successfully in intensified and diversified their cropping, but those in the lower part of the basin have failed to introduce cash crops (Sato and Periyar Ramasamy, 2011). A large amount of arable land has been abandoned, and such changes in land use have allowed the widespread invasion of tree species, such as *Prosopis juliflora* (Sato and Periyar Ramasamy, 2011; Sato, 2013).

This paper examines the current status of the land transaction between different caste communities located at the upper-middle part of the Gundar river basin. Based on the surveys

conducted in 2007 and 2018, and government official records on land ownership from 1989-90 seasons, changes in land ownership was investigated, along with farmers' crop choices. After a brief explanation of the study site, the land transactions occurring between 1989 and 2018 are shown. Then, changes in the farmer's crop choices between 1987 and 2018 are presented. Based on these two results, the factors and mechanism of land transaction in the study village are discussed.

1. Outline of the study site[1]



Source: Prepared by author using Sato(2011)

Figure 1 Map of the Study Village

[1] Data presented in this paper is mainly based on the sample survey conducted from May to July in 2007 and a survey conducted from July to December in 2018. Most of the information, such as farmland ledgers presented in Tables 3 and 4, was collected during the author's short visits to this village from 2006 to 2018. In 2007, 61 farmers who own land in tank command area and lived in 4 hamlets (Sowdarapatti, Meenachipuram, Siddireddipatti, and Valayapatti) were interviewed to collect information about their land holdings, the kind of crops cultivated, crop yield, and irrigation practices using tank and well. The survey conducted in 2018 aimed to collect holistic information on their livelihoods, such as income sources, land holdings and transactions,

Figure 1 shows the map of the study village—Sowdarapatti *gram panchayat* (hereafter S *GP*). It is part of the Tirumangalam *taluk* in the Madurai district of Tamil Nadu state. The S *GP* is located about 30 km southwest of Madurai city, and 13 km west of Tirumangalam town. There are very few direct transportation options between S *GP* and Madurai; therefore, most of the people have to go through Tirumangalam town to reach Madurai. There are 9 hamlets (Sowdarapatti, Meenachipuram, Siddireddipatti, Valayapatti, Pottipuram, Valnayakanpatti, Muthupatti, Chokkalingapuram, and Indira Colony) in this village, but the bus from Tirumangalam stops at only three of them.

The average annual rainfall in Tirumangalam town is 905 mm; of this, 42% falls during the northeast monsoon season. This is because the humid southwest monsoon is blocked by the Western Ghats, located at the western border of the state. The S *GP* is located in the middle part of the Gundar river basin, starting from the Western Ghats. Two seasonal tributaries of the Gundar river (the Goundanathi and Marattar rivers) flow through this village. The agricultural land in this village can be divided into two types. The first type is the tank command area, which is irrigated by tank water. The other type is dryland, which is not irrigated by tank water and usually functions as a catchment area for downstream tank water storage. The registered size of tank command area and dryland in S *GP* is 247.5 acres and 3291.2 acres, respectively. As per the traditional cropping pattern, paddy is cultivated in tank command area during the northeast monsoon season, followed by millet and other crops. The cropping sequence of millet–fallow has traditionally been dominant in dryland.

Demographic features of the S *GP* from 1961 to 2011 are presented in Table 1. The number of households has increased from 693 in 1961 to 964 in 2011; a rapid increase in the number of households was observed between 1961 and 1971 and between 2001 and 2011. However, the total population in 2011 was close to that in 1971, reflecting the continuous decrease in household size. In 1961, 80% of the workers were recognized as cultivators, but this share fell to 10% in 2011. Official statistics revealed that majority of the village residents seemed to be engaged in agricultural labor and non-farm works. The total number of households covered by the 2018 survey was 966; therefore, almost all of the households in S *GP* were covered.

agricultural practices, migration of the household members, and so on. Data analyzed in this paper is of land holdings, operational holdings, crop-wise cultivated area, major income sources, and so on.

