

**STUDY THE EXTENT OF FARM MECHANIZATION WITH RESPECT  
TO TRACTOR AND POWER TILLER IN RICE GROWING BELT OF  
ORISSA**

**Summer Internship Program At**

**ODISHA FARM MECHINARY RESEARCH AND DEVELOPMENT CENTRE (OFMRDC),  
BHUBANESWAR**

**Industry guide**

**Mr. Pravat ku. Samal**

**Executive Engineer, CAD Division, Bhadrak**

**Institutional Guide**

**Dr. B. Parasar**

**Head, Department of Extension Education**



**BY**

**SMITANJALI PATRA**

**DEPARTMENT OF AGRIBUSINESS MANAGEMENT**

**ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**BHUBANESWAR-751003**

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TRACTOR AND POWER TILLER IN RICE GROWING BELT OF  
ORISSA**

**DISSERTATION SUBMITTED TO  
ORISSA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY  
IN PARTIAL FILFILLMENT OF THE DEGREE OF  
MASTER OF BUSINESS ADMINISTRATION  
(AGRIBUSINESS MANAGEMENT)**

**BY**

**SMITANJALI PATRA**

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Centre for Post Graduate Studies  
Orissa University of Agriculture and Technology  
Bhubaneswar-751003**

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**CERTIFICATE-II**

This is to certify that the dissertation entitled “Study the extent of farm mechanization with respect to tractor and power tillers in rice growing belt of Orissa”, submitted in partial fulfillment of the requirements for the degree of Master in Business Administration in Agribusiness Management of the Orissa University of Agriculture and Technology (OUAT), Bhubaneswar is a record of research work done by Miss. Smitanjali Patra during the period of her study in this University under my guidance and supervision. This dissertation has not previously submitted on the basis for award of any Degree, Diploma or other similar titles. The assistance and help received as well as source of information availed during the course of investigation have duly acknowledged.

Dr. B. Parasar

Head of the department,

Extention Education

Date

# DECLARATION

I do hereby declare that dissertation entitled “Study the Extent of Farm Mechanization with Respect to Tractor and Power Tiller in the Rice Growing Belt of Orissa” being submitted by me in partial fulfillment of the requirement for the Degree of Master of Business Administration in Agribusiness Management of Orissa University of Agriculture and Technology(OUAT), Bhubaneswar under the guidance of Mr. Pravat ku, Samal, OFMRDC. I further declare that the contents of the report authentic and have not been published and presented earlier.

Date

Smitanjali Patra

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My esteemed teacher and supporter Dr. S. Mahapatra, Head of the Department, Agribusiness Management, Centre for Post Graduate Studies, Orissa University of Agriculture and Technology, Bhubaneswar, Er. Pravat Ku. Samal , Executive Engineer, CAD division, Bhadrak and Dr. Sangram Swain, Professor, College of Agricultural Engineering &Technology, OUAT, Bhubaneswar were also very supportive and cooperative. I reckon with all gratitude for their kind help, cooperation and scholarly suggestions.

I extend my heartily thanks to my friends- Bina and Jyoshna for their help during my research work.

At the nib but ineptitude, I wish to express my deep sense of honor, love, hearty regards to my family members for their constant help, support, blessings and love that become a part of my life and made each and every step of my life beautiful and pleasant. Without my parents blessings and care it would not be possible to complete this thesis and achieve another success in my academic career.

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## **ABSTRACT**

The productivity of farms not only depends on high yielding/hybrid seeds, fertilizer , pesticide but also greatly on the availability and judicious use of farm machinery by the farmers. Agricultural implements, equipments and machines enable the farmers to employ the power judiciously for production purposes. Agricultural machines increase productivity of land and labor by meeting timeliness of farm operations and increase work out-put per unit time. So to increase the production level of agriculture sector, there is a strong need of farm mechanization in the state. Tractor and power tiller are the power source which are used to operate different kind of machinery to complete different agricultural practices.

Orissa is an agrarian State. Almost 70% population of the State dependent on agriculture. Rice covers about 69% of the cultivated area and is the major crop, covering about 63% of the total area under food grains. It is the staple food for almost the entire population of Orissa; therefore, the state economy is directly linked with improvements in production and productivity of rice in the state. The environmental condition of Orissa is very much suitable for paddy cultivation.

Still all these suitability, Orissa is lacking behind the other states like Punjab, Hariyana, Gujrat, Bihar etc in using of farm machineries. Although Orissa is the highest seller of PT still after that Orissa is lacking behind in farm mechanization. When tractor is more efficient and useful than a power tiller, the tractor market is down in Orissa in comparison to other states.

The continuous flood, small land holdings, lack of awareness, lack of knowledge about the operational and maintenance practices, economy of the people etc are the major reason behind it. By overcoming these constraints we can popularize farm mechanization in Orissa. In this process Govt. of Orissa also helps the poor farmers by subsidizing various farm machineries and equipments.

We cannot solve this problem only by providing subsidy to the farmers. Training, awareness, good irrigation system, etc are very much necessary to overcome this problem. We

have to create a good market in Orissa both for tractor and power tiller by using a suitable strategy. This not only rises the way to the tractor and power tiller market but also for the other equipments which are attached with the power sources for completing different agricultural operations.

OFMRDC (Orissa Farm Machinery Research and Development Center) & Agricultural Engineering wing under Directorate of Agriculture plays an important role to promote farm mechanization in the state by providing/popularizing various types of new machines in the state. The Orissa Farm Machinery Research and Development Centre (OFMRDC) act as a testing center for all manual & animal drawn implements including power operated machines up to 5 HP produced in the state or neighboring states. This center (OFMRDC) is approved by the Government of India as a testing center and by National Council on Vocational Training (NCVT ) as a training institute.

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# A BRIEF OVERVIEW OF OFMRDC

The erstwhile Implement Factory (IF), renamed as Orissa Farm Machinery Research & Development Centre (OFMRDC) started functioning in the year 1960-61 with the objective of production and sale of improved agricultural implements. This was upgraded once in 1963-64 and for second time in 1975-76.

The State Agricultural Policy 1996 brought a significant increase in the use of farm machinery and power consumption in agriculture which was subsequently emphasized enlarging the scope of mechanization in State Agricultural Policy 2008. Due to heavy demand on supply of improved farm machinery and power, Government desired ‘Government Implement Factory’ to play a larger role in augmenting the noble effort and decided to rename it as ‘**ORISSA FARM MACHINERY RESEARCH & DEVELOPMENT CENTRE (OFMRDC)**’ with a mandate to undertake massive research and development and promotion of various farm implement and equipment in collaboration and association with state agricultural universities, KVKs, industries etc in public private partnership (PPP) mode. This becomes a challenge for the stewards of the OFMRDC to achieve the larger goal of the Government and meet the demands and aspirations of the farming community in the event of risks associated with their sustainable livelihoods due to unforeseen effects of global warming through frequent drought, flood, pest and diseases etc.

It would be our sincere endeavor to put OFMRDC in the highest position of our wish list of priority to achieve the objectives with support of the Government, industry, agencies engaged in research , development , marketing etc.

On 1<sup>st</sup> January, 2010 Government in Agriculture Department has been pleased to rename Government Implement Factory as ‘**ORISSA FARM MACHINERY RESEARCH & DEVELOPMENT CENTRE (OFMRDC)**’. Now, OFMRDC in close association and collaboration with State Agricultural University, Central Rice Research Institute, Institute of Minerals and Metals Technology and other research institutes look forward to enlarge the scope of farm mechanization in the State.

# **ORGANIZATIONAL AIMS & OBJECTIVES**

- a) Identification of improved agricultural implements developed by different academic & research institutes in Orissa like CRRI, RRL (now known as IMMT), OUAT and other ICAR institutes like CIAE, Bhopal, State Agricultural Universities, and other National & state level agencies outside the State.
- b) Identification of local implements accepted by the farmers in different agro climatic situations and refinement / development thereof.
- c) Prototype development, production and field testing and demonstration of the above identified implements.
- d) Refinement / modification through consultative process involving farmers, field officers and scientists from research & academic institutes.
- e) Finalization of prototype implements acceptable to the farmers.
- f) Preparation of engineering drawings and outlining production process of accepted implements.
- g) Approval of costing, engineering drawing and production process of the accepted implements/machinery by the State Level Technical Committee (SLTC).
- h) Batch production of accepted implements

- i) Release of production process to the approved private entrepreneurs (SSI Units) for mass production and supply against payment.
- j) Supply of technical drawings and costing to the field functionaries for quality control.
- k) Training to the field functionaries on use of different implements.
- l) Organizing seminars, workshops and State Level Technical Committee Meetings, preparation of technical literatures, booklets and conducting exhibition for wide publicity.
- m) Organizing Skill up gradation Training for Rural artisans on repair and maintenance of implements and machinery for self employment.

