NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN: 2394-3696
VOLUME 5, ISSUE 2, Feb.-2018

# DESIGN AND MANUFACTURING OF MANUALLY OPERATED MULTIPURPOSE RICE TRANSPLANTER

MR. BOBADE AKIB
*U.G. Student, Department of Mechanical Engineering, Rajendra Mane College of Engineering & Technology, Ambav (Devrukh), Maharashtra, India.*

MR. DESAI AVINASH
*U.G. Student, Department of Mechanical Engineering, Rajendra Mane College of Engineering & Technology, Ambav (Devrukh), Maharashtra, India.*

MR. DHARVAT SUSHANT
*U.G. Student, Department of Mechanical Engineering, Rajendra Mane College of Engineering & Technology, Ambav (Devrukh), Maharashtra, India.*

MR. GAMARE PARAG
*U.G. Student, Department of Mechanical Engineering, Rajendra Mane College of Engineering & Technology, Ambav (Devrukh), Maharashtra, India.*

MR. RAUT S.K.
*Assistant Professor, Department of Mechanical Engineering, Rajendra Mane College of Engineering & Technology, Ambav (Devrukh) Maharashtra, India*

**ABSTRACT**
Agriculture have a large contribution in Indian economy. It is one of largest source of employment. Though manually rice transplanting gives us a uniform crop it is expensive and it requires lot of labour also involving lot of hard work [4]. Lots of efforts has been made in design and modification of this machine to make the rice transplanting system more economical comparatively [7]. This study is concentrated on Design & Manufacturing of Manually Operated Multipurpose Rice Transplanter by providing supplementary arrangement like grubbing, lawn mower for limited areas in Indian rice cultivation especially for Konkan region. The proposed work can be done by removing the complexity in the mechanism, reduced cost and reduce weight of today's rice transplanting machines.

**INDEX TERMS:** Agriculture, Konkan region, Lawn mower, Multipurpose, Rice Transplanter.

## I. INTRODUCTION

A Rice transplanting machine is a special machine. Rice is highly consumed crop in the world [7]. A large scale of farmers is involved in the cultivating and production of rice. By using rice transplanting machine we can obtained Better production, Good quality, less labour required, Saves time, Low cost. [5] Present rice transplanter is useless after the cultivation period so we are increasing its applications by attaching supplementary arrangement like grass cutter, grubbing machine etc. It is particularly designed for Konkan region because of stepped land structure present rice transplanting machines are useless in this region. It will minimizes human efforts and hard work. A grass cutter is a machine which uses revolving blades. Blades are used to cutanuneven grass at an even length. Classification of grass cutter is depend on its axis that is vertical and horizontal axis. It also called as cutter and cylinder. If we observed traditional lawn mowerheight of cutting blade is fixed. So to obtain specific height we required lift the deck. This task will done by using wheel support also that work will take lot of time (5 to 7 minutes) to regulate the rotor. [9] To overcome above problem we are designing this simple mechanism. Manual transplanting of rice seedling is causing musculoskeletal problems, back bone problems, hard work and it proving costly because of the labour required.

**TRANSPLANTING PROCESS CAN BE CARRIED OUT**

1. By hand.
2. Manually operated transplanter machines.
3. Mechanically operated transplanter machines.

This method is good for small area and to fill patches. [4]

## II. CLASSIFICATION OF RICE TRANSPLANTERS

- According to Parameters:
  1. Nursery requirements and its type
  2. Power source
- According to Nursery requirement:
  3. **Cleaned seedlings:** Use cleaned roots seedling on mat that has 5 to 7 leaves appearance about 25 to 35 cm long cleaned at time of transplanting. Transplanting process required 150 people / hour / hectare. [2]
  4. **Mat Type on the Polythene sheet:** This method is used due to requirement of labour is less
- By considering power source requirement:
  5. Manual
  6. Animal drawn
  7. Power tillers
  8. Tractor mounted
  9. Self-Propelled.