Table 1 Demographic Features of Study Village

		1961	1971	1981	1991	2001	2011
No. of Households		693	802	795	868	862	964
Population	Male	1496	1685	1709	1622	1566	1696
	Female	1579	1679	1769	1666	1565	1699
	Total	3075	3364	3478	3288	3131	3395
Aveage Household size (number/HH)		4.44	4.19	4.37	3.79	3.63	3.52
Cultivators among Workers (%)	Male	80	41	40	33	38	10
	Female	69	20	22	34	31	4
Agricultural Laborers among Workers (%)	Male	9	29	43	51	40	42
	Female	18	7	69	57	57	57
Other workers among Workers (%)	Male	11	30	16	17	22	48
	Female	5	56	7	10	12	38

Data source: GOI (1961; 1971; 1981; 1991; 2001; 2011)

According to a report published by Anna University (1998), the irrigation tank seem to have been constructed during the reign of either the Pandyas (1300 to 1600 AD) or Nayakas (1600 to 1800 AD). The following is an excerpt from the history of Sowdarapatti tank in the report by Anna University (1998):

> *During the British rule, the village and tank were assigned to 16 Brahmin families. A few of the residents, particularly, Brahmin hired the services of the members of Thevar community to look after their lands. With the passage of time, Brahmins leased out their lands and the land ownership passed into the hands of other communities. Eventually at present there are only three Brahmin families owning land in ayacut (tank command) area. Slowly, the land ownership was transferred to Reddiar community and the Brahmins migrated to urban centres seeking Government jobs.*

Table 2 Caste wise Composition of Households in Study Village (2018)

Caste Groups	Number of Households	Caste Communities
Forward Caste (FC)	0	Iyar, Pillai
Backward Caste (BC)	551	Reddiyar (350), Kallar(37), Maravar(35), Thevar (29), Chettiyar (10), Others and NA(90)
Most Backward Caste (MBC)	198	Mooper(169), Vannar (7), Asari(6), Others and NA(16)
Scheduled Caste (SC)	205	Paraiyar(153), Pallar(26), Sakliar(12), Others and NA(14)
Christian	9	
NA	3	
Total	966	

Data source: Field survey in 2018

According to an interview with an elderly person in 2007, 90% of the tank command area was owned by 60 Brahmin households in 1950s. In 1970s, there were 25 Brahmin households in this village, and land transactions in the tank command area have been increasing since then. Table 2 shows caste wise composition of households in S *GP* in 2018. Currently, there are no households of the so-called "forward castes" (FC), such as *Iyar* (Brahmin) and *Pillai*. There are 551 households categorized as backward castes (BC), and *Reddiyar* community was the dominant caste in this panchayat. A substantial number of the households belonged to those from the most backward castes (MBC) and scheduled castes (SC), who owned 20.5% and 21.5% of the total households, respectively.

2. Land transactions between 1989 and 2018

The distribution of farmland-holding individuals, according to their caste, in the tank command area is estimated from official records and shown in Table 3.[2] Majority of the land holders from 1989 and 2015 were categorized into BC group. Marginal land holders, that is, those who own their land less than 0.5 acre have been dominant throughout this period. Further, the table shows that the descending order of caste groups, in terms of the number of land holders, has remained the same (BC >> MBC > FC > SC). Table 4 shows land transactions between different caste groups using the same data source. Although intra-caste land transactions were dominant between the 1989-90 and 2005-06 agricultural seasons, more than 4 acres of land were sold from BC to MBC, and from MBC to SC. During the period between 2005-06 and 2014-15, land transactions from FC to the BC group accounted for more than half of the total land sales by FC communities.