## **IMPORTANT ACTIVITIES OF OFMRDC**

### **RESEARCH & DEVELOPMENT**

Research and Development activities in the factory are taken up mainly for selected products on receipt of demand from farmers, feedback from field engineers and other officials. Apart from this, implements / equipment developed by this farm performing better and accepted by farmers are also included for modification / refinement suiting to the needs of our agro-ecological situations. During the process of development due importance is given to farmers feedback on drudgery and affordability, adequate field test and pilot demonstration.

The research and development activities are continuous in nature. The final product is established after vigorous test in the field and continuous demonstration at various agro-ecological situations. After successful completion of field trials and demonstrations the product is set for limited production initially at Implement Factory level before its release to the SSI units for mass production and supply to the farmers.

# **Chapter-I**

## **Introduction**

# INTRODUCTION

“India’s future is in her farms. Agriculture has the potential to accelerate growth and social development in India.” **Mukesh Ambani , Reliance Industries.**

Agriculture is the back bone of our country. There are about 70% of people of India depend only on agriculture. About 67% cultivable land present in India. Orissa is an Agrarian State. Almost 70 percent population of the State is dependent on agriculture. The agriculture sector contributes only about 16 per cent of the Gross State Domestic Product (GSDP). The State has about 64.09 lakh hectares of cultivable area out of total geographical area of 155.711 lakh hectares accounting for 41.16 per cent. Total cultivated area is about 61.50 lakh hectares.

Agriculture sector contributes about 16% of the Gross State Domestic Product (GSDP). About 65% of the workforce depends on agriculture for employment/livelihood. The average size of land holding in the State is 1.25 ha. Small and marginal farmers constitute about 83% of the farming community.

Rice is the main crop of the State. The total rice production in the State during 2012-2013 is estimated to be 94.29 lakh tons. This is the highest ever achieved in the State. The previous high was in 2007-2008, at 76.55 lakh tons.

Agricultural growth depends primarily on two main factors - institutional factors and technical factors. Institutional reforms or factors include land reform, tenancy reforms and institutional credit reforms etc. Technical factors emphasize using agricultural inputs like high yielding variety seeds, fertilizers and mechanization of agriculture.

Farm Mechanization brings a significant improvement in agricultural productivity in a number of ways. The timeliness of various agricultural operations is crucial in obtaining optimal yield, which is possible only through mechanization. Secondly, the quality and precision of the operations are equally significant for realizing higher yield. The various operations such as land

or seed bed preparation, sowing and planting, fertilizer application, irrigation application, plant protection, harvesting and threshing need a high degree of precision to increase the efficiency of the inputs as well as to reduce the losses. Farm Mechanization also goes a long way in reducing the drudgery in agricultural operations. With mechanization, there are good chances to reduce the cost of production resulting in higher margin of profit.

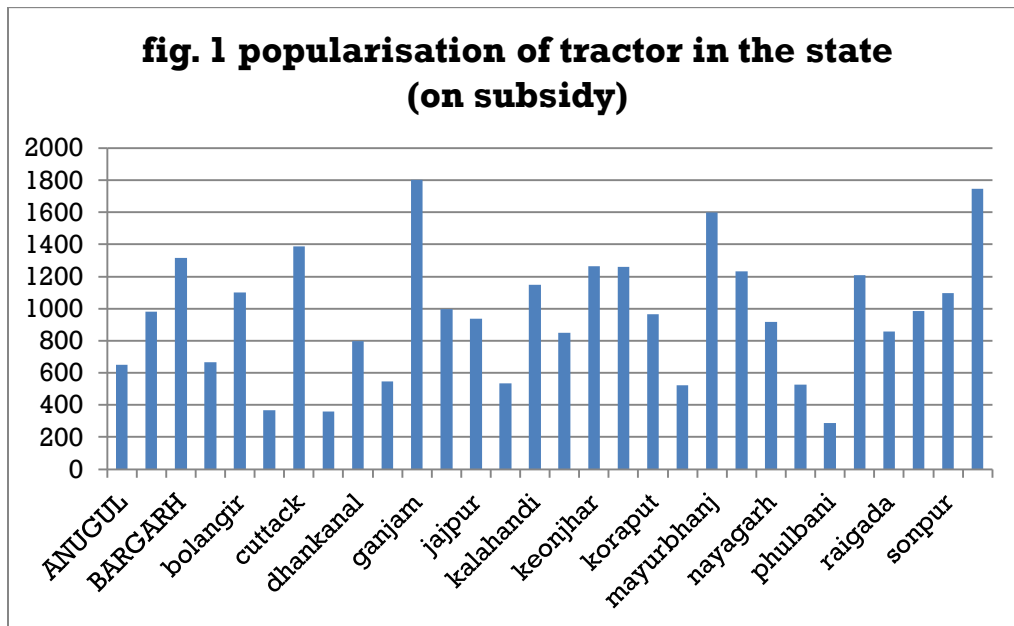
The economic advantages of Agricultural Mechanization in quantitative term can be expressed as per the following:

- Increase in productivity -12-34%
- Seed –cum Fertilizer Drill facilitates  
20% saving in seeds &15-20% saving in fertilizer.
- Enhancement in cropping intensity -5-22%
- Reduction in labour -20-30%
- Saving in time -20-30%

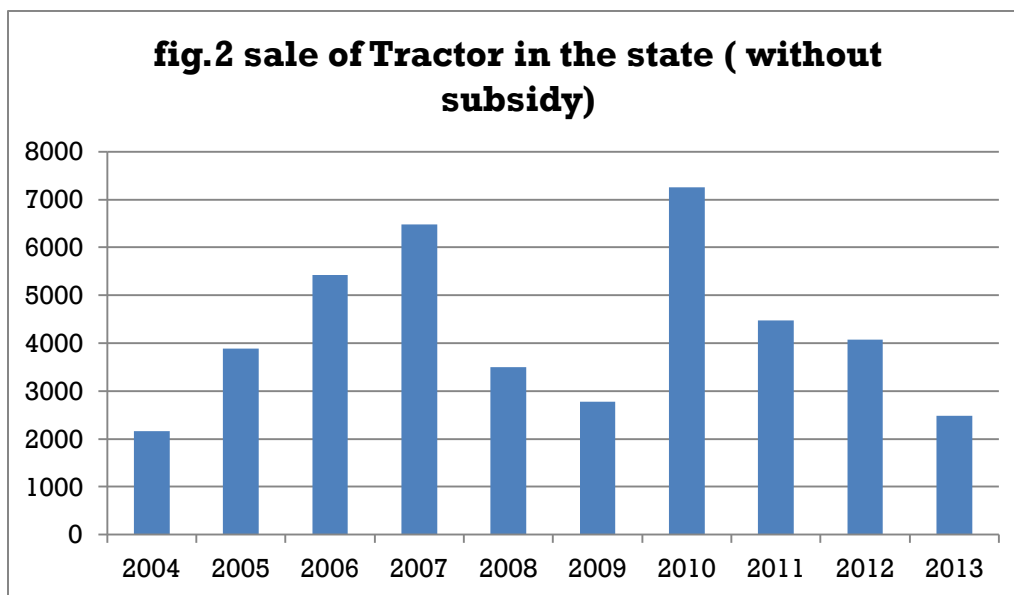
For Pattern of assistance on farm machinery, implements and equipment, State level Technical committee consisting members from Agricultural Engineering wing of Directorate of Agriculture, CRRI, CAET, RRL, EPM have been formed who verify, test, demonstrate all new machines to be introduced in the state & decide its cost and subsidy to be given to farmers. The Orissa Farm Machinery Research and Development Centre (OFMRDC) act as a testing center for all manual & animal drawn implements including power operated machines up to 5 HP produced in the state or neighboring states. This center (OFMRDC) is approved by the Government of India as a testing center and by National Council on Vocational Training (NCVT ) as a training institute.

