A
PROJECT REPORT
ON

-IN-1 PRO TRANSPLANTER"

partial fulfillment of requirements for the degree of

Bachelor of Vocational
Department of farm equipment and machinery

SUBMITTED BY :

] Pwan Bhagwat Lande
] Vaibhav Shrawan Lande
] Shyam Gajanan Pande
4] Pavan Dinesh Ingle
5) Roshan Shashikant Jadhao
6) Dhiraj Raju Kakade
7) Mangesh Santosh Chavan

Under the Guidance of
Prof.KULDEEP.N.TATHOD

Department of farm equipment and machinery
SAHAKAR MAHAESHI LETE BHASKARRAO SHINGANE ARTS COLLEGE,KHAMGAON

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CERTIFICATE

Certified that Project work entitled " **5-IN-1 Pro-Transplanter** " is a Bonafide work carried out in the final year by **"Pawan Bhagwat Lande Vaibhav Shrawan Lande Shyam Gajanan Pande Pavan Dinesh Ingle Roshan Shashikant Jadhao Dhiraj Raju Kakade Mangesh Santosh Chavan"** in partial fulfillment for the award of Bachelor of Vocation from Sant Gadge Baba Amravati University, Amravati during the academic year 2021-22 from 7 September 2021 to 21 September 2021 and 12 April 2022 to 27 April 2022.

Mr. Kuldeep N. Tathod
Asst. Professor

Dr. Nilima D. Deshmukh
Principal

Principal
Sahakar Maharshi Late
Bhaskarrao Shingne Arts College
Khamgaon Dist. Buldana

TEBLE OF CONTENTS

INTRODUCTION

Developing countries contribute 72% of the total vegetable production in the world. The transplanting operation is one of the most labor intensive in vegetable production. India is the second largest producer of vegetable in the world (ranks next to China only). India share 12 percent of world production of vegetable with a productivity of about 15 tons/ha which is quite low as compared to many countries. It is largely done by hand in India and most developing countries and incurs large investments in labor, time, and cost.

The basic requirements for small scale cropping machines are, they should be suitable for small farms, simple in design and technology and versatile for use in different farm operations. Many operations in agriculture are now being performed by machines. This reduces the labor requirements which have been the principal motivating force in mechanization. Our farmers cannot afford to buy large costly machine. Vegetable planting machine is a device which helps in planting of vegetable plants in a desired position hence assisting the farmers in saving time and money. The basic objective of planting operation is to plant the vegetable plants in rows at desired depth and plant to plant spacing cover the plants with soil and provide proper compaction over the plant

Keywords: Plantation, Transplantation, Quick return mechanism, Transplantation machine ,Effective cultivation

A. History

Ferminger (1953) reported that in India, for small-scale vegetable gardening, holes of 60 cm diameter and 30 cm deep are manually dug in the field at desired spacing's. The soil is mixed with farmyard manure, bone meal, and wood ashes. The hole is then filled to a depth of 15–20 cm and packed. A seedling is placed in the middle of the hole and topsoil is filled around the seedling, compacted, firmed, and soaked with water. A shelter is built to shade the seedling under dry weather conditions. This method does not require any field preparation. A shovel or spade is the only implement used. In medium and large fields in India, a well-pulverized seed bed is prepared and raised beds, 90–120 cm wide and 30 cm high, are built manually or with tractor-drawn implements.

Tsuga (2000) reported that in Japan before the mechanization of transplanting operation, the time required for manual seeding and transplanting of vegetables accounted for about 40% of the total time required for cultivation of the crop.

Kimetal (2001) observed that in Korea, manual transplanting of Chinese cabbage (B. campestris L. var. Pekinensis) required 184 man-hours·ha−1 . Manual transplanting on a large commercial scale is labor intensive, expensive, and often does not result in uniform distribution of plants compared with mechanical transplanters (Orzolek, 1996). To overcome these factors, mechanical transplanters were developed for planting various vegetable seedlings.

Abstract

Developing countries contribute 72% of the total vegetable production in the world. The transplanting operation is one of the most labor intensive in vegetable production. India is the second largest producer of vegetable in the world (ranks next to China only). India share 12 percent of world production of vegetable with a productivity of about 15 tons/ha which is quite low as compared to many countries. It is largely done by hand in India and most developing countries and incurs large investments in labor, time, and cost.