Table 5 presents the caste-wise distribution of farmland holding households covered in our 2018 survey. As already indicated in Table 2, there is no FC household in S *GP* village. The total number of land holding households in the tank command area was 184, which was much less the number of land holding individuals in Table 3, because each households owns several land parcels. Around 19.0% of total households in the S *GP* have farmland in the tank command area. Similar to the results in Table 3, BC households were dominant in the tank command area, but a substantial number of MBC and SC households also owned land. In all caste groups, most households had less than 2 acres of land, but a few farmers also had holdings of more than 5 acres. Average size of land holding was highest in the SC households, followed by MBC and BC.

The dryland was owned by 468 households, which accounted for 48.8% of the total households in this GP. Similar to tank command area, BC shared more than 60% of the total dryland in S *GP*. However, the majority of dryland holders lived outside the village, as official size is 3291acres. Several big land holders, who owned more than 10 acres, were also observed. Average size of land holding by BC, MBC, and SC groups ranged between 2.2 and 2.8 acres; there were very small differences among different caste groups.

[2] This table is created from the farmland ledger obtained from the Village Administrative Officer (VAO). Owing to the delay in official registration, the data might not reflect actual land holding situation in the years considered. As land ownership is individual, this record is not summarized on the basis of households.

Table 3 Caste group wise distribution of farmland holding individuals in tank command area (in acre)

(a) 1989-90 agricultural season

Caste Groups	Number of Land Holder	Size of Farmland (in acre)						Average Land holding (acre)
		0.01-0.50	0.51-1.00	1.01-2.00	2.01-3.00	3.01-5.00	5.01-7.00	
FC	52	45	3	3	-	-	1	0.42
BC	275	219	47	7	2	-	-	0.36
MBC	86	67	13	6	-	-	-	0.36
SC	11	10	1	-	-	-	-	0.27
Total	424	341	64	16	2	0	1	

(b) 2005-06 agricultural season

Caste Groups	Number of Land Holder	Size of Farmland (in acre)						Average Land holding (acre)
		0.01-0.50	0.51-1.00	1.01-2.00	2.01-3.00	3.01-5.00	5.01-7.00	
FC	42	34	5	-	2	-	1	0.51
BC	264	218	37	8	-	1	-	0.35
MBC	74	55	13	6	-	-	-	0.38
SC	9	8	1	-	-	-	-	0.25
Total	389	315	56	14	2	1	1	0.37

(c) 2014-15 agricultural season

Caste Groups	Number of Land Holder	Size of Farmland (in acre)						Average Land holding (acre)
		0.01-0.50	0.51-1.00	1.01-2.00	2.01-3.00	3.01-5.00	5.01-7.00	
FC	34	26	6	2	-	-	-	0.37
BC	287	229	47	9	-	-	2	0.36
MBC	86	68	12	5	1			0.35
SC	20	20						0.21
Total	427	343	65	16	1	0	2	0.37

Data source: (a) Farmland ledger in 1989-90 compiled by treasurer of Sowdarapatti tank WUA
(b) Farmland ledger in 2005-06 obtained from VAO
(c) Farmland ledger in 2014-15 obtained from VAO
Caste groups of landholder in (b) and (c) were identified by author's field surveys

Table 4 Land transaction between Caste groups (in acre)

Caste groups		Between 1989-90 and 2005-06		Between 2005-06 and 2014-15	
Seller	Buyer	Size of farmland (acre)	Share (%)	Size of farmland (acre)	Share (%)
FC	FC	14.3	93.4	7.1	44.8
	BC	0.7	4.8	8.4	52.6
	MBC	0.3	1.8	0.4	2.5
	SC	0	0	0	0
BC	FC	0.4	0.6	0	0
	BC	58.1	91.6	59.8	96.7
	MBC	4.5	7.1	1.1	1.8
	SC	0.5	0.8	0.9	1.5
MBC	FC	1.1	5.2	0.1	0.3
	BC	2.6	12.1	0.5	2.9
	MBC	13.7	63.4	18	96.6
	SC	4.2	19.3	0	0.1
SC	FC	0	0	0	0
	BC	0.3	14.1	0.3	12
	MBC	0.3	13.2	0	0
	SC	1.6	72.8	1.9	88