In Orissa, Farm mechanization has reached new heights, the number of tractors sold to the farmers increased from less than 200 tractors in 1999-2000 to more than 5,000 in 2011-2012. Major manufacturers of the tractors in India are – Tafe, Eicher , Escorts, Ford, HMT, Mahindra Swaraj, New Holland, Sonalika, Johndeer

The total sale of Tractor (on subsidy) is given below:



(Source: activity report of OFMRDC)

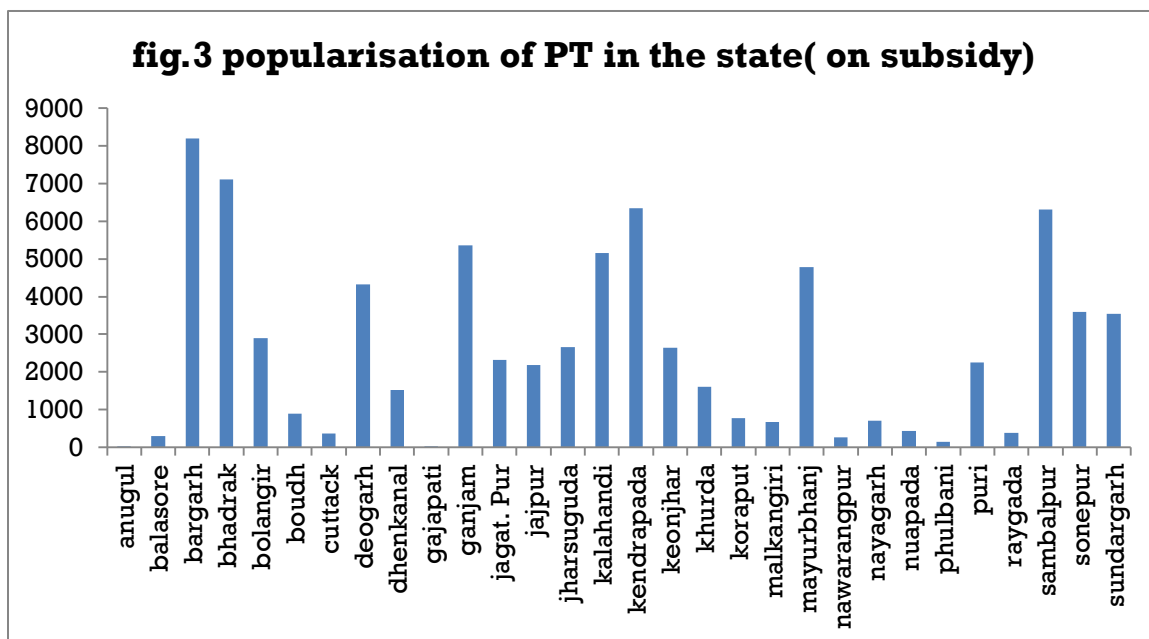


(Source: activity report of OFMRDC)

Unlike tractors, power tillers are non-controversial so far as the displacement of labour is concerned. In fact power tiller sets all such controversies at rest since it engages more labour per unit of land than tractor and bullock farms and is particularly useful in the intensive cultivation of paddy.

Farmers particularly of paddy areas which comprise 28 % of the arable land in the country face the challenging task of timely preparation of seed bed and transplanting of paddy seedlings. The existing manual labour and animal power do not deliver the quality of seed-bed which the genetically potential HYVs of paddy demand. In addition to seed bed preparation, many other operations like interculture, plant protection, harvesting, threshing, irrigation etc. can be successfully accomplished by a power tiller. Therefore, the power tiller should become a popular device in the cultivation of paddy, in particular, and other crops in general for the smaller farmers.

Orissa became the largest consumer of power tillers selling more than about 10,000 in 2013-14. Recently the VST power tillers company has made business of 109 crores only in Orissa during 2013-14. Besides VST other operators of PT in the states are KAMCO, Greves, Sarchi, Samrat, Manab, Kubota, Ganga, Shifang, Dibyashakti, Rhino, Eastern, kabi etc. The total selling of PT in the state( on subsidy) is given below:



(Source: activity report of OFMRDC)

## **1.1 STATEMENT OF THE PROBLEM**

Orissa is an agriculture based state. Most of the people are depend up on agriculture for their lively hood. Rice is cultivated in most of the part of Orissa. The climate of Orissa is very good for rice cultivation. Mechanization in farming is very much necessary to increase the productivity of Orissa. Tractor and power tiller are the power source to support the mechanized farming through which all the operational practices are done.

In other stats like UP, Punjab, Hariyana, Bihar etc the people adopt farm mechnisation to increase their productivity. Tractor is very much popular there. Then what are the reason that Orissa is lacking behind the other states in productivity. To which extent people of Orissa accept the concept of farm mechanization through tractor and power tiller. What are the different constraints for the tractor market in Orissa. Orissa is the highest seller of PT. what is the reason behind the popularization of PT. And how can we make tractor and power tiller more popular and user friendly among the farmers of Orissa.

## **1.2 OBJECTIVE OF THE STUDY**

The main objectives of the study are as follows:

- (1) To study the characteristics of different categories of adopters of tractor and power tiller in the area under study
- (2) To study the perceived attributes of PT and Tractor of rice growers in the study area.
- (3) To study the reasons of adoption as well as rejection thereof in using PT and tractors by the rice growers.
- (4) To study the extent of knowledge of rice growers about the operation and maintenance of PT and tractors.
- (5) To identify the constraints as well as scope in popularizing the concept of farm mechanization through Tractor and PT.
- (6) To suggest a suitable strategy for extrapolating farm mechanization using other farm machinery and equipments including Tractor and PT.

# **Chapter-II**

## **Review of literature**

## **2.1BRIF REVIEW OF LITERATURE**

Realizing the importance of the Agriculture sector, a series of measures have been initiated in the re-oriented State Agriculture Policy-2008 to make agriculture more lucrative with stress on scientific application of modern inputs. The mechanization scenario has gained momentum in the state. The State has the unique distinction of popularizing wide range of crop specific manual/ bullock drawn implements developed in-house compared to other states through subsidy fold. It is an admitting fact that the level of adoption of agricultural machinery in the state are low as compared to other progressive states like Punjab, Haryana, Gujrat etc . But in recent years the farmers of the State have shown positive response to own improved machinery which is evident from the increase in popularization of tractor, power tiller, threshers, combine harvesters etc.

According to a report published in New Indian Express Farm mechanization is picking up in Orissa by default. Acute shortage of farm hands is propelling the mechanization in agriculture sector, which augurs well for the State. The sale of power tillers last year in Orissa was second highest after Gujarat in the country. Against this background, the Government is also giving more emphasis to greater farm mechanization and prudent agronomic practices to boost the productivity per hectare this rabi season.

Mr. Paikaray, Head of Agricultural Engineering wing said, Orissa is the only State in the country that gives maximum subsidy over the Central farm subsidy on the mechanized farm equipments. He said the additional subsidy ranges to the tune of Rs 45,000/- to `Rs 60,000/- per implement.

Paikaray, however, admitted that poor consumption of electricity per hectare in the State suggests low use of power driven mechanized farm equipments.

Paikaray, however, admitted that poor consumption of electricity per hectare in the State suggests low use of power driven mechanized farm equipments.

The current power consumption per hectare in Orissa is only 1.02 kilowatt/hectare against 3.5 kw/hectare in Punjab. It also indicates that farm mechanization is limited to a select group of farmers in Orissa.

High marginal farmer base in Orissa is proving major stumbling block for increased farm mechanization, admitted Paikaray. To overcome this, the Agriculture Ministry is trying to boost the use by adopting the custom hiring model for marginal farmers in a big way, he said.

Custom hiring means sharing of farm equipments like tractor, seed drill, reaper, combine etc with others on rental basis. This is feasible because, a power tiller can till over 3 acre per day and the average landholding size here is below 3 acres.

The FAO comments that lack of mechanics in rural Orissa is reducing the use of mechanized equipments. Paikaray said the government is providing training to village unemployed youths through State Employment Mission to address the problem.

According to a report, A record number of 2,170 tractors were sold under farm subsidy scheme in the last financial year as against Government target of 1,500. Never before in the agriculture history of the State, such a large number of tractors were sold in spite of Government subsidy. However, this was possible due to significant increase in the rate of subsidy, said Director of Agriculture and Food Production Arabinda Padhee. Prior to the last kharif, the subsidy on the purchase of tractor was limited to Rs 45,000. The subsidy amount was doubled last year to Rs 90,000 and this is definitely the major motivating factor for the farmers to own a tractor.

Similarly, the sale of power tiller has gone up. Under farm subsidy, 7,762 power tillers were sold in the last fiscal year as against a target of 5,529.(expressbuzz.com).

The survey report of M. A. QUAYUM AND AMIN MUHAMMAD ALI on the topic of Adoption and Diffusion of Power Tillers in Bangladesh shows that, the reason behind the adoption of these machineries are: shortage of labor for land preparation, easy to reduce the cost, easier and faster to land preparation, rent out/custom work, social prestige, reduce drudgery, shortage of draft power and difficult to care for bullocks.

# **Chapter –III**

## **Materials & methods**

## **3.1 METHODOLOGY**

The present study is an empirical study basically based on the primary data but secondary data have also been collected from various published and unpublished sources as per the requirement of the study .For collection of primary data, an exclusive survey was conducted in Balasore district of Orissa by targeting customers from all the five DAO CIRCLES of the district. To obtain information a structured questionnaire was formulated including both close as well as open ended questions. Based on the results of pilot studies final interview schedules were finalized for farmers. These questionnaires were filled by the researcher by face to face interaction with the respondents.

## **3.2 SAMPLING:**

As the study is based on primary data collected from farmers from the rural area, the researcher faced lot many problems during the process of collection of data. Farmers leave their homes early in the morning and return back late in the evening. Thus the availability of the respondents was the crucial issue due to odd working hours of the respondents. . In view of the above problem, convenience sampling method was adopted, though enough care was taken to make the sample representative to the population.

## **3.3 SAMPLING UNITS**

One farmer has been considered as one sampling unit for the purpose of the collection of primary data.

