



A STRUCTURAL TRANSFORMATION OF FARM ASSETS AT INDIVIDUAL FARM LEVEL IN TAMIL NADU

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ABSTRACT

Agriculture is the main stay of Indian economy. Investment decides the productive potential of the economy. The performance of Agriculture sector depends on the level of investment by both public and private investment. Understanding the structure of the investment on agriculture helps to identify the required level of investment pattern to achieve the desired level of production. An attempt has been made to study the investment pattern on farm across different size groups of farmers in Tamil Nadu. The investment in agriculture was broadly classified under farm buildings, irrigation structures, livestock and machineries and implements. The study results showed that larger share of investment was made in machineries and implements (40.21%) followed by irrigation structures (28.67 %) and farm buildings (20.75 %).

KEY WORDS: Agriculture Investment, Private Capital.

INTRODUCTION

Investment is the single most crucial factors for the development of an economy as it accelerates the other factors of economic development. Capital in physical or human form greatly contributes towards increasing the efficacy of the production. (Schultz, 1964). In agricultural sector, the degree of progress largely depends upon the additional income generated by farmers from year to year from their farm activities. The investment on factors like farm buildings, irrigation structures, livestock and machineries and implements is so vital as these decides the level of crop production. High investments have contributed significantly to higher production and growth in almost every developing country including India. (Mogues et al, 2015). Thus improvement in the efficiency of agricultural operations becomes possible only when there is adequate investment in the farm.

Though there is a positive association between capital formation and agricultural development, the Government finance or overall public capital formation in Indian agriculture has been stagnating or decreasing since the beginning of 1980's due to presence of externalities, and high risk which discourage investment in agriculture from private sector (Ghosh, 2005). The Ministry of Agriculture estimates that to double farmer incomes by 2022-23, private investment in agriculture must leap two times to almost Rs 1,40,000 crore. Private investments refer to

investments made by farmers own savings and borrowings from institutional and non-institutional sources. Doubling of farmer's income is possible if sufficient investment is made in modernization, diversification and high value addition in agriculture (Martin, 2018). According to Ministry of Agriculture, public investment must grow at 16.8% annually, up from around 10%, to achieve the target of doubling farmer incomes. Since 50 % of our population lives in rural area depends on agriculture, increase investment in agriculture will improve the income of the rural sector. Poverty alleviation depends on increasing agricultural productivity among small farmers and investment in agriculture has a major role to play. (Anderson and Lorch 1999, Roy and Pal, 2002). It is very crucial to study the investment pattern of farmers towards agriculture. Thus the study aims to find out the investment pattern of various categories of farm households on farm assets in Tamil Nadu.

METHODOLOGY

In order to study the investment pattern, a total sample size of 7481 farm households comprising 2519 marginal farmers, 2040 small farmers, 1374 semi medium farmers, 775 medium farmers and 773 large farmers were selected randomly from all the 385 revenue blocks of the state. (Table 1).

TABLE 1: Number of respondents selected

Sl.No	Particulars	No. of respondents
1	Marginal	2519
2	Small	2040
3	Semi-Medium	1374
4	Medium	775
5	Large	773
	Total	7481

RESULTS AND DISCUSSION

The level of investment in agriculture is influenced by many factors like age, sex, education, occupational pattern

and size of holdings of the head of the farm households. Hence the general characteristic of the farm households is discussed in detail in the Tables 2 - 4.

TABLE 2: Age and Sex of the sample farmers

(no's)