The basic requirements for small scale cropping machines are, they should be suitable for small farms, simple in design and technology and versatile for use in different farm operations. Many operations in agriculture are now being performed by machines. This reduces the labor requirements which have been the principal motivating force in mechanization. Our farmers cannot afford to buy large costly machine. Vegetable planting machine is a device which helps in planting of vegetable plants in a desired position hence assisting the farmers in saving time and money. The basic objective of planting operation is to plant the vegetable plants in rows at desired depth and plant to plant spacing cover the plants with soil and provide proper compaction over the plant

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A. Present Scenario

Bare root seedlings are taken from nursery beds and transplanted manually in rows at recommended spacing's in the raised beds. Soil is placed around the seedling and compacted using a spade. This is called raised bed planting. It requires 185–260 man-hours·ha−1 for transplanting eggplant, onion , and chille pepper. In some farms that do not have a high degree of mechanization, raised beds are not prepared. After the seed bed is prepared, seedlings are manually transplanted in rows, covered with soil, and compacted. Ridges and furrows are built as the plants grow. This is called flat planting. This method requires about 320 man- hours·ha−1 for transplanting tomato at 60 cm row-to-row spacing and 30 to 45 cm plant-to-plant spacing (Central Institute of Agricultural Engineering [CIAE], 2004). Sometimes, furrows are opened using tractor-drawn implements and seedlings are planted in furrows by hand. In areas with a cool climate and spring rain, raised bed planting facilitates early planting of vegetable seedlings as it protects the plants from accumulation and puddling of rain in un-bedded soil. It also allows for close spacing of plants. Flat planting occurs in areas with dry weather, and it necessitates wider spacing between the plants. Transplanting and planting vegetables in traditional way, is of hard job and inefficient activity. In addition, harvesting of prior crop and preparation of the substrate and transplantation should be done in a period of short time in doubled planting which by doing conventional way of transplantation, it would be hard. These factors show the need for mechanization of transplantation even more than before. Labor costs, solicitude in transplanting and the difference in depth of planting seedlings are of other factors that make the mechanical transplanting of vegetables seeding, necessary. Mechanization of transplanting means the reduction demand for labor in cultivating operation in which the minimum damage to seedling and the maximum efficiency of cultivating is being provided. However, this requirement happens when the labor income is less than the revenue provided by machines replacement. Today there are many instruments which are designed and built for automate cultivating of vegetables seedlings, But in spite of large estates which are being cultivated by vegetables in India, especially tomato, but there hasn't been a widespread and consistent practice in this area, And imported equipment are being used very rare and limited. This need increases by rising cultivating of crops that can be cultivated in transplanted form, and in contrast, it should design and build new equipment and devices for mechanization of this kind of cultures.

TRANSPLANTING & DIRECT SEEDING

1) Transplanting versus Direct Seeding: Advantages and Appropriateness of Each Technique

A. Transplanting and Direct Seeding Defined

1) "Transplanting" refers to the act of transferring seedlings from containers in the greenhouse (cell trays, flats, pots, etc.) into the garden or field

2) "Direct seeding" or "direct sowing" refers to planting seeds in the field to germinate in place

3) Note that there are no hard and fast rules about which crops are transplanted vs. directly sown; there are advantages and disadvantages to each method, and a number of factors will play into the decision regarding which approach to use. These include scale of planting, labor availability, length of season, types of seeders available, weed management capacity, and greenhouse and land availability. In some cases, transplanting a difficult-to-transplant crop can pay off if the market offers a premium for early harvest.

B. Transplanted Crops

1) Advantages of starting crops in greenhouse

a) Greater climate control: Temperature, humidity, water

b) Soil mix can be tailored to specific crop, as per fertility and drainage capabilities

c) Offers protection from predators and elements: Wind, rain, birds, snails, etc.

d) Greater season extension (can start crops earlier indoors)

e) Intensive rather than extensive management of seedlings: E.g., one 12" x 24" flat of leeks can plant a 4' x 50' bed with 6 rows at 6"/row (600 seedlings). Fewer resources— time, water, weeding, etc.—are required to care for 1 flat of leeks vs. 1 direct- sown bed. vi. Weed management: Transplanted crops have a better chance at outcompeting weeds than seeds sown directly in the ground

CALCULATION

Circumference of tire 167.4 cm i.e. for every one full rotation of the tire vehicle moves by 167.4 cm.

As it is said before that driver is mounted on same shaft which are coupled to the tire and so when tire rotates our driver gear also rotates and it attached to the shaft by hole tap and key.

A. Distance Between Seedlings

Driver gear is having 125 teeth

Driven pinion is having 21 teeth

Gear ratio= 125/21 = 5.95

So for every full rotation of the driver gear we will be having 5.95 times rotation of the driven pinion.

One full rotation of the driver gear means one full rotation of shaft as well as tire. As circumference of the tire is 167.5 cm

As cam and driven pinion are mounted on same shaft, as pinion rotates 5.95 times for every one rotation of gear cam also rotates

5.95 times and cam is connected to the seedling transplanter device with help of connect rod so transplanter also punches 5.95 timesfor every one rotation of gear.