## III. METHODOLOGY

The design solution is found by first reviewing the relevant literature on existing transplanters and doing a case study on Maharashtrian (Specially Konkan region) rice transplanting to determine important factors like hardness and soil type etc. considered in the design.Maharashtra is the western part ofbharat. It has one side of Arabian Sea. It lies between 15° 44' to 22° 6' N and 72° 36' to 80° 54' E. Total area is 307000 $Km^2$ which is about 9.36% of the country. Maharashtra is 3rd large state in India .that rank will be given by comparing its population and area. The population of Maharashtra is 80 million that is 9.47% of the country's population.Rice is the 2nd important crop in Maharashtra that is of 14.990 lakh hectares. Annual rice production is 32.37 lakh tones and average productivity of the Maharashtra is 2.01 t/ha. Comparing with country Maharashtra take 13th rank of rice production. Maharashtra has comparatively low productivity of rice as compare to Andhra Pradesh Panjab, Haryana, etc.

## IV. GEOGRAPHICAL INDICATOR CLIMATE

Maharashtra has anideal monsoon climate, with hot summer, rainy and cold winter weather seasons. Tropical conditions dominate all over this state, and even the hilly areas are also not that cold. Frost,Dew, hail also be occur sometimes as according to seasonal weather.

Summer:

It occurs generally from March to May. Thunderstorms are common in the month of April & May all over the state. Temperature lies between 22°C-39°C.

Rainy:

Rainfall starts usually in the starting of June. July and August are the rainy month in the Maharashtra. Monsoon startsit's retire with the beginning of September.

Winter:

It occurs generally from November to end of February. Temperature lies between 12°C-34°C during this season.

## VI. MECHANISM DESCRIPTION

The machine used for the cutting of unnecessary grass of yards is lawn mower. They are different in size, dimensions andtheir mode of operation, and human power. It will walk behind the mowers are constructed

to be propel by human efforts and while getting the power from the wheel rotation. The motor operated lawn mowers is cut grass with the use of blade witch rotted parallel to ground. In these method there is five blades in cylinder is rotating and achieving the same power given by the operator.

**TERMINOLOGY**

This reference is in degree differential from the surface of the grass. The pitch centerline, is the imaginary line drawn at an angle of 90 degree to the grass dissecting the pitch at its center. There are two rollers. The back end roller trails is cutting unit, and is normally a solid roller. The action of pushing the lawn mower machine makes the cylinder revolve. The blade is joined to the bevel gear. This gears increases speed of blade. Shafts of the gears are engaged in to the bearings. The bearings are used for the holding shafts and frictionless rotation.

## VII. CONCLUSION

As we studied the present manually operated rice transplanter we can say this are complicated and cost of the transplanter keep away farmers from its benefits.To overcome their drawback we simplify and re-design rice transplanter. We are trying to use simple linkage mechanism which reduces the farmer efforts and easy to handle specially for kokan region.Manually operated multipurpose rice transplanter low maintenance which economical for every farmers also increase the production of rice cultivation efficiently.

## REFERENCES

I. Baladev Raj Kamboj, Ccs Agricultural University, Yamuna Nager India, 2013. "*Mechanized Transplanting Of Rice (Oriza Satava L.) In Nonpuddled and Till Conditions in the Rice Wheat Cropping System in Haryana, India".*
II. Bala Ibrahim & Wan Ishak Wan Ismail, 2014, *University Putra Malaysia, "Development of System Rice Intensification (SRI) Paddy Transplanter".*
III. A. K. M. Saiful ET, al BAU Mymensing Bangladesh. 2015 *"Commercial Mechanical Rice Transplanting Under Public Private Partnership in Bangladesh".*
IV. Tawanda Mushiri, University Of Johannesburg, South Africa, 2017*,"Design Of Rice Transplanter For Zimbabwean Farmers".*
V. Uttam Patel, Gujarat Technological University, vol3, 2017. *"Design and Development of Rice Transplanting Machine".*
VI. Parthiv Mehta, Gujarat Technological University, vol3, iss4, April2017. *"Design and Development of Rice Transplanting Machine".*
VII. Satish Kumbhar ET, al, Vol 6, Issue 3, 2017, "*Design Analysis and Fabrication of manual Rice Transplanter''.*
VIII. Venkatesh K ET al, IJIRSET, Vol 4 ,2015, *''Fabrication and analysis of lawn mower''*
IX. N. Nagarajan ET al, AJAST, Vol 1, Issue4, Page 50-54, 2017 "*Design and Fabrication of lawn mower.*
X. Status Paper on Rice in Maharashtra B. L. Thaware *, R. L. Kunkerkar and H. A. Shivade. **ADR, Regional Agricultural Research Station, Karjat-410201, Maharashtra, India.*