Sl.No.	Particulars	Marginal	Small	Semi-Medium	Medium	Large	Total
A							
Age							
1	Young (upto 35 yrs)	235 (9.33)	181 (8.87)	147 (10.70)	100 (12.90)	85 (11.00)	748 (10.00)
2	Middle (36-50 yrs)	792 (31.44)	645 (31.62)	351 (25.55)	187 (24.13)	208 (26.91)	2183 (29.18)
3	Old (above 51yrs)	1492 (59.23)	1214 (59.51)	876 (63.76)	488 (62.97)	480 (62.10)	4550 (60.82)
	Total	2519 (100.00)	2040 (100.00)	1374 (100.00)	775 (100.00)	773 (100.00)	7481 (100.00)
B							
Sex							
1	Male	2340 (92.89)	2015 (98.77)	1298 (94.47)	691 (89.16)	689 (89.13)	7033 (94.01)
2	Female	179 (7.11)	25 (1.23)	76 (5.53)	84 (10.84)	84 (10.87)	448 (5.99)
	Total	2519 (100.00)	2040 (100.00)	1374 (100.00)	775 (100.00)	773 (100.00)	7481 (100.00)

(Figures in parenthesis indicates per cent to total)

TABLE 3: Education level of sample farmers

(no's)

Sl. No	Particulars	Marginal	Small	Semi-Medium	Medium	Large	Total
1	Illiterate	789 (31.32)	621 (30.44)	396 (28.82)	180 (23.23)	186 (24.06)	2150 (28.74)
2	Up to Class V	659 (26.16)	504 (24.71)	299 (21.76)	195 (25.16)	150 (19.40)	1814 (24.25)
3	Up to Class VI to X	636 (25.25)	542 (26.57)	412 (29.99)	248 (32.00)	234 (30.27)	2080 (27.80)
4	Class XI & XII	268 (10.64)	214 (10.49)	140 (10.19)	78 (10.06)	101 (13.07)	808 (10.80)
5	Graduate	140 (5.56)	129 (6.32)	98 (7.13)	56 (7.23)	73 (9.44)	502 (6.71)
6	Post Graduate	27 (1.07)	30 (1.47)	29 (2.11)	18 (2.32)	29 (3.75)	127 (1.70)
	Total	2519 (100.00)	2040 (100.00)	1374 (100.00)	775 (100.00)	773 (100.00)	7481 (100.00)

(Figures in parenthesis indicates per cent to total)

It could be seen from Table 2 that, in the selected 7481 sample farms, 60.82 per cent of them were headed by old age groups of more than 51 years and followed by middle age groups (29.18 %) and young age group (10%). More number of young and old age group were seen in medium category (12.90%) and Semi medium category (63.76 %) respectively. This implies that agriculture in the state was mostly carried out by older people. It may not be a good sign for the growth of the agriculture, though old age group farmers had better experience; their marginal efficiency may reduce over a period which would in turn lead to lesser output. The results revealed that about 94.01 per cent of the sample farms were headed by males. Similar pattern was observed irrespective of the farm size categories. This implies that male still dominates the decision making in agriculture in the state.

The educational details of the heads of sample households are presented in Table 3. It could be seen from the Table 3 that out of 7481 sample farmers, it was found that on an average 38.60 per cent of the sample respondents had secondary education and 24.25 per cent of them had primary education. However, nine per cent of them had beyond secondary education. The illiterates of the sample

respondents were 28.74 per cent. Illiterates were more in marginal farm category (31.32 %), whereas farmers who attained graduation and post graduation level of education were more in large farm category (13.19%). This implies that even after seven decades of independence, only about 70 per cent of the farming community had received education. Previous studies also revealed that illiteracy is one among the major factor which determines poor economic conditions of the farming community.

The occupational pattern of the farm households also influences the income and investment level of the farmers. The details are furnished in Table 4. It was observed from Table 4 that, among the sample households, 88.06 per cent of them were found to have crop production as the major occupation followed by animal husbandry (2.70 %) and farm labour (2.57%). Similar pattern was observed across farm categories. Though crop production was predominantly carried out as major agricultural activities, it was high among marginal farms (91.86 %). It was followed by semi-medium (89.96 %) and small (85.49 %) farms. Respondents who had agricultural processing as major occupation was less than one per cent, and it was 1.86 per cent while considering non-farm occupation.

Crop production, animal husbandry and fisheries, off farm activities, non - farm and other businesses seemed to be minor occupation for 842 sample farm households. Among the minor occupations, animal husbandry seemed to be important activity among the sample respondents (36.10 %) followed by farm labour (24.47 %) and other

activities (20.07 %). About 10 per cent of the respondents had crop production as minor occupation. Similar pattern of occupation was observed in almost all farm categories. However, farm labour formed major share among marginal farm category.