Data source: (a) Farmland ledger in 1989-90 , 2005-06 and 2014-15
Caste groups of landholders identified by WUA treasurer and author's field surveys

Table 5 Caste group wise distribution of farmland holding households in 2018 (in acre)

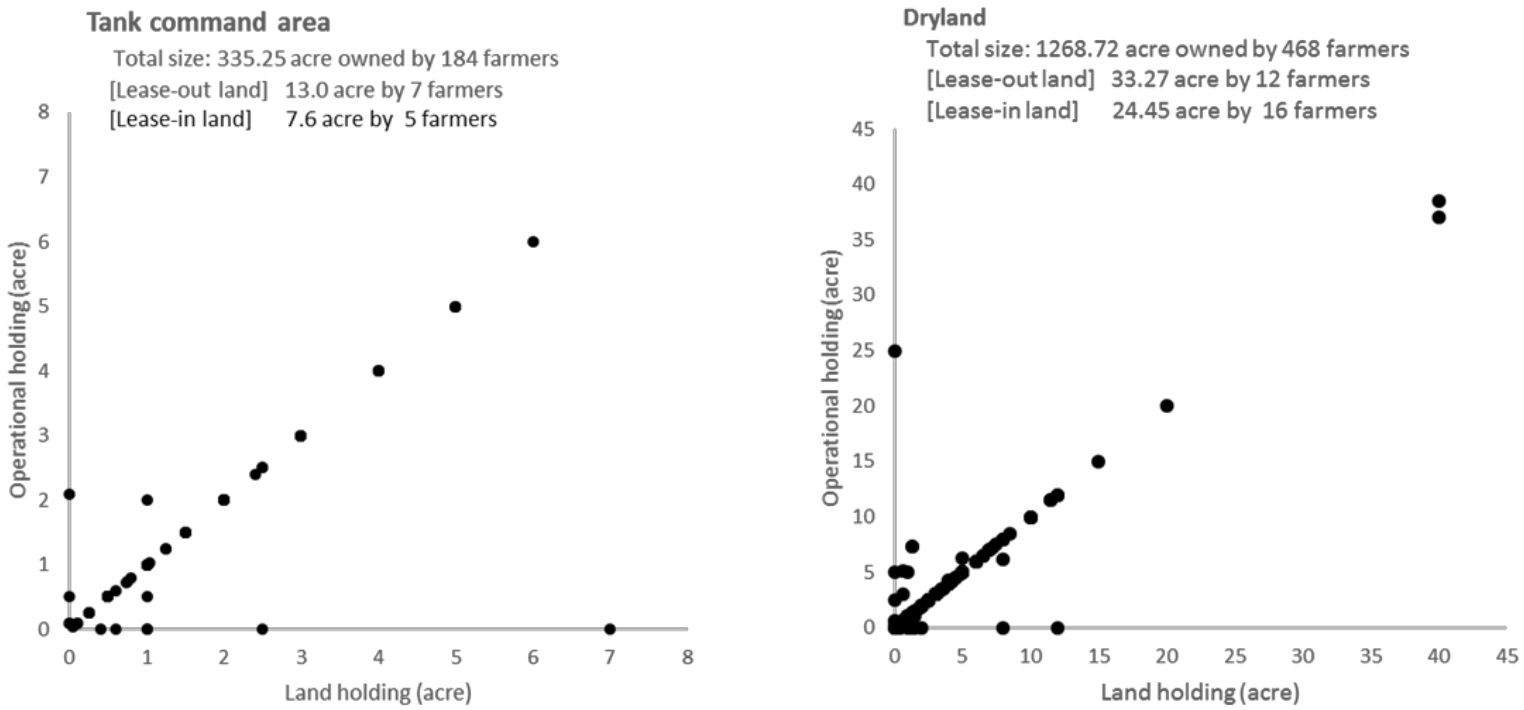
(a) Tank command area

Caste Groups	Number of Land Holding HH	Size of Farmland (in acre)						Average Land holding (acre)
		0.01-0.50	0.51-1.00	1.01-2.00	2.01-3.00	3.01-5.00	5.01-7.00	
FC	0	-	-	-	-	-	-	
BC	110	31	34	28	9	6	2	1.5
MBC	44	12	15	11	3	2	1	1.8
SC	29	2	12	10	2	2	1	3.29
Christian	1	1	0	0	0	0	0	0.25
Total	184	16	46	38	13	4	1	1.86