Distance between each seedling is given by the ratio of

circumference of tire and gear ratio used.Distance between

seedling= 167.4/5.95

= 28.13 cm

B. *Depth Of Punch*

If connect rod is mounted on 75 mm for cam center then depth of punch is 15mm. If connect rod is mounted on 85 mm for camcenter then depth of punch is 25 mm

Working

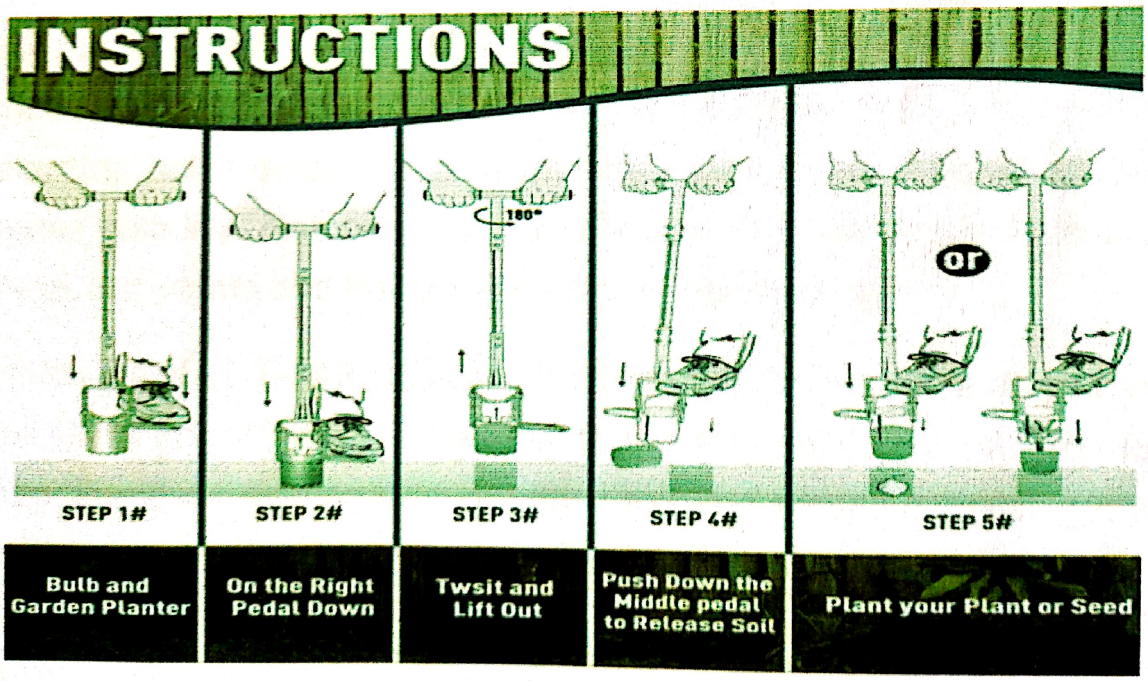
STEP 1 #
First place the lower end of the planter where the plant is to be planted

STEP 2 #
Press into the ground with the help of transplanter handlebars or footbars

STEP 3 #
Now remove the planter out of the ground

STEP 4 #
Push down the middle pedal to release soil

STEP 5 #
Plant your plant or seed



Advantage

5-IN-1 PLANTING TOOL- The one which we are discussing now is not just a long-handled bulb planter, but it is a 5-in-1 tool. It can work as a weeder, post hole diggers, garden tool, and bulb planter. The advantage of using this tool is that you will not have to worry about keeping all the gardening tools handy. The advantage is that it can do so quickly and therefore, it is easy for you to create multiple holes in no time, successfully complete the transplantation or cultivation.

DURABLE NEW BULB PLANTER- The reinforced steel construction ensures that you can use it day in and day out. With our long handle planter tool, you just press down the middle pedal, and you can control how deep want to go into the dirt. We use the pedal on the right to effortlessly release your soil without bending over. Sharp serrated bottom cuts easy to penetrate soil and dirt.

IDEAL SIZE AND WIDE-USE - Our bulb planter are 39 inches tall, 11 inches wide with t-handles, and weigh 3 pounds. Dig 3.5 inch diameter planting holes quickly. The upper and lower rows of bolts let the tool more stability. Not only can more bulbs be grown quickly in a short time, but plants and flowers can also be transplanted.