TABLE 4: Occupational Pattern of Farm Households

(no's)

Sl. No.	Particulars	Marginal	Small	Semi medium	Medium	Large	Total
A	Major						
1	Crop production	2314 (91.86)	1744 (85.49)	1236 (89.96)	655 (84.52)	639 (82.66)	6588 (88.06)
2	Animal Husbandry/Fishery	35 (1.39)	66 (3.24)	41 (2.98)	31 (4.00)	29 (3.75)	202 (2.70)
3	Farm Labourer	29 (1.15)	71 (3.48)	33 (2.40)	22 (2.84)	37 (4.79)	192 (2.57)
4	Agricultural Processing	18 (0.71)	12 (0.59)	9 (0.66)	5 (0.65)	9 (1.16)	53 (0.71)
5	Non-Farm	21 (0.73)	48 (2.35)	19 (1.38)	31 (4.00)	20 (2.59)	139 (1.86)
6	Others	102 (4.05)	99 (4.85)	36 (2.62)	31 (4.00)	39 (5.05)	307 (4.10)
	Total	2519 (100.00)	2040 (100.00)	1374 (100.00)	775 (100.00)	773 (100.00)	7481 (100.00)
B	Minor						
1	Crop production	20 (6.92)	22 (9.52)	16 (9.04)	15 (18.29)	14 (22.22)	87 (10.33)
2	Animal Husbandry/Fishery	96 (33.22)	77 (33.33)	74 (41.81)	36 (43.90)	21 (33.33)	304 (36.10)
3	Farm Labourer	109 (37.72)	59 (25.54)	27 (15.25)	8 (9.76)	3 (4.76)	206 (24.47)
4	Agricultural Processing	3 (1.04)	1 (0.43)	3 (1.69)	1 (1.22)	1 (1.59)	9 (1.07)
5	Non-Farm	10 (3.46)	13 (5.63)	21 (11.86)	12 (14.63)	11 (17.46)	67 (7.96)
6	Others	51 (17.65)	59 (25.54)	36 (20.34)	10 (12.20)	13 (20.63)	169 (20.07)
	Total	289 (100.00)	231 (100.00)	177 (100.00)	82 (100.00)	63 (100.00)	842 (100.00)

(Figures in parenthesis indicates per cent to total)

TABLE 5: Size of Holdings of Sample Farm Households

(ha)

Sl.No.	Particulars	Marginal	Small	Semi medium	Medium	Large	Average Size
1	Wet	0.90	1.96	3.50	4.50	8.30	3.83
2	Garden	0.60	1.58	3.70	5.60	7.20	3.74
3	Dry	0.80	1.23	2.80	4.20	6.90	3.19
	Average	0.77	1.59	3.33	4.77	7.47	3.58

The size of holdings in the sample farms is furnished in Table 5. It could be seen from the Table 5 that the average size of holdings in the study area was 3.58 hectares and it ranged from 0.77 hectare in marginal farm to 7.47 hectares in large farms. The average size of wet lands was found to be 3.83 hectares and it varied from 0.90 hectare in marginal farms to 8.3 hectare in large farms. Likewise the garden lands varied between 0.60 and 7.20 hectare with an average area of 3.74 hectare in the study area. Dry lands were found to be higher in large farms (6.9 hectares) as compared to other categories of farms under study.

Investment Pattern on Farm Buildings

The investment pattern refers to the investment on different categories of assets. Among them, the investment on farm buildings, irrigation, machineries and implements and livestock played a major role. Investment on farm building is presented in Table 6. It could be seen from the

Table 6 that among the different farm categories, marginal farm category farmers had relatively low investment on building structures (Rs.283042). As the farm size increases, the per farm investment also increases. It ranged from Rs.283042 in marginal farms to Rs. 977487 in large farms. The farm house was the major asset (Rs.316638) among the sample farm households followed by cattle shed (Rs.69233) and storage shed (Rs.64763). Similar pattern of investment was found across farm size categories. Apart from farm house, cattle shed became the major investment for marginal, semi medium and large farmers whereas for small and medium farmers, storage shed became the major investment after farm house. Investment in storage shed by all categories of farmers is a good indication which is very crucial for holding the harvested produce for getting the required price.