(b) Dryland

Caste Groups	Number of Land Holding HH	Size of Farmland (in acre)								Average Land holding (acre)
		0.01-0.50	0.51-1.00	1.01-2.00	2.01-3.00	3.01-5.00	5.01-7.00	7.01-10.0	10.1-40.0	
FC	0	-	-	-	-	-	-	-	-	
BC	285	18	51	96	47	44	11	13	5	2.81
MBC	94	12	29	34	8	7	0	1	3	2.7
SC	89	13	15	38	9	9	2	0	3	2.26
Christian	2	0	0	1	0	0	0	1	0	4.1
Total	468	16	46	38	13	4	1	4	1	2.69

Data source: Field survey in 2018



Data source: Field survey in 2018

Figure 2 Relationships between land holdings and operational holdings

Figure 2 shows the relationships between land holding size and operational holdings in the study village. The land lease market is not very active in S *GP*. Only 5 among the 184 land holding households leased-in land in the tank command area, whereas 16 farmers among the 468 owning dryland leased-in the land. According to the information collected from villagers, the land pawn market is more active than land lease market in S *GP*. Land is pawned for 2–3 years, and sometimes it is sold after this contract. The Price of the land, which ranged from INR 30,000 to INR 100,000 per acre, depends on the access to roads and irrigation water. Land close to a road can be used for housing or industrial purposes. Land price in the tank command area is higher than that in dryland owing to the difference in irrigation water access.

3. The way to secure the livelihood of villagers

Intermittent changes in crop choice by the farmers who owned land in the tank command area is presented in Table 6. In the tank command area, the size of cultivated area in the rainy season and dry season remained stable throughout the period studied, although changes in the kind of crops were observed, especially between 2002 and 2007. Paddy cultivation is dominant, but increase in sugar crop (= sugarcane) cultivation and decrease in fibre (= cotton) cultivation was also observed. According to the survey in 2007, some sugar companies promoted sugarcane cultivation among the well owners in S *GP*. In dryland, greater acreage in during rainy season was observed in two periods: 1987–92 and 2002–07. There seemed to be a shift from cotton cultivation to other crops, such as cereals, during 2002–07. The acreage during dry season remained low throughout the period.

Table 7 shows the crop-wise cultivation area in 2018. In the tank command area, paddy cultivation was dominant. However, its share was 50.7 % and 35.5% of the tank command was left fallow. Only a small part of the tank command area was cultivated during the dry season. On the other hand, around 75% of the dryland owned by the residents of S *GP* was cultivated during rainy season. Cereal production was most popular, but cotton cultivation was also commonly seen.

Table 8 shows the major types of jobs held by the household heads in S *GP*. Nearly half of the BC household heads engaged in agriculture, and 23% of them worked as daily laborers. The share of cultivators in MBC and SC groups were lower than that in the BC group, but the share of daily laborers was inversely related to that of cultivators. The combined sum of blue-collar and white-collar workers was 13-16% in all caste groups; this is much less than that of cultivators or daily laborers.

