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Study on Use Pattern of Tractor in Odisha

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Abstract: ***The present study was conducted to determine the use pattern of tractors and to establish the relationship between life, maintenance cost, and use pattern of the tractors in selected regions of Odisha. Data was collected with the help of a pre-structured questionnaire through personal interviews of farmers in three districts of Odisha. Districts Mayurbhanj, Sonepur, and Nuapada for the study. From each district, three blocks were selected, and from each block, two villages were randomly selected from each of these villages, ten farmers who owned the tractor and equipment with cultivable land were randomly selected. The results showed that most of the tractor owners in all the two districts had medium landholdings (4-10 ha) comprising nearly 46% of the total tractor ownerships. The use of tractors was used mostly for non-agricultural purposes like transportation of construction materials as compared to agricultural purposes.***

Keywords: Tractor, Maintenance cost, Landholdings, Questionnaire, Personal interview

I. INTRODUCTION

A. Farming Status of Odisha

Odisha is one of India's most fertile tracts of land. Nearly three-fourths of its population depends on agriculture for survival. In the process of farm mechanization, a large number of machines are required to be used on the farm. Among them, the use of a tractor is very important and has its specific place because the animal power available with the cultivators may be incapable of coping with the situation. Certain agricultural operations, such as land development, leveling, and threshing, cannot be carried out effectively with bullock power. During the peak period of the agricultural season (harvesting, sowing, and paddy transplanting) the labour cost shoots up 2 to 3 times more than the average cost. Thus, farm mechanization help farmers perform farm operations timely and relatively, at a lower cost. Tractors are generally associated with farming as farmers use them alongside machinery to perform implements like plowing, tilling, sowing, and harrowing. In addition, a tractor is used for pushing or pulling the machinery, thereby making the farming operations more convenient. Implements were hired for agriculture work by needy people. As the landholding size had gone down raring of bullocks has become uneconomical people prefer to do operations by implementing customer hiring .data were collected regarding the attitude of farmers towards custom hiring and rate of custom hiring. It was expressed in the percentage of total use hours and farmers practicing custom hiring of a total number of farmers.

II. MATERIALS AND METHODS

A survey study was planned in the villages of three districts of Odisha.

The following points were kept in mind:

1) To select the farmer who owned tractors based on sampling procedures and collect information on the tractors and implements with respect to their use, maintenance cost, failure, and repair frequency and charges for the same.

2) To make a random selection so that the result should be unbiased and appropriate statistical tools can be applied for analysis.

Table 1 (List of villages choose from study area)

Sl. No.	Select Villages choose from the study Area		
	District	Block	Village
1	Mayurbhanj	Saraskana	Saraskana
			Mundhakata
		Bangriposi	Dighi
			Joka
		Kuliana	Budhamara
			Pathuri

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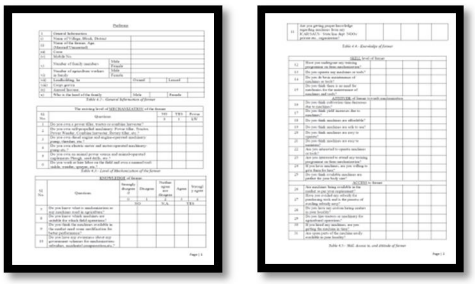
2	Sonepur	Dungripali	Tamamura
			Kapasira
		Biramaharajpur	Khalipali
			Arjunpur
		Binika	Rengali
			Pipilipali
3	Nuapada	Nuapada	Budhipali
			Supuli
		Komna	Dalipada
			Deodhara
		Khariar	Lodra
			Amalapali

III. RESULTS AND DISCUSSION

A. Tractor ownership versus land holding:

To collect information from farmers we have formulate questionnaires for personal interaction to famers.

PERFORMA



Information was based on ownership and use pattern of tractor implements system was analyzed from the data obtained from farmers owing tractor implement system. The land ownership patterns for the selected farmers of three selected districts namely Sonepur, Nuapada, and Mayurbhanj.