## **3.4 SAMPLE SIZE**

The size of sample is 150 units consisting of 30 units from each DAO CIRCLE (mentioned below) of the district.

- Balasore (Baleswar, Sadar, Ramuna, Basra)

- Nilagiri (Nilagiri, Oupada)
- Soro (Soro, Bahanga)
- Jaleswar (Jaleswar, Bhograi, Baliapal)
- Simulia (Simulia, Khaira)

### **3.5 DETAILS OF THE STUDY AREA**

The scope of the study is Balasore district of Orissa. Balasore, a coastal district on the north-eastern border of Orissa, has the distinction of having been called the “Granary of Orissa” with stretches of green paddy fields, a network of rivers, blue hills, extensive meadows and an extraordinary beach.

Balasore situated on Mahanadi Deltaic region can be divided into three sub-micro regions viz Balasore coastal plain, Lower Suburnarekha Basin and Nilgiri upland. Lying between 21003’ and 21059’ North latitude and 86020’ to 87029’ East longitude, Balasore is bounded on the north by Midnapore district of West Bengal, on the east by the Bay of Bengal, on the south by the district of Bhadrak and on the west by the districts of Kendujhar and Mayurbhanj.

Extending over an area of about 3,806 sq. km which covers 2.44 per cent of total area of the state, it ranks 20th among the districts of Orissa in size. The district of Balasore is constituted by **5** towns and **2952** villages spread over **12** blocks and 2 sub division. The district map is shown below:

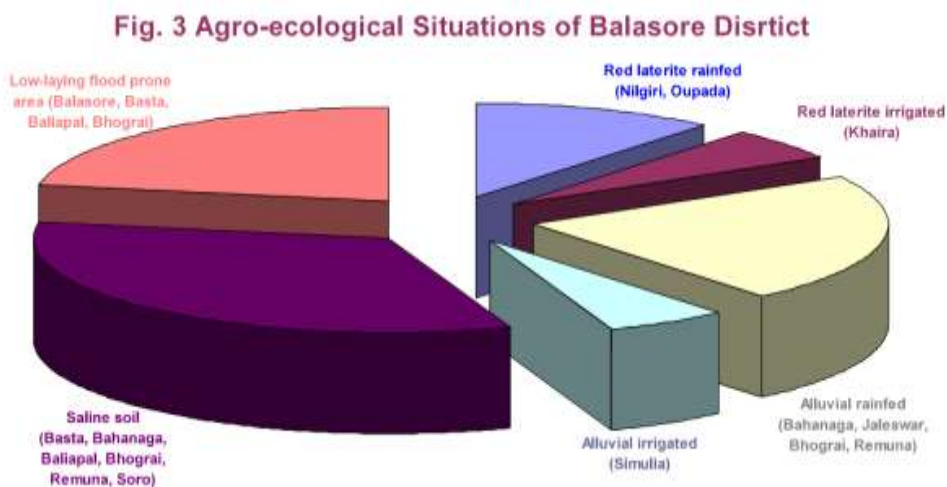
**Fig.4 district map of Balasore, Orissa**



The soil of Balasore district is mostly alluvial lateritic. The soil of Central region is mostly clay, clay loam and sandy loam which is very fertile for paddy and other farm produces. Nilgiri Sub-division is mostly gravelly and lateritic soil, which is less fertile. A small strip of saline soil is also seen along the extreme coastal part of the district.

According to the agro-ecological situation of the district it is divided in to 6 major agro-ecological region. The fig. is shown below:

**Fig.4 Agor Ecological situation of Balasore district**



Balasore, the coastal district of Orissa is crisscrossed with perennial and estuarine rivers because of its proximity to sea. Two important rivers of Orissa , namely :- Budhabalanga and

Subarnarekha have passed through this district from west to east before surging into the Bay of Bengal. The normal rain fall of the district is 1592 mm. beside that, the irrigation system in Balasore district is very much widespread.

Besides all these facilities now Balasore saw a downtrend with the paddy production. According to a report (The New Indian Express) natural calamities hampered agricultural production there by affecting the socio economic condition. As per the official records, once upon a time , paddy was being cultivated in around 3 lakh ha (both rabi and kharif crop) .As on today when the crop land has decreased to 2.69 lakh ha , paddy is being cultivated in 2.21 lakh ha. Production also has witnessed a downtrend in paddy cultivation registering on an average 33 quintal per ha. Against 35 quintal earlier.

To address this problem, farmers should get latest farm mechanization, quality seeds, fertilizers, appropriate cropping strategy, storage facility and marketing linkages under the PILOT project of NABARD. The production of paddy in the district Balasore is 5526088 quintal in the year 2013-14. To increase the production level people adopt different kinds of farm machinery, like Tractor and Power Tillers. It not only saves their money but also saves their time. So that in the block like Baliapal, Basta, Bhograi and Jaleswar they cultivate paddy 3 times in a year where as in the other blokes they only go for 2 times paddy ( rabi and kharif). The other reason for the three time crops is the developed irrigation system of this district. If we go for the previous year records- In power tiller Balasore is the highest selling district in Orissa.

# **Chapter-IV**

## **Result & discussion**

### **Objective-i**

Indian agriculture is characterized by overwhelmingly small holdings due to higher population density and nearly two-third of its population residing in the rural areas coupled with unabated land fragmentation due to the inheritance laws of the country.

The per capita availability of cultivated land was 0.39 hectares in 1950-51, which declined to 0.13 hectares in 2006-07. During 2000-01 there were 40.67 lakh operational holdings in the state out of which marginal and small holdings accounted for 83.8 %, medium 15.9% and

large, less than 1% of the operational area. The average size of holding is only 1.25 ha. The size of operational holdings along with poverty of people poses a big problem in the agricultural growth of the State. The marginal farmers, constituting more than 50 % of the farmers, either own or rent a piece of land for cultivation. The crop intensity is 144%. Because of the endemic poverty, the farmers cultivate their crops with little inputs and hence crop production is low. In this backdrop, besides enhancing capacity, increase in productivity per unit land area and cropping intensity holds the key to agricultural development.

The total population of the district Balasore is 2321000 nos. out of which 1135000 nos. male and 2321000 nos. of female. 2667000 nos. of people live in rural areas. The percentage of rural population of Balasore is 89.08% of the total population. The no of total house holds are 403,653. 18.84% of the total population are of scheduled cast and 11.28% are of scheduled tribe. The category wise selling of tractor and power tillers (2013-14) in the 5 DAO CIRCLES of the district Balasore are given below.

**NO.OF PERMIT ISSUED & TARGET OF DAO CIRCLES, DISTRICT BALASORE  
FOR THE FINANCIAL YEAR 2013-14 SCHEME**

S.L NO	DAO CIRCLES	IMPLIMENTS	GEN. TARGET	GEN. ISSUE	SCP TARGET	SCP ISSUE	ST TARGET	ST ISSUE
1	BALASORE	TRACTOR	35	35	15	13	3	1
		POWER	210	210	298	292	120	109

		TILLER						
2	JALESWAR	TRACTOR	36	34	30	5	8	0
		POWER TILLER	80	65	187	167	100	82
3	NILAGIRI	TRACTOR	29	21	8	2	8	3
		POWER TILLER	155	140	50	38	65	53
4	SORO	TRACTOR	32	28	25	18	0	0
		POWER TILLER	147	142	130	118	15	8
5	SIMULIA	TRACTOR	27	19	15	7	0	0
		POWER TILLERS	129	128	55	45	10	4

## Objective-ii

### STUDY OF DIFFERENT ATTRIBUTES:

#### POWER TILLERS:

The Power Tiller is one of the important machines that augment farm mechanization. Unlike tractors, power tillers are non-controversial so far as the displacement of labour is

concerned. In fact power tiller sets all such controversies at rest since it engages more labour per unit of land than tractor and bullock farms and is particularly useful in the intensive cultivation of paddy. It is more popular in Orissa just because the majority of farmers are small with land holding below 2 hectare who can hardly afford costlier tractors.

Farmers particularly of paddy areas in the state face the challenging task of timely preparation of seed bed and transplanting of paddy seedlings. The existing manual labour and animal power do not deliver the quality of seed-bed which the genetically potential HYVs of paddy demand. In addition to seed bed preparation, many other operations like interculture, plant protection, harvesting, threshing, irrigation etc. can be successfully accomplished by a power tiller. Therefore, the power tiller has become a popular device in the cultivation of paddy, in particular, and other crops in general for the smaller farmers.

### **Other Advantages of power tiller:**

1. Cost wise the power tiller should be an obvious choice of small farmers, if they are intending to have a mechanical power source for farm- operation. Today the average cost of a power tiller is ₹95,000/- after subsidy. The cost of a matching mould board plough, tiller, pumpset, sprayer, thresher etc. will amount to ₹25,000/-. Correspondingly, the cost of trailer will amount to ₹ 15,000/-.
2. The maintenance of the power tiller is easy.
3. It is ideally suited for mechanizing small farm holdings which account for 80 % of the farm holdings of the country.
4. It is well recognized that paddy is one of the most difficult crops to grow. Puddling and the other tillage operations by the power tiller helps a great deal to minimize the operational vagaries by more than half and increases the yield. The power tiller is therefore, a real friend of farmers in increasing the production of paddy crop.