Structural transformation of farm assets at individual farm level in Tamil Nadu

TABLE 6: Investment Pattern on Farm Buildings (in Rs/ farm)

Sl.No.	Particulars	Marginal	Small	Semi medium	Medium	Large	Average
1	Cattle shed	36189	22705	90216	74455	122602	69233
2	Storage shed	22366	66338	68826	114982	51305	64763
3	Pump house	18375	32552	56201	82138	104053	58664
4	Tractor shed	3186	11083	46269	70274	51444	36451
5	Labour quarters	0	637	4003	6452	25485	7315
6	Farm house	185208	282402	209831	366519	539230	316638
7	Goat shed	372	1569	0	3226	0	1033
8	Mulberry shed	0	0	0	64516	0	12903
9	Poultry shed	0	0	0	51613	0	10323
10	Other farm building	17345	14582	6938	128719	83368	47603
	Total	283042	431867	482283	962893	977487	627515

TABLE 7: Investment Pattern on Irrigation Structures (in Rs/ farm)

Sl. No.	Particulars	Marginal	Small	Semi Medium	Medium	Large	Average
1	Open well	99297	253509	265094	300179	379956	259607
2	Water Channel	10187	27650	19033	22599	8292	17552
3	Tanks/ponds	3116	5086	7304	8969	11012	7098
4	Submersible pump	24256	31615	40987	71194	72199	48050
5	Sprinkler	19132	10397	19036	38972	43079	26123
6	Drip irrigation	36712	55855	83959	126060	137692	88055
7	Compressor	11930	16434	25609	43570	53789	30267
8	Electric motors	15922	23918	59355	80085	84107	52677
9	Oil engines	11571	13634	19560	36781	40383	24386
10	Pipes	2971	3204	7887	12557	19146	9153
11	Pumping sets	23036	26417	29868	53462	80048	42566
12	Under-ground pipes	0	123	185	341	343	198
13	Dug cum Bore well	64291	62576	55180	135883	138915	91369
14	Bore well	47897	25226	46730	74996	79813	54932
15	Tube wells	46066	60312	136526	139467	192214	114917
16	Others	14	18	0	0	54	17
	Total	416398	615973	816316	1145116	1341041	866969

TABLE 8: Investment Pattern on Machineries and Implements (in Rs/ farm)

SL.No.	Particulars	Marginal	Small	Semi medium	Medium	Large	Average
1	Combine harvester	0	19608	12920	284516	106856	84780
2	Motor cycle/scooter	47995	56274	60086	90313	100220	70978
3	Paddy transplanter	0	0	0	0	19685	3937
4	Power chaff cutter	339	1468	698	2232	2290	1406
5	Power sprayer	2948	3695	6253	18976	10663	8507
6	Power thresher	0	0	946	21322	23992	9252
7	Power tiller	20437	9972	64352	111423	50108	51258
8	Tractor	174125	473862	612182	1106372	1262194	725747
9	Truck /jeep/ tempo	13100	39216	111119	118452	238437	104065
10	Bicycle	2273	2591	4066	4843	13920	5539
11	Cultivator	3643	4108	24295	14008	31165	15444
12	Disc plough	1381	1824	7462	28734	35535	14987
13	Leveler /planer	86	101	814	334	4541	1175
14	Rotavator	4978	14601	30367	76087	168825	58971
15	Sprayer	1650	2353	3729	5966	4954	3730
16	Axe	551	636	932	1584	1271	995
17	Drum	146	160	559	210	259	267
18	Hand cart	84	87	330	296	614	282
19	Hoe	529	609	890	1274	1389	938
20	Shovel/spade	744	825	1240	2281	5176	2053
21	Sickle	392	440	708	822	907	654
22	Watering can	48	27	121	258	63	103
23	Crowbar	142	185	246	414	420	282
24	Bags	15	6	84	62	48	43
25	Animal drawn plough	228	359	251	1084	129	410
26	Cage Wheel	873	466	1310	2839	7040	2506
27	Rake	0	0	10	10	0	4
28	Baskets	6	6	9	18	0	8
29	Harrow	0	0	0	1935	1682	723
30	Trailer	2382	2696	4334	3993	13922	5465
31	Tiller	2183	6275	5724	96411	51216	32362
31	Puddler	1298	0	3130	310	38810	8709
33	Bed Planter	159	0	0	1097	0	251
	Total	282734	642450	959165	1998475	2196332	1215831