LONG-HANDLE T-BAR DESIGN- The long handle means that you get an excellent grip. It ensures that the tool does not bend at all. The longer handle means that you will not have to bend down while using it which is a definite relief. The sturdy grip means that you can hold it and use it for a long time. It is perfect for those who have mild arthritis.

AFTER-SALE SERVICE: No matter what questions you have about our long handled bulb planter

5-in-1 Pro Transplanter Defferent Work

1} Bulb Planter

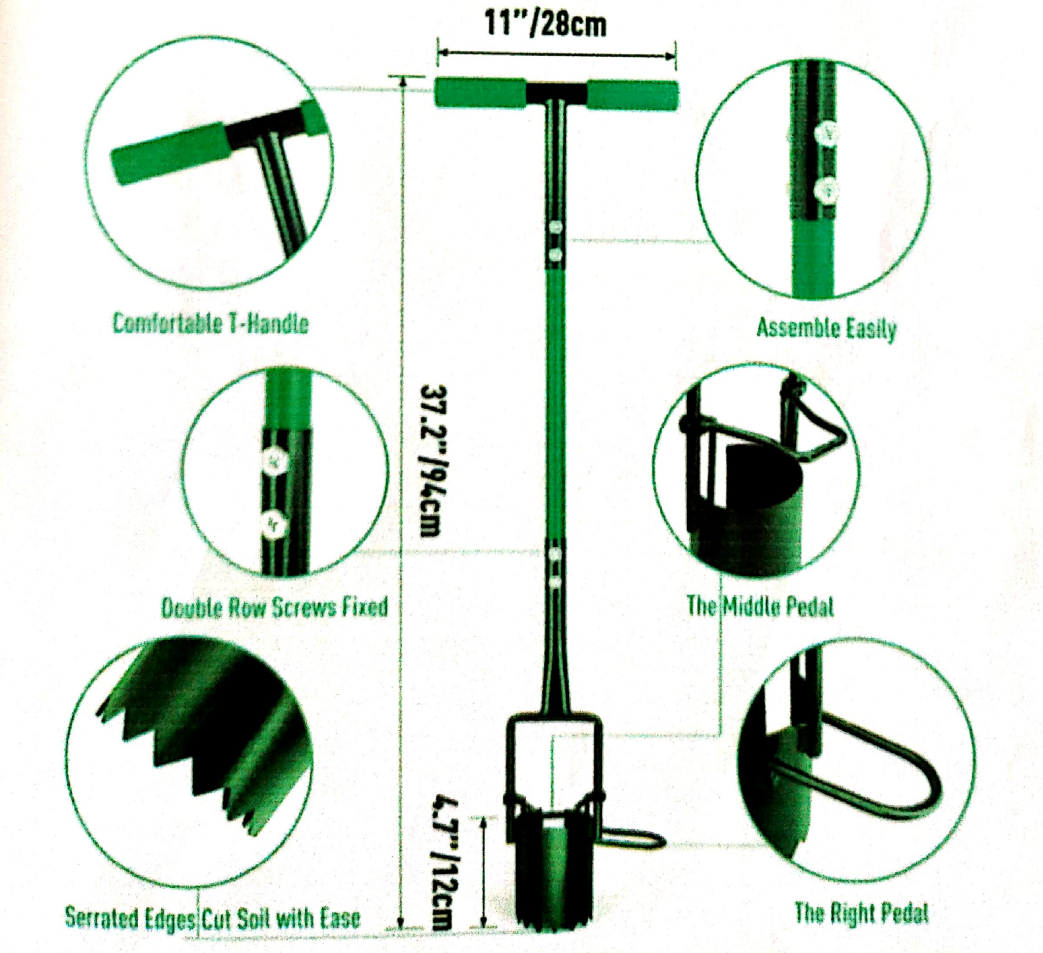
2} Weeder

3} Sod Plugger

4} Annual Planter

5} Soil Testing [Renewed]

product details



COSTING

18 X 12 INCH IRON SITE	360
1 X 2 INCH RECTANGULAR PIPE	400
1 INCH DIAMITER CIRCULAR PIPE	400
8 INCH IRON ROD	300
WELDING WORK	500
COLOUR PENTING	60
TOTAL	2020

CONCLUSIONS

A. Tray -plants survive well after being transplanted.

B. Planting the vegetable seedlings in rows at desired depth and plant to plant spacing cover the plants with soil and provide proper compaction over the plant.

C. Time consumed for planting is less compared to manual planting .

D. Relative cheaper then transplanting manually.

E. Labor required for planting is less.

F. Average yield is high , as seedling are first grown in nursery which are maintain in better climatic conditions .

G. Plants are usually healthier and have strong , deeper systems.

H. Plant density is higher .

I. Time consumed is less for planting.

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