5. The light weight of the power tiller is a favorable factor for working in wet as well as dry land conditions. It creates the least disturbance of soil structure, can cross over the bunds separating the small holdings, does not sink in wet paddy fields, can climb steeper hill slopes and conveniently operates in bench terraces and can manoeuvre the narrow pathways of rural areas.

6. Power Tiller reduces the drudgery of long walking in the field during operations as compared to operations by bullocks. For example where ploughing by bullocks and country plough may take 20 - 25 kms of walking to complete an acre, the power tiller may take 3 - 4 kms of walking to complete the same area.

7. Power tiller demands less body effort as compared to operation by bullocks. The bullock implements require the hand and body pressure to achieve depth and alignment of the implement in use, whereas, in power tiller the implements are mostly self guided. This reduces human drudgery to a great extent.

8. The comparative higher output of operation by the power tillers as compared to bullocks reduces the operational time and achieves timeliness in operation.

9. Learning to operate a power tiller is much easier as compared to tractor and does not require driving license.

10. Power Tiller farmers tend to have more diversified cropping pattern than in control farms.

## **TRACTOR:**

A tractor is a farm vehicle traditionally used to mechanize agricultural tasks such as tillage & haulage. The tractor has come a long way since its humble beginning as a steam engine on wheels during the early 19<sup>th</sup> century. Today, tractors are used for ploughing, planting, spraying, harvesting, threshing, digging etc. Modern tractors can be used for a variety of tasks including routine lawn care, landscape maintenance, moving or spreading fertilizer and clearing bushes. The attributes which popularize tractor amongst the farmers are:

## **Wide Range**

There is a wide range of tractors available today, each suitable for a specific task. If you need to work on a large garden or an extensive area of field or pasture, a subcompact or compact tractor will fit heavy duty landscaping jobs and tasks like digging, hauling or ploughing. A subcompact tractor is a smaller version of a compact tractor. It has the power and versatility to perform a large range of gardening tasks including mowing, moving mulch and tilling gardens. A compact tractor is a smaller version of the utility tractor and is ideal for landscaping tasks. Subcompact and compact tractors have a horsepower that ranges from 15hp to 50hp.

If you have a small farm and need to mechanize more complex farming tasks, then you will need a utility tractor. Utility tractors come in different models and offer a horsepower that ranges from 45hp to 110hp. Utility tractors are also known as diesel tractors because diesel is typically used to fuel these large tractors. There is also a wide range of farming implements that can be attached to utility tractors to help you accomplish a variety of tough jobs on the farm.

## **Versatility**

Tractors are now designed and manufactured to be versatile so that a single tractor can perform a wide range of tasks. For instance, a compact tractor can accomplish tasks that range from gardening to simple farming jobs. You can also attach implements to a compact tractor such as front loaders or back hoes to perform an even wider range of jobs.

## **Power and durability**

Tractors are also typically designed to run over rough terrain and pull extremely heavy loads. The engine generates a large amount of force to get the tractor to run and perform its tasks, making it effective in tough farming or landscape tasks. Modern tractors also come with cast iron front axles for extra strength and durability, so you can rely on your tractor to perform under tough conditions.

## **Ease of transmission and operation**

You might find a manual transmission on a tractor difficult to use, but features of modern tractors such as powershift transmission and hydrostatic transmission make operation

much easier. Powershift transmission facilitates smooth shifting through 8 gears in low range and 8 gears in high range while hydrostatic transmission allows for effortless changes in direction. Modern tractors also provide power steering to make turning much easier. Some more advanced models are also able to reduce operator fatigue with exclusive shift controls and an automatically responsive transmission.

### **Ease of installing gardening and farming implements**

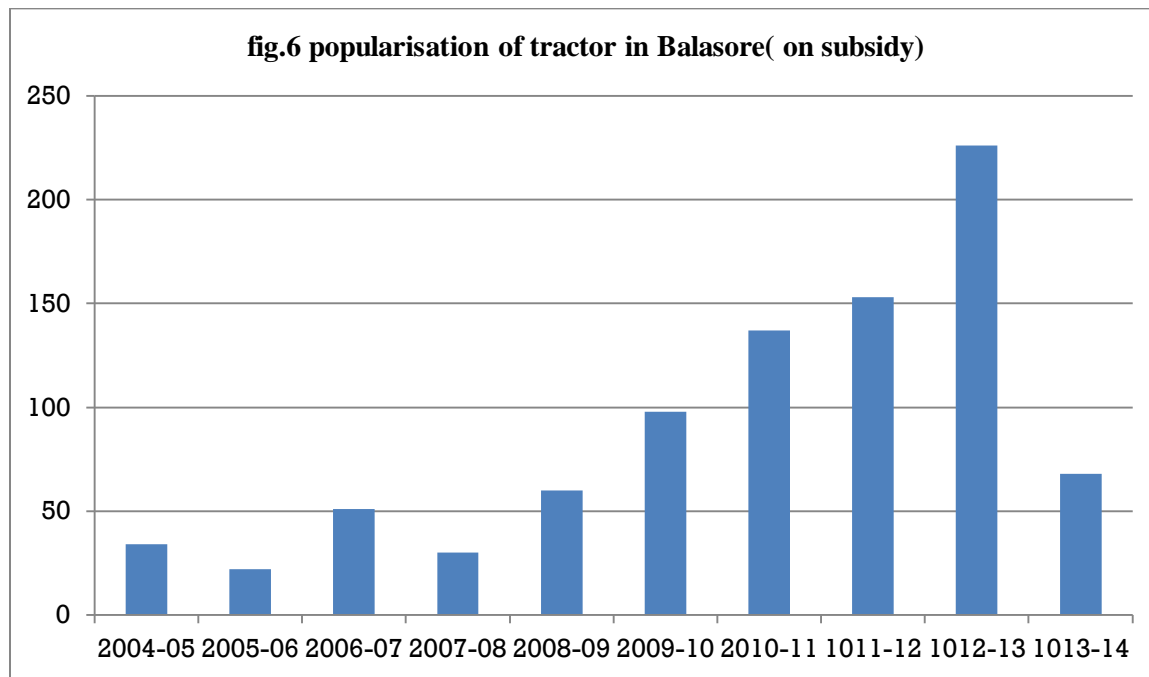
A variety of gardening and farming implements including a front end loader attachment or a back hoe can be installed on to a tractor, so that it can perform a wider range of tasks. A tractor may have three-point hitches and a power take-off or PTO. A three-point hitch attaches an implement, secures it in place and also lifts and lowers the implement. The PTO is a shaft that goes from the tractor to the implement and transfers the tractor's engine power to it. Gardening and farming implements are considered heavy equipment so it requires appropriate knowledge and training before installing and using it.

## **Objective –iii**

Production of tractors began in India in 1961. Eicher Tractors was the first company to produce tractors from its unit at Faridabad in erstwhile Punjab. During 1961– 62, India produced 880 tractors. During 1986–87, the total population of tractors in the country was 80,369 and this reached to 2,78,556 during 1999–2000. From 1986–87 to 1999–2000, there has been in general a rising trend in production and sale of tractors after which there has been a slight decreasing trend in production of tractors, which has again picked up during 2003–2004. Tractors are manufactured in the organized sector. Currently, there are about nineteen

manufactures of tractors in India. Mahindra & Mahindra is the largest tractor producer in the country having a market share of over 25%. Tractors are mainly used in the States like Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Haryana and Gujarat. These six States together account for 78% of the total tractor population of the country. Punjab has the highest density of tractors in terms of gross cropped area.