Investment Pattern on Irrigation Structures

The total investment on irrigation structures among the sample households was Rs.866969 (Table.7). It was higher in large farm categories i.e Rs.1341041 followed by medium, semi medium, small and marginal farms with Rs.1145116, Rs.816316, Rs.615973 and Rs.416398 respectively. In all sample farm categories, on an average, the investment on open well was Rs. 259607 and it ranged from Rs.99297 among marginal farms to Rs. 379956 among large farms.

It could also be seen from the Table 7 that next to open wells, farmer's investment was higher in tube wells (Rs.114917). However it varied across the farm size categories. It was higher in large farms (Rs.192214) and lower in marginal farm (Rs.46066). The investment on dug cum bore well of the sample farms revealed that on an average the investment was Rs. 91369 and it ranged from Rs.55180 among semi medium farms to Rs.138915 among large farms. The investment on drip irrigation structures was higher in large farms (Rs.137692) and lower in marginal farms (Rs.36712). From the Table 7 it is clear that investment pattern on irrigation structures increases with increase in farm size. Though it is highly recommended to save rainfall water through farm ponds and tanks, a very minimal amount has been spent on these structures irrespective of the farm size. Failure in investment on water harvesting structures resulted in huge investment on ground water extracted structures like dug cum bore wells, borewells and tube wells.

Investment Pattern on Machineries and Implements

The investment pattern of sample farms on machineries and implements are presented in Table 8. It could be observed from Table 8 that the sample farm households made an investment of Rs.1215831 on machineries and implements. The investment capacity of the marginal and small farmers was Rs.282734 and Rs.642450 respectively. The durable assets like motor cycle, power chaff cutter and sprayer accounted for more or less similar proportion of investment with little difference across the different categories of sample farms. The animal drawn ploughs were replaced by tractors hence the investment made on tractor was found in all the farm categories. The study results revealed that the price of combine harvester, power thresher and paddy transplanter become almost unreachable to the marginal and small farmers.

Investment Pattern on Livestock

Livestock forms the major asset position in sample farm households, which would help them in farming and providing a supplementary income for their livelihood sustenance. The investment pattern on livestock assets in the sample farms of Tamil Nadu is presented in Table 9. It could be understood from the Table 9 that the average value of livestock assets maintained by the sample farms was Rs.312117. The value of the livestock assets possessed by medium and large farms was Rs.616795 and Rs.401011 respectively. It was observed that in all farms, the farmers possessed high value milch animals. With respect to poultry birds, medium and large farms possessed poultry birds worth of Rs.4134 and Rs.2248 respectively.

TABLE 9: Investment Pattern on Livestock Assets (in Rs/ farm)