Table-3.1 (Ownership VS Landholding)

Category	Landholding (In-ha)	Percentage of tractor		
		Mayurbhanj	Sonepur	Nuapada
Marginal	<1	1	2	1
Small	1-2	20	22	21
Semi medium	2-4	23	25	22
Medium	4-10	45	46	48
Large	>10	11	5	8

Inference to this analysis 40-50 percent of medium landholding (4-10ha) farmer-owned tractors.

B. Distribution of operator's age in the study area:

The age-wise distribution of tractor operators in the three districts Mayurbhanj, Sonepur, and Nuapada.

Table-3.2(Age-wise distribution of power tiller operators)

Age	Percentage of the operator (%)		
	Mayurbhanj	Sonepur	Nuapada
<25	11.11	12.78	19.44
25-35	47.22	33.33	25.00
35-50	41.67	53.89	55.56

Respondents stated that young operators were relatively less careful primarily due to their age and stage. On the contrary, it was observed that farmers in the age group of more than 35 years had proper experience and could handle minor troubles in their tractors more efficiently. In other parts of the country also, it has been observed that farmers give steering of tractors in hands of young boys without caring for the consequences of mishandling. These young boys sometimes use tractors in a fashion similar to cycle and scooter, which lead to mishandling and mismanagement.

C. Education level of Operators/Farmers

Educational level-wise distribution of tractor operators/farmers in the three districts - Mayurbhanj, Sonepur, and Nuapada. The education level of tractor operators is represented in (Table 4). In all three districts, more than 38% of operators were 10th pass. It was due to the age factor as many of the tractor operators were in the youth category. Similar results were found by Kumari and Kumari (2014) inthe Uttar Pradesh state of India where more than 60% of the tractor operators were educated up to high school or less.

Table-3.3 (Educational level of operators)

Education level	Percentage of the tractor operator		
	Mayurbhanj	Sonepur	Nuapada
>10	37.89	57.33	43.68
<10	62.11	42.67	56.32

D. Distribution Patterns of Tractor age in the Study Area

Tractor age-wise distribution of tractors in the three districts - Mayurbhanj, Sonepur, and Nuapada.

Table-3.4 (Distribution patterns of tractor age)

Year	Percentage of tractors year wise		
	Sonepur	Nuapada	Mayurbhanj
0-5	42.64	47.7	43.29
5-10	51.78	46.25	50
11-15	5.58	6.05	6.71

As we see in *(Table 3.4)* when the tractor age increases the use of that tractor decreases. These things happen because when the tractor age increases it requires more maintenance as compared to the primary stage, so users try to buy a new one.

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E. Customer Hiring Rate of Tractors in Different Operations

The customer hiring rate of tractors in different operations in the three districts - Mayurbhanj, Sonepur, and Nuapada.

Table-3.5(Customer hiring rate of the tractor)

Operation	Rates (Rs. /h)		
	Sonepur	Nuapada	Mayurbhanj
Cultivator	1100	1200	1200
Rotavator	1400	1300	1400
Thresher	1100	1200	1100

Diesel Consume - 4 to 6 L/ hr- 600
Operator Cost - 200
Maintenance Cost - 200
Operation cost per hour- 1000
Profit (Varies from area to area) - 400
Total- 1400

The customer hiring rate difference is shown in three district is due to the availability of the implements, if in one area more equipments are there then the customer hiring rate of that area is less. But if in one area less equipment is there then the customer hiring rate is more.

F. Tractor fuel Consumption in Different Operations

The fuel consumption rate of the tractor in different operations in the three districts - Mayurbhanj, Sonepur, and Nuapada.

Table-3.6 (Fuel consumption)

Operation	Horsepower range wise fuel consumption (L/h)		
	25-35 hp	35-45 hp	45-60 hp
Cultivator	2.5-3	3-4	4-5
Rotavator	3	5	6
Thresher	3-4	4-5	5-6

Here we see in tractor when the power is increases the fuel consumption is also increases and when the power is decreases the fuel consumption is also decreases.