The following graph shows the popularization of tractor in the study area:



(source: activity report of OFMRDC)

### **Cause of adoption:**

- Shortage of labour for land preparation
- Cost effectiveness
- Bullocks are sold
- Cultivate own land
- Rent out/custom work
- Social prestige
- Timely planting
- Better land preparation
- Reduces drudgery
- Shortage of draft power

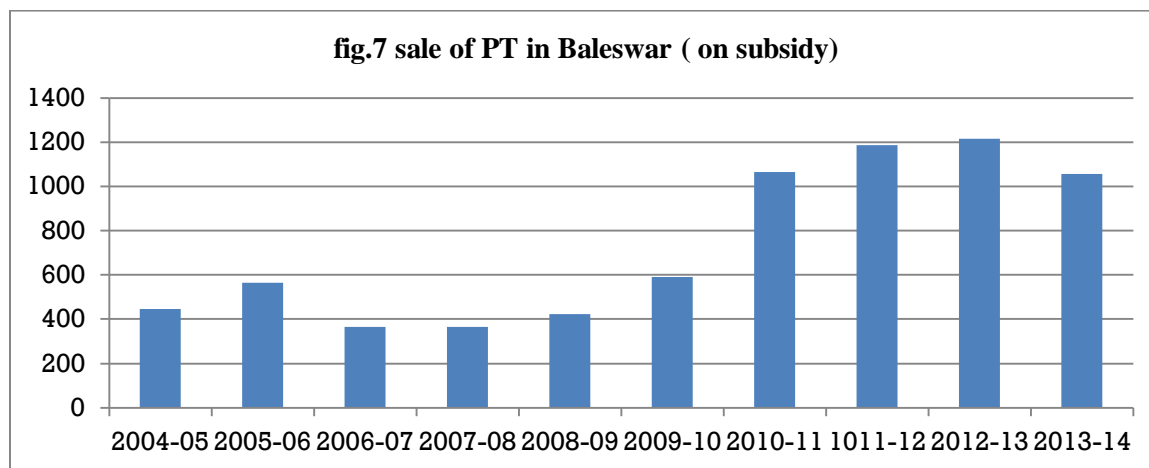
- Commercial use

### **Cause of rejection:**

- It is much more expensive for a small farmer.
- Small land holdings.
- Lack of knowledge of different operations of tractor.
- Non availability of easy credit.
- Non availability of well matched implements.
- Lack of knowledge of maintenance and repairing.

Hand tractors / power tillers were introduced in the country by importing a few models in 1961–62. Their indigenous production was started in 1965–66 by manufacturing 329 power tillers, it increased to 10,500 power tillers in 1995–96 and the same has touched 15,849 during 2003–2004. Hand tractors can be used for agricultural operations, transport purposes and stationary application for operating irrigation pumps, threshers, plant protection equipment etc. besides their suitability for wet land cultivation. Hand tractors presently being manufactured in the country, are in the range of 5 to 12 hp, suitable, mainly, for wet-land cultivation and in the plains. A light weight power tiller which could be useful for the hilly and terrace farming in the country would find place in the country. Besides that, there also exist power tillers up to 15 hp, which are also being imported. Orissa is the highest adaptor of PT. Normally the farmers in Orissa are small and marginal farmers. It is very difficult to finance for a tractor for them. As we know that PT are normally very good for wet land cultivation. In the district Balasore the irrigation facility is very much developed. The farm land here is also plane. In some places of Balasore the farmers go for three times paddy in a year. For them it is very easy and good to have a power tiller. Paddy is not only one crop cultivated in Balasore. There are also vegetables, rasi, jute etc. where Power Tiller plays a great role and it is more beneficial for the farmers of Balasore as compared to Tractor.

The following graph shows the popularization of PT in the study area:



(Activity report of OFMRDC)

## Reasons for purchasing power tillers in the study areas

- Shortage of labour for land preparation
- High labour cost
- Easier and faster land preparation
- Difficult to care for bullocks
- Bullocks are sold
- Cultivate own land
- Rent out/custom work
- Social prestige
- Timely planting
- Better land preparation
- Reduces drudgery
- Shortage of draft power

## CAUSE OF REJECTION OF POWER TILLER:

- non-availability of 3 to 5 hp low cost power tillers
- rising of selling price
- lack of confidence in farmers due to absence of training and after sales service
- Non-availability of well matched implements.
- Shortage of service center.
- People still continuing with the traditional method (bullock power).

## **Objective-iv**

### **MAINTANANCE PRACTICES OF TRACTOR:**

The tractor plays a significant role in mechanised agriculture. To keep it working for a long time at a minimum cost, it requires an adequate and timely maintenance.

To make your tractor efficient and cost effective, avail the services of a skilled mechanic, use the right grade of oil and genuine spare parts.

### **Daily / Everyday (After 8-10 hours of work)**

1. Check the level of oil in the engine. It should be done 15 minutes after the engine has cooled down. If found deficient, the level should be replenished with engine oil of the right grade.
2. Check the water of the radiator and refill it.
3. Clean the air cleaner and check the oil level. If it is less, fill it to the required level. Fill clean oil in case the existing oil has become dirty.

### **Weekly (After 50-60 hours of work)**

1. Repeat the daily maintenance measure.
2. Check the air pressure in the tyres. If the pressure is low, get the necessary air.
3. Check the elasticity of the fan-belt under the pressure of the thumb. It should stretch to a degree of 12 & 18 milli-meters.
4. Clean the air pressure and fill it with an oil of the right grade.
5. The water stored in the oil filter should be drained out by the drain plug.
6. Check the water-level of the battery. If water is found below the limit, fill it with distilled water.
7. Check the level of the oil in the gear box.
8. Apply grease to the clutch shaft and bearings, brake control, bearing of the fan, hub of the front wheel, tie rod and the radius cross, etc.

### **After a fortnight (120 to 125 hours of work)**

1. Repeat the weekly schedule of maintenance.
2. Apply oil to the Dynamo and the starter.
3. Clean the carbon in the smoke-tube.
4. Change the engine oil. To do so, keep the tractor in starting position for a while and then switch it off so as to heat up the entire oil, then drain out the oil through the drain plug and fill fresh and clean oil of the right grade.

5. In case the oil filter is made of paper, element, cloth, felt, etc. change them. Clean the metallic oil filter.

6. Check the feel play of clutch and brake, it should be 15mm long. Adjust it according to the need.

### **Monthly (After 250 hours of work)**

1. Repeat every step of fortnightly maintenance.

2. If it is advised to clean the primary diesel filter, (in the manual supplied with the tractor) clean it or change it.

3. Wash the filters of the tap of the oil-tank.

4. Check the water in the battery. If its relative density is below the mark, change the battery.

### **After two months (500 hours of work)**

1. Follow the monthly schedule of maintenance.

2. Change the other element of diesel filter.

3. Get the injector and diesel pump checked either by an authorized dealer or an experienced mechanic.

4. Contact your authorized dealer or an experienced mechanic for the inspection of valve.

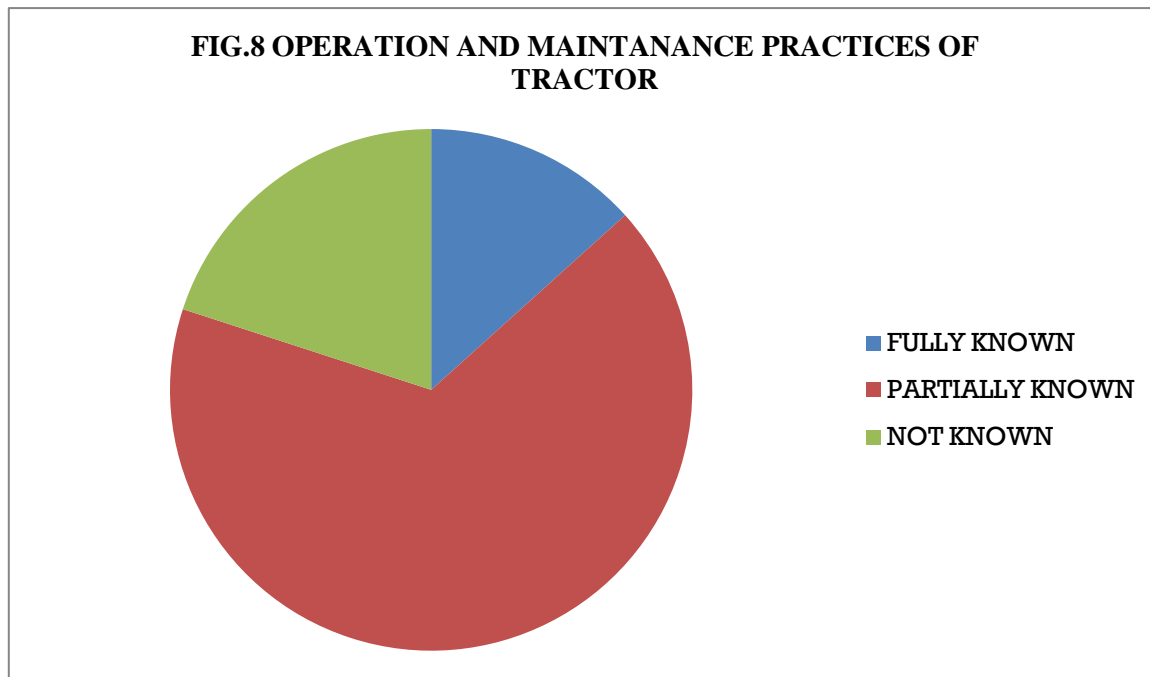
5. Get the dynamo and the self starter inspected.

6. Open the oil tank and clean it.

### **After four months (100-1200 hours of work)**

1. Follow the bi-monthly maintenance schedule.
2. Drain out the oil of the gear box and fill it with a clean oil of the right grade.
3. Drain out the oil of the back-axle and fill clean oil.
4. Change the oil of the Belt-pulley.
5. Clean the filter of the Hydrolic pump.
6. Change the steering oil.
7. Change the grease of the front wheel.