Sl.No.	Particulars	Marginal	Small	Semi Medium	Medium	Large	Average
A.	Livestock						
1	Cattle						
	Milch	44392	53338	129174	409932	213275	170022
	Calf	18740	10700	13503	26609	36936	21298
	Bull	6465	2729	15463	19097	29323	14615
	Breeding	12423	4883	9625	13946	5799	9335
	Draught	10692	12228	25365	33247	17965	19899
	Multipurpose	7114	7745	12841	17725	11114	11308
2	Buffalo						
	Milch	16838	12412	21687	39776	23777	22898
	Calf	198	0	437	387	0	204
	Breeding	893	2206	2911	7742	0	2750
	Draught	1191	2574	2183	0	3234	1836
	Multipurpose	7662	3333	9389	10065	17464	9583
2	Goat						
	Milch	594	719	1534	4923	2879	2130
	Kid	96	78	134	902	402	323
	Breeding	6796	5632	12086	23528	16844	12977
	Multipurpose	8186	2596	8673	5819	7332	6522
3	Sheep						
	Breeding	1358	1924	3278	2317	12540	4283
	Multipurpose	3613	772	3372	781	2125	2133
	Total (A)	147252	123870	271656	616795	401011	312117
B.	Poultry						
	Chickens						
	Multipurpose	240	377	959	4134	2248	1592
	Total (B)	240	377	959	4134	2248	1592
	Total (A+B)	147492	124247	272615	620929	403259	313709

TABLE 10: Investment pattern of farm households on farm assets (in Rs/ farm)

Sl.No	Particulars	Marginal	Small	Semi Medium	Medium	Large	Average
1	Farm buildings	283042 (25.06)	431867 (23.80)	482283 (19.06)	962893 (20.37)	977487 (19.88)	627515 (20.75)
2	Irrigation structures	416398 (36.86)	615973 (33.95)	816316 (32.26)	1145116 (24.22)	1341041 (27.27)	866969 (28.67)
3	Machineries and implements	282734 (25.03)	642450 (35.41)	959165 (37.91)	1998475 (42.27)	2196332 (44.66)	1215831 (40.21)
4	Livestock	147492 (13.06)	124247 (6.85)	272615 (10.77)	620929 (13.13)	403259 (8.20)	313709 (10.37)
5	Total	1129666 (100)	1814537 (100)	2530379 (100)	4727413 (100)	4918119 (100)	3024024 (100)

(Figures in parenthesis indicates per cent to total)

It could be observed from the Table 10 that among the various assets, the investment pattern of sample households was higher on machineries and implements (40.21%) followed by irrigation structures (28.67 %) and farm buildings (20.75 %). Higher investment on machineries (40.21 %) reduces the investment on livestock (10.37 %). The investment on machineries and implements were higher under large category of farmers (44.66%), as large farmers have the potential to buy new machineries. Among the categories, with the exception of marginal farmers, the investment pattern of all other farm household's categories were higher in case of machineries and implements. Since irrigation is crucial for crop production, the proportion of investment by marginal farmers was higher on irrigation structures (36.86 %). Increased expenditure towards irrigation structures might be due to reasons like expectation of high production, or be safe with changing climatic conditions or preference towards irrigation intensive crops to get higher income.

CONCLUSION

- It is evident from the study that Majority of the farm households were headed by farmers with more than 51 years. It may not be a good sign for the growth of the agriculture.
- It is evident that still majority of the farm household were headed by male and this implies that the decisions in farm families were taken by male only. Generally women are more risk averse than men and are, therefore, more likely to take decisions that minimize risks. It has also been observed that women are more open to advice and are willing to change their ideas in response to newer information. Since, in agriculture, most of the activities beginning from nursery preparation, weeding, harvesting, cleaning, grading, processing and livestock maintenance, were performed by female, empowerment of women in agriculture is needed.
- The study results showed that still a certain proportion of farmers were illiterate. Illiteracy is one among the major factor which hinders the economic development of the farming community.
- Marginal and small farmers have little incentive to take long-term capital loans for investments, such as micro-irrigation, which mitigate risk during drought. They can be encouraged to obtain loans.

- Investment in livestock is very crucial. Livestock form an integral part of farming and helped to complement farm income along with the income from crop cultivation. It has been seen from the results that the level of investment on livestock by marginal and small farmers is very low. The major reason behind the less level of investment was the high feed cost. Loans for livestock feed will encourage the vulnerable marginal and small farmers in livestock investment.
- Though investment by farmers in agriculture is largely private, still for the agricultural growth, large public investment like education, research, extension, rural infrastructure, irrigation and finance is required.

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