IMPACT OF FARM MECHANIZATION ON SELECTED FILED CROPS IN TAMIL NADU (INDIA): AN ANALYSIS

N. Anandaraja[1], K. Chandrakandan[2], R. Vijayaraghavan[3] and C. Karthikeyan[4]

The economic progress of the nation is directly expressed by the overall availability of energy and its consumption. Increase of input in agriculture directly or indirectly increases the production and productivity. In the age–old system of agriculture, the draught animal was the predominant motive power source for operations such as tillage, post harvest and haulage etc. it is an established fact that inadequacy of the power and machinery results in very poor yields. Therefore, in order to bring more land under cultivation and to improve productivity, it is imperative to introduce other sources of power on the farm.

Mechanization is predominantly taking place mainly for those traditional practices, which failed to achieve the timeliness in operation. Agricultural labourer availability in India is become scarce day by day. Quantity as well as quality of daily output of agricultural labourers is also decreasing. Hence, agricultural equipments / implements have now been recognised as one of the input to agriculture due to the reduction of operational costs, minimising human drudgery, generation of more employment in the farm sector in addition to the increased production. Farm machines also confer definite benefits to the farm in terms of greater efficiency, economy and higher productivity particularly by speeding up agricultural operations during critical periods.

1. *Ph.D. Scholar, Department of Agricultural Extension, TNAU, Coimbatore*
2. *Professor, Department of Agricultural Extension, TNAU, Coimbatore*
3. *Professor, Agricultural Extension, Regional Research Station, TNAU, Bhavani Sagar*
4. *Assistant Professor, Department of Agricultural Extension, TNAU, Coimbatore*

India, one of the principal countries depending on agriculture is faced with the critical situation of the need to improve the production and productivity through mechanization as well as to provide more job opportunities to meet the demand of growing population. Therefore, this study was taken timely with the objective, to assess the impact of farm mechanization or farm productivity and operational efficiency.

Methodology

The study was conducted in Tamil Nadu State (India), under the two farming situations viz., High Irrigation Intensity District (HIID) and Low Irrigation Intensity District (LIID) during 1999-2000.

From the two farming situations, totally six major crops were selected. They were Paddy, Sugarcane and Cotton in HIID and Ragi, Tapioca and Groundnut in LIID. For each crop, 80 respondents were selected though Simple Random Sampling procedure.

The data were collected by means of personal interview with the help of structured interview schedule.

Impact of farm mechanization referred to the actual change in the operational efficiency and farm productivity, which may be a positive change (or) negative change due to the influence of farm mechanization over a period of time. Here the impact of farm mechanization on operational efficiency and farm productivity were measured in the terms of the changes observed in the number of labourers used, average working time in hours, average cost (in Rs.) involved for operational efficiency and average yield / ha of a farm. For the assessment of impact, a base period has to be considered. For this study the farmers who continuously used implements, equipments for three years were selected as the respondents and the mechanization index was used for analysis. The tools used for the study were as follows

Mechanization Index

Mechanization Index was based on the number of farm machinery used by the respondents and the number of years for which the respondents concerned.

For example, if two farm machineries X1 and X2 are used by a farmer for the past n1 and n2 years respectively, then mechanization index of the farmer will be $(X_1n_1 + X_2n_2)$.

Operational efficiency

The term operational efficiency refers to the increased efficiency in terms of execution of all farm operations for a crop per season. It was measured in terms of time, cost and quality of work for the impact of farm mechanization.

The impact was measured based on the average difference between pre-mechanization and post-mechanization effect on number of labourers, time, cost and quality of work as perceived by the respondents. The quality of work was measured in the two-point continuum of satisfaction.

Farm productivity

The term farm productivity was operationalised as increased productivity of the farm due to farm mechanization, which was measured in terms of the yield obtained from the farm. The impact of farm productivity was measured based on the average difference in yield between pre-mechanization and post-mechanization as obtained by the respondents.

Findings and Discussion

1. Impact of farm mechanization on operational efficiency

Operational efficiency is the efficiency obtained for doing different agricultural operations as a result of using improved farm equipments, machinery, implements and tools for a minimum period of three years. It was studied in terms of change in the average number of labours used, average working time in hours, average cost involved in rupees and change in quality of work. The data collected from the respondents were analysed and presented in Table 1.

Table 1. Distribution of respondents according to there perceived impact of farm mechanization on operational efficiency

Table 1.1 Average number of labour used

Sl.No	Crop	Average number of labour used		
		B	A	D
1	Paddy	92	76	16
2	Ragi	43	33	10
3	Sugarcane	160	148	12
4	Cotton	141	129	11
5	Tapioca	157	136	21
6	Groundnut	94	83	11

Note: B – Before mechanization A – After mechanization
D – Difference between before and after mechanization

1.1. Average number of labour used: (Crop season)

It could be seen from the Table 1.1 that an average maximum decrease in the number of labourers used due to the impact of farm mechanization registered in tapioca crop was 21 whereas, the average minimal decrease in the number of labourers used in ragi was noticed as 10 labourers. The decrease of labourers used for other crops was between 11 and 16. The same was noticed as 12 for sugarcane, 11 for cotton, 16 for paddy and 11 for groundnut.

It could be inferred that since more number of implements and tools such as tapioca cutter, ridger and harvester are used for tapioca crop, there is decrease in the average number of labour. The change was relatively less for ragi as the use of improved implements and tools is less.