G. Implements used in the Study Area

The availability of tractor drawn implements in the study areas is given in (Table-8). Tractor owners in the selected districts were having a good number of farm implements for tillage. In the three districts, all the tractor owners owned cultivators and trolleys. About 30.56%, 19.44% and 38.89% farmers owned a leveler in Mayurbhanj, Sonepur, and Nuapada districts, respectively.

Table-3.7 (Use of Implements)

Implement	Mayurbhanj		Sonepur		Nuapada	
	No	%	NO	%	NO	%
Cultivator	38	100	37	100	36	100
Leveler	11	30.56	7	19.44	14	38.89
Seed-fertilizer drill	2	13.89	5	19.44	6	16.67
Trailer/Trolley	40	100	38	100	39	100
Tractor	43	100	41	100	42	100

H. Agricultural and Non-Agricultural use of Tractors in the Study Area

Use pattern of tractors for agricultural and non-agricultural job is presented in (Table 9). Mayurbhanj, Sonepur, and Nuapada districts recorded 31.97%, 37.46% and 31.29% for agricultural use, respectively and 68.03%, 62.54% and 68.77% for non-agricultural use. The use of tractors for non-agricultural activities was mainly limited to transportation of construction material from one location to another. The results were synonymous to those obtained by Vatsa and Saraswat (2003) in Himachal Pradesh. The tractors were used more for non-agricultural purposes (62% of annual working hours) as compared to agricultural operations.

Table-3.8 (Agricultural and non-agricultural use of tractor)

Operation	Annual use in hours (%)		
	Mayurbhanj	Sonepur	Nuapada
Agriculture	32.97	36.46	32.23
Non-agriculture	67.03	63.54	67.77

I. Women Worker in Different Agriculture field Operation

Table-3.9 (Women workers in different operations)

Different field operation	Percentage of women (%)		
	Mayurbhanj	Sonepur	Nuapada
Transplanting	60	56	59
Weeding	99	98	99
Cutting	39	36	38
Winnowing	20	23	21

Agriculture sector employs 80% of all economically active women in India; they comprise 33% of the agriculture labor force and 48% of the self-employed farmers. In India, 85% of rural women are engaged in agriculture, yet only about 13% own land.

Socio-economic profile of farmers revealed that the average age of the heads of the farm family ranged from 35 to 52 years. Among the sample farmers, 55 % had education up to middle school level, 21 % high school education, 12 % higher secondary/college education and the remaining were illiterate.

The majority (46 %) of medium farmers (4-5 ha), 23.34 % semi medium farmers (2-4 ha), and 21 % small size farmers (1-2 ha), preferred purchasing of tractor over power tiller followed by 1.34 % marginal farmers category (less than 1 ha). This may be due to versatility of the tractor for performing most of the farm operations as well as transportation work.

Only about 15.2 % of the farmers had proper training for use and maintenance of tractor and about 55 % of them had a license to drive the tractor. Ninety percent of farmers were facing difficulty in maintaining animals, about 64 % of the farmers had problems related to non availability of labour during peak periods/agricultural seasons and about 61 % had problems of timeliness of farm operations. These were the main reasons given by the farmers for buying a tractor.

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V. CONCLUSION

A. Average annual use the tractor was 1,772.62 hours. However, tractors were used for less time in actual agricultural operations. This may further be increased if threshing were also carried out through the tractor engine.

B. Tractors were used for the farmers own work as well as for custom work. The percentage tractor use for their own work was 29.53. For rest of the time the tractor was used for custom work.

C. Average cost of operation of the tractor was more initially and, thereafter, decreased with increase in age.

D. Break-even point increased with the increase in size of the tractor. The maximum break-even point was 685.20 hours for the 26.11 kW tractors.

