

# Review Paper on Development of Rice Transplanter

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*Abstract -- In old day's rice transplantation process is generally done manually. All the processes from the sowing the rice seeds to rice transplanting from the one place to other place to the cultivation of rice to the harvesting of rice and lastly to the collection of rice was done only by manually. Rice is cultivated in 113 countries and it is the staple food of more than 50 percent population of the world. About 90 percent rice area exists in Asia. However the rice production fluctuates depending upon the weather conditions. During the sixties India became self-efficient in food grain production but the benefit was restricted to irrigated areas and rich farmers. This traditional method of rice transplanting is labor intensive, hazardous with low per acre plantation of plants and time & cost consuming. Due to these factors the completion of rice cultivation suffers within the optimum transplanting period consequently farmers face the problem of low per acre production with high production cost. Therefore technology for small holding size plays a very important role in developing countries. We are going to developed manual operated rice transplanter machine. This paper presents transplantation process and proposed work of manual rice transplanter machine.*

transplanting. It increases the approximate area that a person can plant. The distribution of food grain production which shows the rice production is major in India Mechanism is needed to raise productivity in rain fed upland and rain fed lowland and to increase cropping intensity in irrigated farms. Seed drills give better plant population, reduce cost and give higher yields of rice. Use of pre-germinated paddy seeders in puddled wetland condition give similar yield like manual transplanting but reduce labour requirement by 75-80%. The manual and self-propelled transplanter reduces cost of transplanting by 45-50%. The average rice yield in India is only 2.09 t/ha, as compared to 6.58 t/ha in Japan and world average of 3.91 t/ha.[2] In Asia, more than 60% farmers have land holding size less than 2 ha. Therefore technology for small holding size plays a very important role in developing countries. Rice transplanter is a specialized transplanter fitted to transplant rice seedlings in paddy fields. One transplanter (2-row at a time) can transplant about 4-5 acres in a day (highly efficient as compare to traditional method). The recommended per acre plant population is 80000 plants and with the help of Transplanter farmer can transplant 80000 to 120000 plants per acre.[3]

## I. INTRODUCTION

A rice transplanter is a specialized machine fitted with a transplanter mechanism (usually having some form of reciprocating motion) driven by the power from the live axle, in order to the transplant rice seedlings onto paddy field. Rice is a major food grain crop of world. Unlike upland row crops, cultivation of low land rice crop is a labour intensive process. In spite of the common belief of availability of surplus agricultural labour in India, there actually exists a scarcity of skilled agricultural workers during the peak transplanting seasons. If this operation is not done in time the yield goes down.[1] In view of this, there is an urgent need to mechanize this operation. The rice translation process is generally manual which involves number of labour. The process of manual rice transplantation is not so efficient as compared to the mechanical rice transplantation. Machine transplanting using rice transplanter requires considerably less time and labour than manual

## II. LITERATURE REVIEW

S. Pradhan and S.K. Mohanty presented, Transplanting of paddy is very tedious job mostly done by female workers during Kharif season and by 2020 there would be 50 percent women against 42 percent at present. Manual hand transplanting consumes a lot of energy and time and full of fatigue, but the poor socio-economic condition of the farmers does not allow them to adopt power operated transplanter. Transplanting operation by different research centers have been developed as 2 row, 3 rows, 4 row paddy transplanter.[7]

M. V. Manjunatha, b. G. Masthana reddy explained, Studies were conducted at Agricultural Research Station, Gangavathi, Karnataka state during 2002 to 2004 on the feasibility of mechanizing transplanting operations in paddy crop with a view to reduce the cost of cultivation. An eight row self-propelled paddy transplanter was used for the purpose. The performance of the mechanical transplanter was quite satisfactory.[8]

Chetan Chaudhari published; this study is based on theoretical development of mechanical rice-transplanter and the basic design on the CAD-CAM software. For the design it taken some consideration and designed a mechanical rice-planter. In the design padded wheel, gear drive and planting finger plays important role. As per the working of the rice-transplanter he worked on some calculation area and find that it will be approximately 95% or more than that efficient than the manual planting process for the same area of planting. The design will be little complex due to the relative driving between the wheel and spur gear.[1]

### III. OBJECTIVE

1. To design rice transplanter is to develop the simple system.
2. Easy in handling and lower in cost.
3. The engine based Rice transplanter machine can also be used, but to make easy working and lower cost we have designed the manual rice transplanter.

Mechanical transplanting of rice is the process of transplanting young rice seedlings, which have been grown in a mat nursery, using a self-propelled rice transplanter. In conventional manual transplanting practice, 8-12 labors are required to transplant one acre.[4] However, if a self-propelled rice transplanter is used, three people can transplant up to four acres in a day. Proposed CAD model of rice transplanter shown in fig.1.

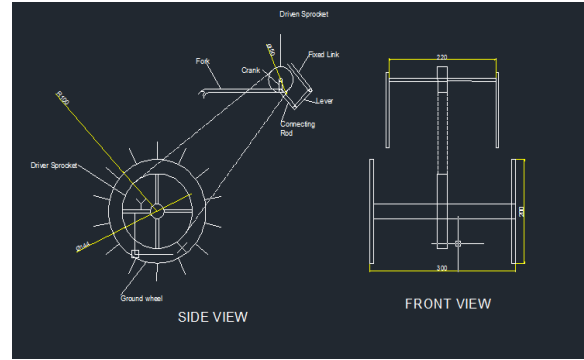


Fig.1 Proposed CAD model of rice transplanter

### IV. LIMITATIONS OF OLD METHOD

Transplanting is tedious and time-consuming (up to 30 man days/ha)

1. Planting labour can suffer from back problems (health risk).
2. Difficult to get enough labour at peak periods to plant on time.
3. Difficult to maintain optimum spacing and uniform plant density, especially with random transplanting and contract labour.
4. Low plant density with contract transplanting on area basis lowers yields.
5. Possible Risk that in rain fed areas seedlings (especially of modern varieties) may get too old before rain falls and the field is ready to be planted.

### V. ADVANTAGES OF RICE TRANSPLANTER

Efficient use of resources by saving on labour, cost saving, water saving.

1. Timely transplanting of seedlings of optimal age.
2. Ensures uniform spacing and optimum plant density with 2-3 seedlings/hills).
3. Higher productivity compared to traditional methods.
4. Less transplanting shock, early vigor of seedling, uniform maturity of crop that facilitates timely harvest and reduces harvest losses
5. Generates employment and alternate sources of income for rural youth through custom services on nursery raising and mechanical transplanting.

6. Better employment opportunities for rural youth through the development of custom service business.
7. Addresses the problem of labour scarcity.
8. Increases farmers' net income.

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## VI. CONCLUSION

Rice paddy transplanter is highly recommended for the local farmers of though beforehand the farmers need to be educated regarding its proper use since mechanized transplanter requires mat – type nursery.

1. Since the farm land is of the average size in the area thus a mechanized paddy transplanter would highly aid in the rice transplantation.
2. It would also decrease the high dependence of farmers upon laborers for transplantation.
3. The transplanter machine can be easily coupled to a weed remover mechanism which could further help farmers in the weeding process of paddy plantation.

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