Table 1.2 Average working times

Sl.No	Crop	Average working time (Hours)		
		B	A	D
1	Paddy	8.00	7.26	0.34
2	Ragi	8.00	7.20	0.40
3	Sugarcane	8.42	8.02	0.40
4	Cotton	8.40	8.10	0.30
5	Tapioca	9.52	8.25	1.27
6	Groundnut	8.17	7.42	0.25

Note: B – Before mechanization A – After mechanization
D – Difference between before and after mechanization

1.2. Average working time: (Hours)

It could be observed from the Table 1.2 that increase in the working time was registered maximum for tapioca crop (1.27 hrs) whereas the minimum decrease was registered for groundnut (0.25 hrs). The other crops registered a decrease in average working time viz., 0.34 hrs for paddy, 0.40 hrs for ragi, 0.40 hrs for sugarcane and 0.30 hrs for cotton.

It could be concluded that decrease in terms of time taken for tapioca crop is more than any other crop because of more mechanization, whereas the time taken for groundnut crop is comparatively less due to less mechanization for various farm operations.

Table 1.3 Average cost involved

Sl.No	Crop	Average cost involved (Rs.)		
		B	A	D
1	Paddy	4110.33	3376.00	734.33
2	Ragi	2710.00	2180.00	530.00
3	Sugarcane	7203.84	5801.60	1396.24
4	Cotton	6358.50	5750.00	608.50
5	Tapioca	7185.00	5835.00	1350.00
6	Groundnut	4480.76	3750.00	730.76

Note: B – Before mechanization A – After mechanization
D – Difference between before and after mechanization

1.3. Average cost involved; (in Rs / ha)

It could be inferred from the Table 1.3 that increase in the cost involved was registered high for sugarcane crop (1396.24 Rs/ha) whereas it was registered less for ragi (530 Rs/ha). The decrease in cost for other crops were, 734.33 Rs/ha for paddy, 708.50 Rs/ha for cotton, 1350.00 Rs/ha for tapioca and 730.76 Rs/ha for groundnut.

It could be concluded that although the cost of cultivation is more in sugarcane, due to the impact of farm mechanization the cost of cultivation was reduced *i.e.* use of improved machinery and impalements such as ridger,

sugarcane planter and cutter. Comparatively the cost of cultivation was less in ragi, may be due to more use of indigenous / traditional farm implements and tools for ploughing, weeding and harvesting operations.

Table 1.4 Quality of work

Sl.No	Crop	Average number of labour used					
		B		D	A		D
		S	NS		S	NS	
1	Paddy	18	62	-44	48	32	+16
2	Ragi	32	38	-6	43	37	+6
3	Sugarcane	21	59	-38	42	38	+4
4	Cotton	39	31	-8	43	37	+6
5	Tapioca	19	61	-45	52	28	+24
6	Groundnut	30	50	-20	36	34	+2

Note: B – Before mechanization A – After mechanization
S – Satisfied NS – Not Satisfied
D – Difference Satisfied and Not Satisfied

1.4. Quality of work

The decrease in the quality of work was measured in terms of farmers' rating as satisfied / not satisfied which indicates the impact of farm mechanization.

It could be seen from the Table 1.4 indicated that for all the crops there was considerable increase in farmers' satisfaction about the work and decrease in dissatisfaction about the quality of work due to the impact of farm mechanization. It could be seen that the increase in the farmers' satisfaction was more for tapioca and satisfaction was less for groundnut.

2. Impact of farm mechanization on farm productivity

An impact of farm mechanization was measured in terms of farm productivity based on the change in the average yield in quintal / ha was collected.

Table 2. Distribution of respondents according to their impact of mechanization Farm Productivity

Sl.No	Crop	Average yield in quintal/ha		
		B	A	D
1.	Paddy	49.325	53.475	4.150
2.	Ragi	2.150	2.300	0.150
3.	Sugarcane	815.000	995.000	180.000
4.	Cotton	2.125	2.375	0.250
5.	Tapioca	476.900	504.025	27.125
6.	Groundnut	32.400	35.950	3.550

Note: B – Before mechanization A – After mechanization
D – Difference in yield between before and after mechanization

It could be evident from the Table 2 that the average increase in yield per unit area registered more for sugarcane (180 quintals/ha) as an impact of farm mechanization whereas it registered negligible difference for ragi (0.150 quintals/ha). For paddy the average increase in yield was 4.150 quintals/ha. The increase in yield of other crops varied and they were 0.250 quintals/ha in the case of cotton 27.125 quintals/ha for tapioca and 3.550 quintals/ha for groundnut crop which may be considered as impressive increase as a result of farm mechanization.

It can be concluded that there is considerable increase in the yield of five out of six major crops studied due to farm mechanization. The impact was more prominent in the case of sugarcane followed by tapioca, paddy, groundnut and cotton. Hence the impact of farm mechanization was observed.

Conclusion

The findings of the present study provide a visible of farm mechanization on farm productivity and operational efficiency. To extent this facility to all the crops and all the categories of farmers the following suggestions have to be considered.

- Efforts should be taken to make the devices simple, the results more observable and physically compatible and they should receive importance in the fabrication and the transfer of technology.
- Provision of financial assistance and subsidy for purchasing the introduced farm equipments – machinery, implements and tools should be made available locally.
- Periodical training programmes and demonstrations may be conducted for the farmers on handling and maintenance of existing and introduced farm equipments – machinery, implements and tools.

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