



Research Article

EXPLORATION OF CUSTOM HIRING SERVICES OF FARM MACHINES IN JUNAGADH

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Abstract- The level of mechanization is increasing day by day in all aspects in Gujarat. The custom hiring is very useful method of having short term control of farm machinery particularly during the tillage operations, sowing and during their harvesting operations, etc. Efforts are made through this study to document the information about the economic status of the custom hiring services of farm machinery. The survey was made for the custom hiring in 7 villages of Junagadh taluka. About 50 farmers were interviewed for the survey and following conclusions were made. Although the use of plough is high but its break-even point is quite higher than that of annual usage. It was observed that profit per investment of combine harvester is maximum whereas it is minimum in case of weeder. Also the implements like rotavator, disc plough, tractor, thresher, cultivator provides good profit to the farmer. There are also some implements like weeder and plough which have negative values of profit per investment. This means that these implements cause loss on the initial investment. It was observed that the return on investment from a machine does not depend on its initial cost. It mainly depends upon the annual usage.

Keywords- Custom Hiring, Break-even point, Farm machine.

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Introduction

Custom hiring is an emerging concept in farming to facilitate adopting improved resource management among the like-minded farmers with commonality in the farming practices. These systems of resource sharing at a reduced cost to individual farmers are in vogue in some regions of the country with respect to farm machinery and implements [1], while studying the economics of tractor cultivation in Punjab observed that on an average a tractor was utilized for 739 hours in a year or nearly two hours in a day. Average hiring out hours per tractor was worked out to be 76 hours per year of which ploughing operation accounted for 61 percent of the total hired out tractor hours [2] evaluated capital investment pattern in a developed village economy in Punjab. He concluded that farmer can perform his operation of farms with the custom hiring of implements. Farmers who are having land holding less than 2.8 ha are potential users of farm implements through custom hiring/rental services studied by [3] [4] mentioned that mechanization level in the state has increased manifold and typical farm machinery decision may require choosing between owning a machine and hiring custom work.

Materials and Methods

In the methodology adopted to collect the information about custom hiring service of farm machinery provided by farmers. It also includes that was used to calculate the Break Even Point of the all machinery used. This information was collected and analyzed in following stages (a) selection of farmers, (b) development of interview performa, (c) collection of data and information and (d) analysis and compilation of data

Information was to be collected from randomly selected 50 farmers in selected

villages who provide service of custom hiring of various farm machinery for different operations. The selection of farmers was based on the variety of machines that they had, covering all types of operations for various types of agricultural produce. They should be able to provide service to farmers involved in production of cereals, pulses, etc.

Annual Fixed Cost was calculated by taking depreciation, interest on investment, taxes & insurance, housing / shelter cost and annual variable cost was calculated by fuel cost, repair and maintenance cost, lubricating oil cost and operator and labour cost.

Calculation of annual fixed cost of the farm machinery

According to the Kepner et al. [5]

Depreciation,
$$D = \frac{(P - S)}{L}$$

Where, D = Yearly depreciation

P = Purchase price of machine (Rs.)

S = Salvage value or the selling price of the machine after its useful life (Rs.)

(Assumed to be the 10% of the purchase price)

L = Useful life of the machine between buying and selling (years or hours)

Interest on investment,
$$I = \left(\frac{P + S}{2} \right) \times \frac{i}{100}$$

Where, I = Rate of interest prevalent in the market (%)

P = Purchase price of machine (Rs.)

S = Salvage value or the selling price of the machine after its useful life (Rs.)
(Assumed to be the 10% of the purchase price)
 i = Annual interest rate (10% per annum for the agricultural machinery)

Insurance and taxes, $In = \left(\frac{P+S}{2}\right) \times \frac{in}{100}$

Where, In = Rate of insurance and taxes (%)

P = Purchase price of machine (Rs.)

S = Salvage value or the selling price of the machine after its useful life (Rs.)
(assumed to be the 10% of the purchase price)

in = Annual insurance and taxes rate (1% per annum for the agricultural use)

Shelter/housing cost, $Sc = \left(\frac{P+S}{2}\right) \times \frac{is}{100}$

Where, Sc = Hiring rate of the shelter (%)

P = Purchase price of machine (Rs.)