Table 6 Crop wise cultivation area in study village (in acre; n=61)

(a) Tank command area

	2007		2002		1997	
	Rainy	Dry	Rainy	Dry	Rainy	Dry
Paddy	92	0	112	0	106	0
Sugar Crops	23	23	0	0	0	0
Fruits and Veg.	1	1	1	1	1	1
Fibre	0	8	0	28	0	25
Cereals	5	60	5	58	5	61
Pulses	0	1	0	0	0	0
Sub total	120	92	117	86	112	87
Fallow	1	29	2	33	1	26
Total	121	121	120	120	113	113

(b) Dryland

	2007		2002		1997		1992		1987	
	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry	Rainy	Dry
Paddy	4	0	2	0	1	0	3	0	3	0
Sugar Crops	3	3	3	3	3	3	3	3	3	3
Fruits and Veg.	3	3	0	0	0	0	0	0	0	0
Fibre	13	2	48	10	46	1	45	8	38	1
Oil Seeds	2	0	1	0	13	0	4	0	5	0
Spices	1	0	1	0	1	0	2	0	2	0
Cereals	110	2	81	3	97	0	101	14	70	0
Pulses	15	0	25	3	17	0	18	14	5	0
Fodder	15	0	15	0	11	0	9	0	8	0
Others	37	0	3	0	0	0	0	0	0	0
Sub total	202	10	178	19	188	4	184	38	133	4
Fallow	45	237	55	214	41	225	38	183	77	207
Total	247	247	233	233	229	229	221	221	211	211

Data source: Author's field survey in 2007.
Note: Sample 61 farmers are selected from those who owned land in tank command area.

Table 7 Crop wise cultivation area in study village (in acre)

	Tank Command Area		Dryland	
	Rainy	Dry	Rainy	Dry
Paddy	196.9	0	58.5	1
Sugar Crops	0	0	0	0
Fruits and Veg.	0	0	12	6.8
Fibre	16.5	4.6	290.5	15.7
Oil Seeds	0		0	0
Spices	0		0	3
Cereals	36.5	30	537.8	7.8
Pulses	0.6	0	21.3	0
Others	0	0	26.5	0
Total Cultivated Area	250.5	34.6	946.6	34.3
Fallow	138.2	354.1	320.4	1233
Total	388.7	388.7	1267	1267.3

Data source: Field survey in 2018.

Table 8 Type of Major Jobs by Caste Groups (For Household Head only)

Caste Groups	Number of Households	Agriculture *1	Daily *2 Laborers	Blue-collar *3 workers	White-collar *4 workers	Others and NA workers	Total
BC	551	260 (47%)	124 (23%)	49 (9%)	40 (7%)	78 (14%)	551
MBC	198	83 (42%)	61 (31%)	22 (11%)	9 (5%)	23 (12%)	198
SC	205	55 (27%)	90 (44%)	19 (9%)	7 (4%)	34 (17%)	205
Christian and NA	12	4 (33%)	4 (33%)	1 (8%)	0 (4%)	3 (25)	12

Data source: Field survey in 2018

Note: *1 including crop production and animal husbandry.

*2 including agricultural labourers, NAREGA workers and others wage labourers..

*3 including agricultural drivers building works, mechanic, driver, carpenter, brick maker and other industrial workers..

*4 including bank officer, teacher, software engineer and others..

4. Discussion

Agricultural production in the study village has historically depended on the tank irrigation system. Tanks were inextricably linked to the social web of rural life and have been managed predominantly by informal institutions based on local customs and norms (Jegadeesan and Fujita 2011). However, their importance has been reducing, especially since the 1960s, when groundwater irrigation started to grow rapidly. Promotion of new well installation in Tamil Nadu accelerated when the government shifted its focus from major/medium irrigation schemes to the exploitation of groundwater potential in 1969 (Sato 2016). Since then, there has been an increase in the proportion of well-irrigated areas; they accounted for 72% of the total irrigated area in 2011. This increase reflects the success of the state government's efforts to promote of new well installation, deepen existing wells, and introduce pumpset energization (GOTN, 1970). Moreover, subsidized agricultural electricity supply started from the mid-1980s; a flat rate system was introduced in 1984, but electricity for agricultural use became free later (Palanisami et al., 2008). The cost of well installation also decreased in the 1990s, mainly because of the decline of pumpset prices and drilling costs (Kajisa et al., 2007). Results from the surveys in 2007 and 2018 revealed that agricultural production had been declining in this village. This means that government's promotion of well installation did not contribute to an increase in crop productivity in S *GP*. This might be caused by the nature of underground layers in this area. Sato (2016) illustrated the subsoil in this village: gravel on soft and hard rock layers is commonly observed and the groundwater holding capacity is geologically much lower than that those of areas with alluvial soil. Many farmers in this village also tried to install wells to increase the availability of irrigation water; however, the bore well digging proved to be a failure (a dry bore well);

