

## Present Status and Future Prospects of Power Tiller Industry in Orissa, India.

Dr.S. Swain  
Chief Research Engineer  
Orissa University of Agriculture & Technology  
Bhubaneswar-751003, Orissa, India.

### ABSTRACT

Orissa is one of the major rice growing states of India. The state covers an area of 15.54 mha with 6.00 mha cultivable land and has a population of 31.51 m. The average size of land holding is 1.46 ha. The power input is much below the national average of 0.87 hp/ha. Recently, the Government of Orissa has accorded equal status to Agriculture as given to the Industry with a determination to increase the power input for agricultural production to 2.54 hp/ha so as to obtain an average rice productivity of 3.0 t/ha.

Appropriate power units so as to be available within the purchasing power of the small size farm owners in lieu of a pair of bullocks appear to be the right approach and is found to be in line with the highly successful Japanese and Korean model of small farm mechanisation. The state needs 0.25 m units of small tillers and tractors per year.

The present population of tractors and power tillers in the state is about 11000nos. In India, two manufacturers in collaboration with Japanese firms started manufacturing of power tillers in 1970. The present production of power tillers in the country is about 10000 unit per year which is inadequate to meet the demands of all the states. To meet the demands of the Orissa state, three Chinese model power tillers imported by local agencies are being supplied to the farmers during the past two years. Encouraged by the demand of power tillers in the state, three local manufacturing units located at Bhubaneswar have come up with their own model of light weight power tillers (1.5 to 3.0 hp) during the past one year. These machines have been evaluated in the farms of the university and have been found to be promising. There is a target of supplying 5000 units of these machines to the farmers of the state during 1996-97. The local manufacturers are in need of international collaboration for technical knowhow to manufacture these machines economically to meet the requirement of the farmers.

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## ABSTRACT

The current status of power tiller use and its industry and future prospects for agriculture in Orissa, one of the major rice growing states of the India has been presented in this paper. On the basis of the data available in the literature and publications of the Government, predictions have been made for the power tiller industry in the state.

## INTRODUCTION

Orissa is one of the major rice growing states of India and there are 3.58 million farm holding in the state. The distribution of marginal (less than 1 ha.), small (1.00 - 1.99 ha), Semi-medium (2.00 - 3.99 ha.), medium (4.00 - 9.99 ha.) and large (10.00 ha and above) farmers constitute 46.88, 26.77, 18.33, 7.18 and 0.84 percent of the total holdings respectively. The area occupied by the above classes comes to 15.05, 22.62, 29.94, 24.94 and 7.45 percent of the total cultivated area respectively. The average size of holding is 1.46 ha (Anon, 1993). The present population of tractor and power tiller have been estimated to be 11000 nos. Agricultural Mechanization is at a preliminary stage having a large scope for future expansion. Rice is the main crop of the state and other crops like ragi, maize, bajra, jowar, pulses, groundnut, til, mustard, jute, sugarcane, potato and other vegetables are grown. For agricultural operations, the power input mainly comes from human and animal sources.

## BACKGROUND INFORMATION

The power tiller is a multi purpose walking type hand tractor designed for tilling the land, both dry and wet cultivation, and other farm operations. This machine was introduced in the country as well as in Orissa during mid-sixties with the brand Kubota imported from Japan and subsequently manufactured by Kerala Agro Machinery Corporation. The programme did not have the desired impact due to inadequate knowledge of the farmers about its use, repair and maintenance, non-availability of spare parts and inadequate after sales service. To meet the requirement of the country, a number of companies came forward to manufacture the machine in collaboration with Japanese counterparts to promote brands like Iseki, Jaykay Satoh, Yanmar, Mitsubishi, and Kubota.

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An indigenous brand, Krishi Power Tiller was promoted by Krishi Engines Ltd, Hyderabad. In eighties, two more models namely National and Universal with indigenous knowhow also came to the market. Out of the eight models only two, namely Kubota and Mitsubishi, could continue to be available to the farmers (Ghosh and Swain, 1990).

To promote the use of power tillers and to develop matching implements for the machine to make it versatile and serve the needs of the farmers, the Indian Council of Agricultural Research started an AICRP (All India Coordinated Research Project) on Power Tillers with Centres at Bhopal and Coimbatore. Although the power tiller is more suitable for rice crop, the benefit of this project was not available to the eastern states in general and Orissa in particular till 1985. Efforts were made during 1985 and a centre of the AICRP on Power tillers was sanctioned for OUAT by the ICAR. The Centre started functioning here in 1986 with the objectives to conduct research on farming systems including use of power tillers, develop suitable power tiller operated implements/machines for local adoption, demonstration of power tillers in farmers fields and impart training to the farmers/mechanics on its use, repair and maintenance to make this small walking tractor more useful to our farmers. With the efforts of this centre, the power tiller population in the state has come to 1600 during the period 1987 to 1995. During the 1st two years, three more brands namely Dong Feng, Bhoomi and Khazana Power tiller (all Chinese make) have been made available to the farmers of the state. The details of some of the power tillers being used by the farmers of the state are given in Table 1.