The following figure shows that how much the farmer of Balasore know about the different operations and maintenance practices of tractor:



(Source: Field Study)

About 66% farmers from the respondents are partially known the operational and maintenances practices of tractor. The reason behind it is lack of proper training and knowledge. They just follow the other farmers who are using tractor for their farming activities. Only about 13% respondents fully know those practices. And about 20% respondents are still not aware of about the different operational and maintenance practices of tractor. These are those farmers which are still not adopting any kind of farm machinery. They are still using the bullock power for cropping their fields.

### **OPERATIONAL PRACTICES OF PT:**

From the very word "power tiller", one can make out that there is a tiller which is powered. In this case the tiller is powered by an internal combustion engine and so is the name derived. A power tiller is a tractor with a difference. It is not a four wheel tractor but a two wheel tractor with a rotary tiller more commonly known as rotavator. The power from the engine is transmitted to the drive wheels and the rotavator through "V" belts, chains and sprockets and gear trains. Because of two wheels, an operator generally has to walk behind the power tiller to guide the direction of travel for various operations. There are hand clutches to engage and disengage power to the wheels and the rotavator unit. Depending upon the mode of operation, three types of power tillers are there -

➤ Pull Type -

The power tiller which pulls different types of implements.

➤ Tilling type-

The power tiller which uses an engine power driven tilling device, such as rotary and crank or screw blades.

➤ General purpose Type -

The power tiller which can be used for a number of farm operations, including the types defined under pull type and tilling types. The power tiller now being marketed in our country belongs to the general purpose type. Some of the special features of power tillers are as follows :

1. Because of smaller size, two wheels and limited constructional arrangements, the power tiller becomes one of the lightest yet most effective farm power sources. Since it has only two wheels, it has to be balanced to stand with the help of an implement attached to it for the desired operation. Its operations are controlled by an operator through its extended handles by walking behind it.

2. One of the special features of a power tiller is that it's both the wheels can do two jobs at the same time. It makes the power tiller move forward through traction of its wheel with the ground and at the same time change the direction as operator desires. It has such an unique arrangement of gears and clutches that while the drive wheels continue to act to push the power tiller, it can be made to turn freely about one of the wheels. As a result of this arrangement the power tiller takes the least space to turn and manoeuvres in the smallest and irregular shaped fields with great ease which the bullocks or tractors can rarely do. In other words, it is a great saver of time and expenses on field operations.

3. In Orissa where paddy in small holdings is predominant, emphasis was laid on rotary tilling of wet paddy fields which has been acknowledged as ideal for puddling operations. For this reason the rotary tilling arrangement has been made an integral part of the power tiller. The puddled soil through single rotavation settles well and makes transplanting of paddy seedlings easy. The use of rotavator is also highly effective in mixing the green manuring crops, crop-residues, fertilizers and manures. When the rotavator is in use, power tillers derive automatic stability during field operation and become ease for the operator to operate. It must be noted that the rotavator can be used not only in the wet paddy fields but also in dryland conditions with a separate design blades. The design of blade for dry rotavation are such that a single rotavation for preparatory tillage can suffice the need for ploughing, harrowing and even planking. After single operation of rotavator, the seed can be sown directly for most crops. This remarkable feat can only be achieved by a rotavator. This makes the seed bed preparation cheap and less time and energy consuming for many crops. Indian Standards Institution (ISI) also has published standard (6690-1972) for rotavator blades to provide information to users regarding the blades that can be used for different crop and soil conditions.

## Operational Capability

Given the right set of matching implements and attachments, the power tiller is capable of performing most of the field operations be the stationery or mobile type. Its capability in particular for wetland paddy cultivation is unique, which no other machine or animal power can equal. The capability of power tiller in general, for performing different operations can be summed as follows:

1. For wetland paddy cultivation, the power tiller can puddle the fields with rotavator and cage wheels much more uniformly and would give atleast 8 times higher output in a day than bullock operated puddling. The cage wheel, in particular, provides a floating effect to the power tiller in wet paddy fields, in addition to puddling the soil.

2. Power Tillers are capable of performing operations right from primary tillage to transportation of crops which may include ploughing, harrowing, cultivation, planking, ridging and furrowing, sowing, fertilizer application, pumping water, interculture, plant protection, harvesting, threshing and lastly the transport operation. In short the power tiller can render all these services for many types of crop production. Table - 1 would provide an idea about the various capabilities and output of a power tiller

**Table 1 - Operational Capabilities of Power Tiller**

Sr. No.	Operations	Attachments	Average output/day (8 hrs. working)
1	Land Levelling	Leveller	Depends upon the extent of earthwork required.
2	Seed bed preparation	Rotavator Mould board Plough Harrow Planker	2 acres 1 acre 2 acres 3 acres
3	Puddling	Rotavator, Cagewheel & Planker	2 acres
4	Ridging	Ridger	3.5 to 4.0 acres

5	Sowing	Seed Drill Seed cum Fertilizer drill Planter	3 acres 3 acres 3 acres
6	Interculture	Tiller Weeder	3 acres 3 acres
7	Plant Protection	Sprayer Duster	3 acres 3 acres
8	Pumping Water	Centrifugal Pump	400 lpm at 15' head
9	Reaping	Reaper	2.5 acres
10	Mowing	Mower	2 acres
11	Harvesting of pulse crop	Harvester	2 acres
12	Sugarcane stump shaving	Sugarcane stump shaver	2 acres
13	Tuber crop harvesting	Potato Digger Groundnut Digger	2 acres 2 acres
14	Threshing	Thresher	Wheat - 16 Q Paddy - 30 Q Jowar/Bajra-45Q
15	Winnowing	Winnowing	100 Q
16	Haulage	1 Ton Trailer	15 kmph (max speed)
17	Other stationery operations	Flour mill, Huller, Flaking machine, Chaff cutter, etc.	Matching to the HP of the engine.

#### **MAINTANANCE OF PT:**

A power tiller is a hardworking implement that makes short order of turning over the soil in your garden. But because its primary work environment is extremely dirty, rocky and muddy, a power tiller requires a few basic maintenance steps to keep it running at its best.

## **Keep It Clean and Sharp**

First, and most important, keep your power tiller clean. After every use, hose off the tiller and inspect it, giving special attention to the tines. If any stones have become lodged between the tines, remove them. Over time, the tines themselves will become dull and need sharpening—you'll know it's time to sharpen if the tiller does not easily cut through soil. If you own a lighter mini-tiller or a small front-tine tiller, flip it onto its side with the gas tank facing up and use either a mill bastard file or a home-and-garden file to sharpen the blades. If you have a large tiller, don't attempt to turn it over; instead, remove the blades and clamp them in a vice before sharpening them with a file. If vines or roots are wound around the axle, cut them off.

## **Change the Oil and Air Filter**

The oil and air filter need to be changed on a regular basis. To change the oil (which should be done every 50 hours of operation or at least every spring), look for the drain plug near the bottom of the oil reservoir. (Different engine manufacturers place the drain plug in different locations.) While the engine is warm but not hot to the touch, remove the drain plug and drain the old oil into a container (dispose of the oil in an environmentally acceptable manner). Replace the drain plug and fill the tiller's oil reservoir with the appropriate amount of the recommended grade of oil, as specified in the tiller's manual. Start the engine and let it idle for 30 seconds. Stop the engine, wait another 30 seconds, and recheck the oil level. If the level is still a bit low, add additional oil in small increments until the oil reaches the full mark on the dipstick.

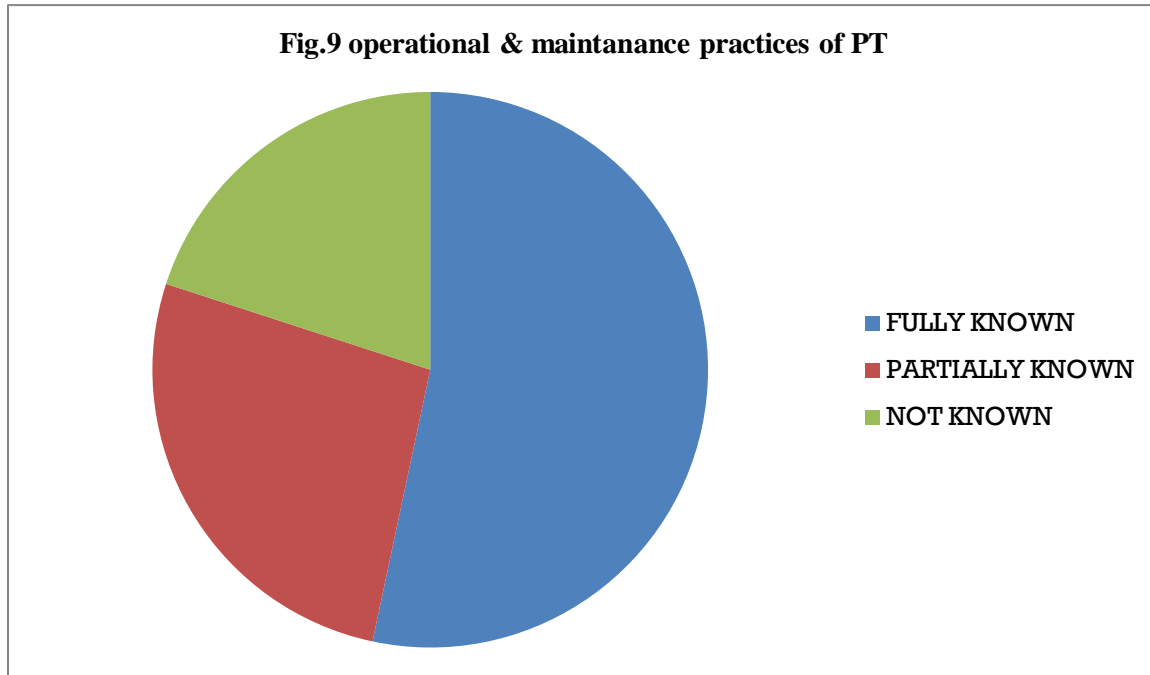
To replace the air filter (which should be done after 18 to 20 hours of operation or at least once a year), first consult the power tiller's owner's manual to see what model of filter is required. Most air filters are enclosed in an easy-to-remove metal or plastic housing. Simply remove any screws that hold the housing in place and swap the new air filter for the old one.