S = Salvage value or the selling price of the machine after its useful life (Rs.)
(assumed to be the 10% of the purchase price)

is = Hiring cost of the shelter (1% per annum for the agricultural use)

Therefore,

Total fixed cost (TFC) = Depreciation + Interest on the investment + Insurance + Shelter charges

Calculation of the variable cost of the farm machinery

Fuel cost (Rs. / h) = Fuel Price (Rs. / lit) \times Fuel consumption (lit / h)

Repair and maintenance cost (RM) = (6%) \times Purchase Price (Rs. / h)

Lubrication oil cost = 30% of fuel cost (Rs. / h)

Operator and labour wages = Labour Charges per day/ Total working hours per day (Rs./h)

Therefore,

Total Variable cost (TVC) = Fuel cost + Repair and maintenance cost + Lubrication Cost + Operator and labour wages

Total Cost of farm Machinery (TC) = Total Fixed Cost (TFC) + Total Variable Cost (TVC)

Analysis and Compilation of Data

Data was collected from various farmers and was compiled in order to get the information about types of machinery possessed by the farmer, their custom hiring charges, mode of custom hiring, problems faced by user/provider. This information was compiled as, Custom hiring services provided by the farmer and Analysis of Break Even Point of different machinery

Breakeven point (B.E.P.)

Breakeven point is the point at which the total revenue is exactly equal to the total costs. At this point no profit is made and no losses are incurred.

$$(B.E.P.)_i = \frac{(\text{Fixed Cost})_i (\text{Rs./year})}{[(\text{Hiring Cost})_i - (\text{Variable cost})_i (\text{Rs./h})]}$$

Where, i = Type of the implement like rotavator, cultivator, seed drill etc.

Annual use (h) of an implement

Total annual use (h) of an implement under different systems can be calculated by the total amount earned by a particular implement divided by the hiring charges of the implement or machine.

For hire out categories

Total annual use hours (TAUH)

$$(TAUH)_i = \frac{\text{Total annual earned by the } i\text{th implement (Rs./year)}}{(\text{Number of } i\text{th implements}) \times (\text{Hiring cost of the } i\text{th implement (Rs./h)})}$$

Where, (TAUH)_i = Total annual use (h) of i th implement under hiring.

Results

A study was conducted to collect the information on various farm machinery from various villages of Junagadh taluka to study the custom hiring status of this area. A profit-loss analysis was done in order to calculate the breakeven point and to determine the economic feasibility of the custom hiring services.

During the survey it was found that the cultivator and rotavator were extensively used by the farmers, which is annually 520 h. Weeder, plough and harrow were also used by the farmers. The annual use of the thresher was more than 500 h and annual usage of tractor was more than 900 h. The annual use of combine harvester was 800 h which was higher than annual use of thresher, disc plough, rotavator, etc.

From the [Fig-1] it is clear that 70 % of farm machinery have annual usage more than 200 h. Also it is seen that all the implements have annual usage more than 100 h. The annual usage of rotavator, cultivator, tractor, disc plough, combine harvester is more than 50%. The annual usage of tractor is maximum as a power source with all implements.

Break even analysis of all these machinery was done in order to know the Break Even Point. (i.e. how much time an implement will be used in order to have no profit and no loss and if these implements used above this point then they provide the profit by respective usage). In this table, the positive values indicate the profit and the negative values indicate the loss from the implement for the given annual usage.

Determination of the Economic Feasibility of Farm Machinery

After calculating the B.E.P., it is observed that most of the implements have B.E.P. more than their annual use i.e. net annual usage of machinery after the B.E.P. is reached to positive (where net annual usage after B.E.P. (h) = Annual use of machinery (h) - B.E.P. of machinery (h)) and if the annual usage > B.E.P. i.e. net annual usage is positive, implement provides profit and vice versa. The graph of annual use, B.E.P. and net usage of machinery is depicted in [Fig-2].