#### **POWER TILLER INDUSTRY**

The development of industrial sector is directed to create employment opportunity, minimise imports, development of economy and export of engineering goods. The objectives of agricultural machinery industry are to develop components capable of meeting all domestic needs promote export of agricultural machinery, improve the design capability of the agricultural machinery and tool manufacturers (Salokhe and Hendriadi, 1995).

The annual production of power tillers in India is about 10000 units and the present population of the machine is 0.14 million. The power tiller population of major rice growing countries like China, Korea, Thailand, Japan and Indonesia have been reported to be 6.53, 0.74, 0.58, 4.00 and 0.016 million respectively (Anon, 1994).

Raising the productivity of rice upto 3057 kg/ha, highest in country, would require a power input of 2.54 hp/ha. This could be set as the target for the state to be achieved in next ten years. The majority of the farm holdings in Orissa comes

Table 1 Specifications of power tillers being used by the farmers of Orissa.

Sl. No.	Specifications	Models					
		KAMCO	MITSUBISHI	NATIONAL	KHAZANA	DONGFENG	BHOOMI
1.	Weight,kg	450	346	170	494	480	460
2.	Power, hp	9-12	10-12	6	14-16	12-13	12
3.	Tilling width,cm	60	60	20	60	62	60
4.	Tilling depth,cm	19	15	6-14 (ploughing)	18	17	18
5.	Capacity,ha/day	1.00	1.5	0.5	1.68	1.36	1.6
6.	Max speed,kmph	15	15	12	16	15	15
7.	Fuel tank capacity,litres	12	10	4.5	16	14	10.5
8.	Fuel consumption,l/h	1.0	1.5	1.0	2.0	1.5	1.6
9.	Seating arrangement during tilling.	NO	NO	NO	YES	YES	YES

under marginal and small category. Appropriate power units so as to be within the purchasing power of these category of farmers, in lieu of a pair of bullocks, appears to be the right approach and is found to be in line with the highly successful Japanese and Korean model of small farm mechanization. Considering 4.2 million ha rice growing area in the state, Orissa will need to induct 10.8 million hp, in form of small power units, by 2005-06. This would require machines as indicated in Table 2 (Report, 1995).

The induction of these machines could be phased over a period of 10 years. Looking into the requirement of the state, three private manufacturers namely M/s Prachi Works Ltd, M/s Kaling Engineers Ltd and M/s Jhallani Agro Industries have come up with prototypes of power tool bar and power plough. These are being evaluated in OUAT for adoption in the state. The specifications of the machines of two of these manufacturers are given in Table 3.

The Government policy has been very favourable for agricultural mechanisation. A proposal for higher dose of subsidy on these category of machines is under active consideration of the State Government. This will result in easy availability of and within the reach of the marginal, small and medium farmers to mechanise the ploughing and puddling operations. A target of 5000 power tillers and tool bars to be delivered to the farmers has been fixed for the current year.

## **CONCLUSION**

Majority of the farm families are largely dependent on human and animal powers and the present productivity level is below national average. Increase in power input through introduction of appropriate machines such as power plough, power tool bar, walking type power tiller, riding type power tiller and small tractor with matching implements would attract the unemployed educated youth to farming to convert modern agricultural technology to profitable farm enterprise.

Alongwith the increased production and popularisation of power tillers in the state, many problems will arise on the manufacturing and marketing front. The policies for increase in the manufacturing and utilization of these machines will include international collaboration for quality products, use of locally available raw materials, standardisation, financial assistance to manufacturers and promotion of favourable environment for growth of local industries.

Table 2 Different type of power tillers/tractors required for the state(Orissa) for mechanisation of agriculture.

Sl. No.	Type of machine	Nos (million)	hp category
1.	Small tractor	0.057	< 18
2.	Riding type power tiller	0.292	8-14
3.	Walking type power tiller	0.638	4-7
4.	Power tool bar	0.639	2-4
5.	Power plough	0.921	1-2

**Table 3 Specifications of Power plough and power tool bar developed in Orissa.**

Sl. No.	Item	Model	
		M/S Prachi Works Ltd.	M/S Kaling Engineers Ltd
1.	Engine, hp	3.00	1.5/3.00
2.	Fuel	Petrol/ Kerosine	Petrol/ Kerosine
3.	Weight	100 kg	90-100 kg
4.	Fuel consumptions l/hr.	1.00	0.5/1.00
5.	Speed, kmph	2.5-4.00	1.5-4.00
6.	Capacity, ha/day	0.40	0.20-0.40

## REFERENCES

1. Anonymous, 1993. Statistical outline of Orissa, Directorate of Economics and Statistics, Govt. of Orissa.
2. Anonymous, 1994. Regional Network of Agricultural Mechanisation, News Letter No.49, April 1994.
3. Ghosh, R.K. and Swain, S. 1990. Practical Agricultural Engineering, Naya Prokash, Calcutta, pp.131-157.
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