this is because they tried to pump up the groundwater stored in the secondary porosity of the rock layer, which is not homogeneous (Sato 2016). It resulted in the continuous increase in the cost of groundwater withdrawal, mainly because of the need to update groundwater facilities.

Figure 3 illustrates the factors and mechanism of inactive land transactions in S *GP*. A substantial part of the tank command area in the village remained fallow; this might be because of the water users' association established in the beginning of the 90s (Anna University 1998) has become inactive. As already observed in an area nearby (Jegadeesan and Fujita 2011), a neglect of the tank management body might have started in S *GP* too. Crop intensification or conversion to crops requiring much more water has become more difficult, and may lead to an increase in the domestic migration to the nearby town or daily movement of labor forces to the surrounding areas (Sato 2011). Such out-migration will accelerate the deterioration of tank management. Although a gradual shift of land ownership from the upper castes to lower castes was observed, the emergence of large land holders cannot be expected under such situation.

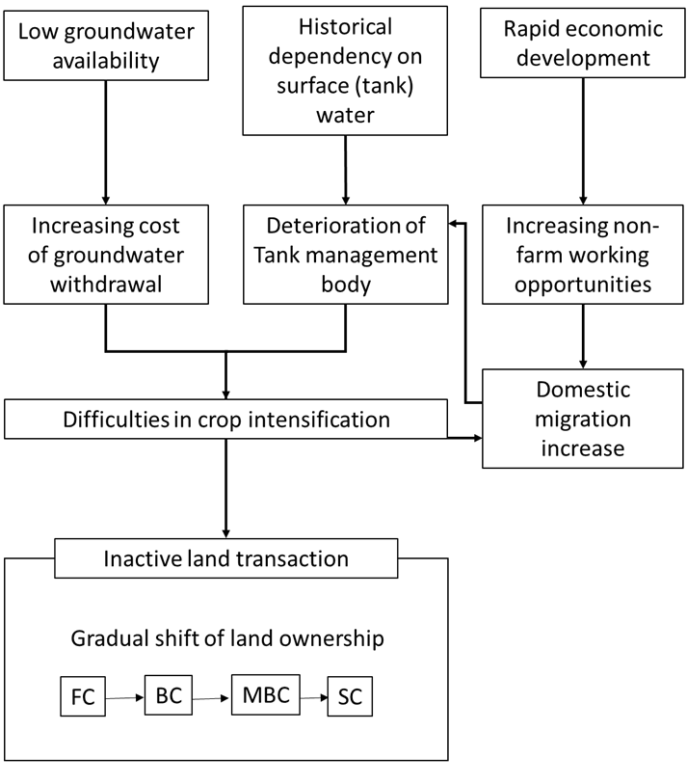


Figure 3 Factor and Mechanism of inactive land transaction in the study village

Sato and Periyar Ramasamy (2011) showed the growing disparity in the access to irrigation water in the Gundar river basin; because S *GP* is located between the villages they studied, this study implies that only a limited part of the upper basin can intensify or diversify its cropping pattern. In other words, broad-based agricultural development cannot be expected in most parts of the basin. Government promotion for cultivating crops requiring less water, such as millets, might be the only way to secure their livelihood if rapid economic development has to continue in this state. Otherwise, their livelihood opportunities will suffer because of economic stagnation.

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