## **Shut It Down for the Season**

At the end of the gardening season, run the gas tank dry before you store the tiller. If you can't run it dry, add fuel stabilizer to the remaining gasoline and run the engine for approximately 30 seconds before shutting the power tiller down for storage. And remember to always store your power tiller in a dry, shady area such as a garage or shed, as sunlight can break

down rubber parts like tires and fuel lines, and moisture will lead to rust on any metal parts. Properly cared for, a power tiller will provide years of reliable service.

The following figure shows that how many farmers in Balasore district are aware off of different operational and maintenance practices of PT.



(SOURCE: field study)

The above figure shows that only 20% farmers are not aware of of different operational and maintenance practices of PT. these are the farmers who are not using tractor or PT. about 53% farmers are fully know the different practices. It is possible because of the wide adoption of PT in Balasore. Using regularly they know how to operate it and how to maintain it properly, to maintain the life span of the PT. Rest 26% farmers are those farmers who are using PT by seeing the others.

## Objective-v

### DIFFERENT CONSTRAINTS OF FARM MECHANISATION:

The main concept of farm mechanization is to apply the principles of engineering and technology to do the agricultural operations in a better way to increase crop yield. This includes the development, application and management of all mechanical aids for field operation, water control, material handling, storage and processing. Mechanical aids include hand tools, animal drawn implements, power tillers, tractors, engines, electric motors, grain processing and hauling equipments.

It is true that farm mechanization has shown good results as of raising the agricultural production and improving the standard of living of cultivators within very short period. But a number of arguments have been advanced against farm mechanization in the study area, such as:

1. Small size and scattered holdings of the farmers stand in the way of mechanization. As a result of this, farm machinery generally remains underutilized.
2. Majority of small cultivators are poor who are not in a position to purchase the costly machinery like tractors, combine harvesters etc.
3. The use of tractor operated machinery may render some of the draft cattle population surplus. Studies under AICRP on Energy Requirement indicate that tractor owning farms do use draft animals for certain jobs. Like-wise farms using animate sources of farm power, use tractor on custom service for certain jobs.

4. The farm machinery have large turning radius and thus require comparatively larger farm for economical use. Mechanization may lead to structural change in agriculture in respect of the occupational distribution in the rural economy. No doubt, the increasing farm mechanization is going to increase employment in secondary and tertiary sectors but it does displace labour in farm operations

5.Lack of proper knowledge of farmer to purchase farm machinery, operate and maintain it properly leads to wrong choice, makes it uneconomical and risky too.

6.There is great shortage of diesel in the country as a whole. Thus, to use so extensive oil based farm machinery is not desirable.

7.The lack of repair and replacement facilities especially in the remote rural areas is another hindrance in efficient small farm mechanization.

8. Due to the seasonal nature of the agriculture, the farm machinery remains idle for much of the time. Thus, idle machinery means unnecessary high costs unless proper alternate use of such machinery in the off-season is made.

## **SCOPE OF FARM MECHANISATION:**

Tractor and power tiller both are the farm power which are the essential input in agriculture for timely field operations for operating different types of farm equipment and for stationary jobs like operating irrigation equipment, threshers/shellers/cleaners/graders and other post harvest equipment. In an agrarian state like Orissa there is a huge scope for farm mechanization.

1. Introduction of high yielding variety(HYV) of different seed open up new root for farm mechanization in Orissa.

2. Irrigation system of Orissa is developed day by day. So people are going for more than one crop in a year.
3. Now people are also aware of about different types of mechanization in Orissa.
4. Shortage of labour and time are the another reason which accelerate farm mechanization in Orissa.
5. The demand of food is increase day by day. To increase the productivity level of the farmer they are go form farm mechanization.
6. Now people are also get good quality seed, fertilizer, pestiside in a good price. Which increasea the productivity of the farm. So they are interested to cultivate there land in a mechanized way.
7. Different Govt. schemes made people interested towards farm mechanization. Specially the subsidy system in different machines.
8. Different new companies are come in to the field to produce different attachments of tractor and power tillers.

## **Objective-vi**

### **STRATEGY:**

Our state Orissa is mainly based up on agriculture. The increase in farm mechanization influence the farmers of Orissa day by day. Now the farmers realize the advantages of mechanized farming. Behind the success of a product Marketing plays the vital role. A Proper marketing strategy makes the product more successful.

- Availability of the product is must be according to the demand of the product. In various places the power tiller and tractor dealers can not fulfil the demand of the customers. The availability most be higher than the demand.
- A standardization and quality-marking centres of farm equipment should be established in potential areas of the state.

- Every product wants promotion. The tractor and power tillers also want a good promotion. By organizing farmers fair, exhibition, campaigning, TV, radio, news paper etc we can promoting the products.
- Training relating to farm machinery and equipment should be imparted to the farmers and artisans.
- If we link different farm machineries with different financial institution. So that farmer can easily get these product. And we can eliminate the middle man(dealers).
- Service units should be encouraged and mobile service units should be started. Adequate and soft loans for such purposes should be provided.

# **Chapter-v**

## **Summery & conclusion**

## SUGGESTIONS

Agriculture is the back bone of Orissa. Most of the people are dependent up on agriculture for their livelihood. But still now agriculture is not done as a commercial purpose in Orissa. Its only the start of farm mechanization, not the end. The state's ecology is most suitable for cultivation of paddy. There is a huge scope of farm mechanization in the paddy growing areas of Orissa. There is a huge scope to enhance the production level of paddy crop by using the mechanization strategy.

Towards this great achievement the Govt. of Orissa helps people very much. There is a subsidy facility for both the large farmers and small & marginal farmers. For enhancing farm mechanization it needed promotions of farm machinery.

By giving proper knowledge and training to the farmers to operate, maintain different machinery will make these products more familiar.

Rent out of farm machinery is a good try to popularize farm mechanization. By doing this not only the owner get some money, but also the small farmers who can't afford these machinery also get benefited. So we have to enhance the hiring process.

In different places of Orissa people use the farm tractor more for commercial purposes not in agricultural purposes. If this can be controlled then farm mechanization will boost in the state.

Subsidy facility is a very good step taken by the Govt. but some people makes their profit from it. So it is good that subsidy only to be allowed to the farmers having land & restriction should be there to see that tractors & PT given on subsidy are solely used for farming purpose.

KAMCO, VST SHAKTI are the only power tillers manufactured in India. Other Chinese products have captured the market due to non-availability of Indian product though it need frequent repair & maintenance. So Govt. should promote Indian entrepreneurs to this sector for the benefit of Indian farmers.

## **CONCLUSION**

From the study it is concluded that, PT are more popular than TRACTOR in Orissa, due to its small size, user friendly nature, low cost, etc. Both tractors and power tillers are used in farming. Although the relative advantages of tractor is more than a power tiller but people prefer PT more. Size of the farm, economic condition of the farmer, better land preparation, shortage of labour motivate the farmers for PT.

There is a vast untapped potential market of tractors and power tillers in Orissa and the manufacturing and selling companies have a golden opportunity to expand their business in orissa. Rural marketing is not an easy task. The key of marketing lies in understanding the needs, perceptions and behavior of the customers. If companies formulate their strategy in this direction rationally and tap the market potential it would be beneficial not to them only but to the whole state.

Both tractor and power tiller need promotion in Orissa. Now also there are some people who were not aware of the use of tractor and power tillers. So proper training is required for both these equipments. Different policy should be taken to distribute both Tractor an PT evenly all over Orissa. Credit should be given to the poor farmers to buy tractor/power tiller and use widely. Identification of the principal constraints or factors may also help in rapid and wide adoption of both tractor and power tillers in Orissa to increase food production.

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