Now the amount of profit or loss can be calculated as

Annual profit/loss (Rs./year) = Net usage after B.E.P. (h/year) \times Hiring charges (Rs./h)

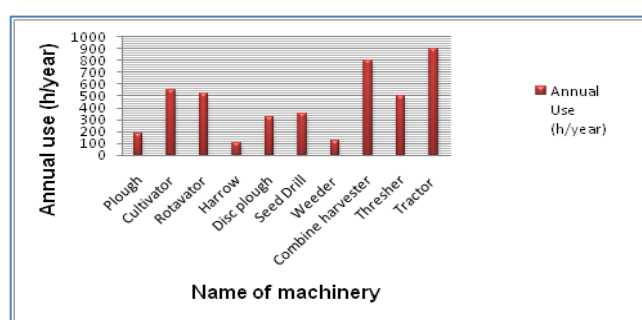


Fig-1 Annual use of farm machinery

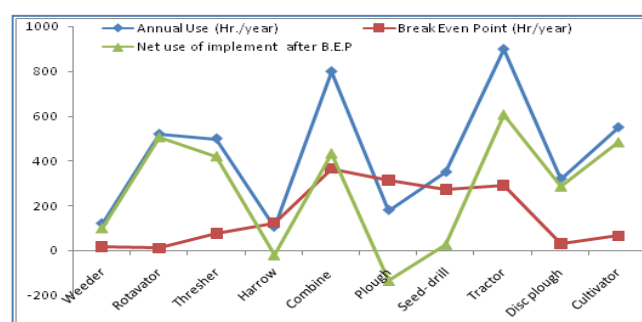


Table-1 Break Even Point analysis of the machinery

No.	Name of the individual implement	Purchase price of implement (Rs.)	Hiring Price (Rs./h)	Total Fixed Cost (Rs./Year)	Repair and maintenance Cost (Rs./Year)	Variable Cost (Rs./h)	Annual Use (h/year)	Break Even Point (h/year)	Net use of implement after B.E.P.	Profit and loss (Rs./year)
1	Weeder	10000	200	630	216	166	120	19	101	2000
2	Rotavator	85000	350	2517	765	161	520	13	507	177450
3	Thresher	142000	350	4038	1204	298	500	78	422	147700
4	Harrow	9500	250	499	171	246	105	125	-20	-5000
5	Combine	1691000	450	47686	12175	320	800	366	434	195300
6	Plough	18000	250	945	324	247	180	315	-135	-33750
7	Seed-drill	13000	250	819	280	147	350	273	27	6750
8	Tractor	474000	250	71606	6412	205	900	292	608	152000
9	Disc plough	31500	300	1651	567	250	320	33	287	86100
10	Cultivator	8500	250	331	114	145	550	66	484	121000

Table-2 Yearly profit per investment of various common implements

Sr. No.	Name of the individual implement	Purchase price of implement (Rs.)	Profit/year Investment
1	Weeder	10000	0.05
2	Rotavator	85000	0.004
3	Thresher	142000	0.09
4	Harrow	9500	-0.19
5	Combine	1691000	0.8
6	Plough	18000	-0.05
7	Seed-drill	13000	0.19
8	Tractor	474000	0.31
9	Disc plough	31500	0.03
10	Cultivator	8500	0.007

Discussion

The level of mechanization is increasing in all aspects in Gujarat. Almost every types of agricultural equipment are being used either by owning or through custom hiring. The custom hiring is very useful method of having short term control of farm machinery particularly during the tillage operations, sowing and during their harvesting operations, etc. Efforts are made through this study to document the information about the economic status of the custom hiring services of farm machinery. The survey was made for the custom hiring in 7 villages of Junagadh taluka. About 50 farmers were interviewed for the survey and following conclusions were made.

Conclusion

1. Seed-drill and plough are available with more than 75% of farmers.
2. Tractors, which are available in villages, are ranging from 40-50 hp.
3. Most of the hiring charges vary from 200-300 Rs./h except that of combine harvester whose hiring charge is 400-500 Rs./h and rotavator hiring charge is 300-350 Rs./h. Annual use of the rotavator was more than 520 h and annual usage of tractor was more than 900 h in most of the villages.
4. More than 60% villages have thresher whose annual use is more than 500 h.
5. Although the use of plough is high but its breakeven point is quite higher than that of annual usage.
6. It was observed that profit per investment of combine harvester is maximum whereas it is minimum for the weeder. Also the implements like rotavator, disc plough, tractor, thresher, cultivator provides good profit to the farmer.
7. It is observed that to make a good profit one have to purchase at least combine harvester, tractor, rotavator, thresher, cultivator and disc plough which provide a reasonable profit and if anyone wants to invest more money than it is preferred to buy multiple numbers of machinery like tractor, thresher, cultivator, rotavator, combine harvester, etc. as per the amount available.
8. It was observed that the return on investment from a machine does not depend on its initial cost. It mainly depends upon the annual usages.

Conflict of Interest: None declared

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