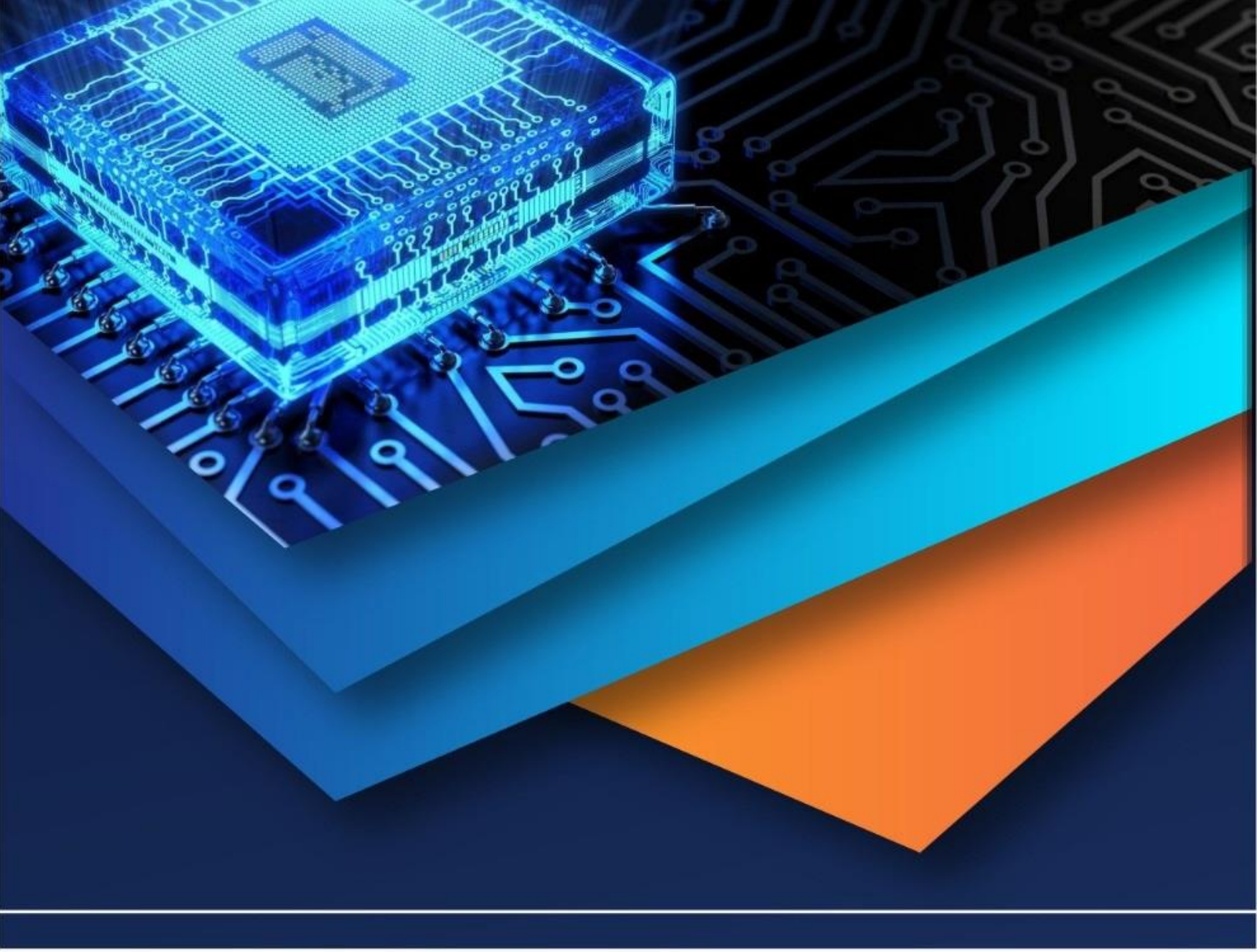
E. Since average annual use in each case was higher than the breakeven point, the purchase and use of a tractor was profitable in the study area.

F. All the tractor owner farmers had cultivator and trolley. No farmer had harvesting machinery. Thus, there existed a clear gap machinery ownership.

G. As the breakdown of tractor machinery system is uncertain however, maximum failure occurred due to brake failure gear damage and clutch plate failures.

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