



e-ISSN:2582-7219



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 5, Issue 6, June 2022



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.54



6381 907 438



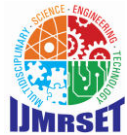
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Design and Fabrication of Economically Modified Onion Harvesting Machine

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ABSTRACT: Agriculture being one of the foremost occupations in India, it is very indispensable to find out and enforce new thought in this field, even though lot of work has been executed in this area. It is unlucky that, these thoughts are no longer been applied excellent in true field. This is due to excessive value and is intricate for rural people. Multipurpose agriculture gear is fundamental and essential gear worried in agriculture for most yielding. Conventional technique of planting and cultivating the plants is a laborious technique and consequently for that cause there is a shortage of labours, this end result in delayed agriculture to overcome these difficulties, In India round 70% person are based on farming and agricultural product. Different sorts of functionalities are performed in farming discipline that are seeding, weeding, plant cutting, sloughing and so on. Onion harvesting computer is primarily based on discount in effort required for harvesting of onion as nicely as for saving price required in harvesting, specially for small scale farming. The reason of designing and fabrication of such small gear is that it full fills necessities of harvesting and reduces the fee of it. Onion harvesting computing device incorporates easy mechanisms with superb manually coping with gadget that want solely human efforts for operations. The cause at the back of this is to simply minimize manufacturing fee of onion manufacturing with the aid of that farmer can get greater output & profits in particular thinking about small scale farming

I. INTRODUCTION

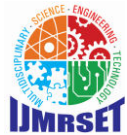
Onion is an essential vegetable crop in India and is an necessary thing of Indian culinary. Being an fundamental meals item, it is additionally a tremendously politically touchy commodity. This document analyses the production, consumption, alternate and rate behaviour of onion in India. India ranks 2nd in world onion manufacturing after China and with an annual manufacturing of sixteen to 17 million tonnes money owed for around 20% of world production. However, Indian onion yield is one of the lowest.



Fig.No.1. Onion bulb

The inherent decrease productiveness in sub-tropical international locations vis-à-vis European counties, scarcity and excessive costs of great seeds, excessive incidence of pests and ailments ordinary underneath tropical conditions, moisture stress or extra rains for the duration of integral boom ranges are elements constraining yield. Wide rate fluctuations make it a unstable crop discouraging giant scale adoption of enter intensive manufacturing strategies and true administration practices with the aid of farmer In India onion is grown in three crop seasons, particularly kharif (harvested in October-November), late kharif (January February) and rabi (April – May).

Rabi season crop is the greatest accounting for about 60 percent of annual manufacturing with kharif and late kharif accounting for about 20 percentage each. Major producing states are Maharashtra, Karnataka, Madhya Pradesh, Andhra Pradesh, Bihar, Gujarat, Rajasthan and Haryana, which collectively account for eighty five percentage of whole



production. It suggests us that there is non-stop boom in onion manufacturing in India. But there is the use of usual onion harvesting approach which is greater time eating and greater labor require And now a days there is massive labour scarcity problem in this field. In India in particular Maharashtra, Gujrat there is small dimension of farm the place used to manufacturing of onion in which handy massive measurement onion harvesting computing device are now not beneficial additionally no longer economical. So overcome this hassle we attempt to plan and manufacture guide running and beneficial to small subject machine.

Onion is the most vital crop in India. The harvesting of onion crop is rigorous and requires large quantity of manpower and time. One of the most important motives of low productiveness is inadequate strength availability on the farm and low stage of farm mechanization. This is mainly real for India. The package deal of contemporary technology, increased seed and fertilizers, use of environment friendly and cost-efficient farm implements, machines and appropriate shape of farm strength is very important. Production suffers due to the fact of fallacious seed mattress preparation, extend in sowing and harvesting. Mechanization permits the conservation of enter thru precision metering, insuring higher distribution, decreasing extent wished for higher response and prevention of losses or wastage of inputs applied.

1.1 OVERVIEW

Harvesting

Harvesting is a procedure of slicing and gathering of mature crop from the field. Harvester is a laptop is used for harvesting. Different sorts of harvesting machines are on hand in the market specifically crop harvester, onion harvester, paddy harvester, tea harvester, potato harvester, wheat harvester and sugarcane harvester. Crop harvesting computing device is as proven in Fig. 1.2, it is capable to harvest special range of grain crops. These machines are fantastically environment friendly and can work at a excessive speed. It can harvest the vegetation except imparting injury to them.



Fig.no.2. Onion Harvesting

Onion harvesting desktop (Fig.3) is of appropriate fantastic so that they can't damage the onions at some stage in harvesting. These machines are capable to harvest deeply rooted onions with awesome ease and with better rate. Thus, these machines are in first-rate demand in the market.



Fig.no. 3 Good excellent of onion plant



The proportion composition of normal onion is: the element of the plant most frequently bump off is an underground storage shape referred to as a Bulb or Head. The section of onion which is above the floor and seen is called stem. the onion harvesting get commenced when stem get fallen . Now there is many automated onion harvesting machine used in developed united states of america or giant farm place which are operated by using the usage of tractor or by way of diesel engine. They are huge in measurement and require exterior energy provide to function they are beneficial for mass manufacturing they are not economically beneficial for small farm.

1.2.OBJECTIVE

- To limit human effort.
- To enlarge the ability of onion harvesting
- To amplify the effectivity of onion harvesting.
- To limit the value and time of onion harvesting.
- To diagram a onion harvesting desktop for placing up small scale, low fee rural industry.

After identification of small scale, low price onion harvesting machines, the overall performance of the machines will be examined for business applications. If performance is discovered satisfactory, the machines would be used for commercial applications.

Advantages

1. Compact
2. Portable
3. Reduce time consumption
4. Eco friendly
5. Less electricity consumption
6. Cost effective
7. Less preservation required
8. Risk free and effortless to use

Disadvantages

1. More strength to be observe on machine
2. Not used in moist soil

II. EXPERIMENTAL PROCEDURE

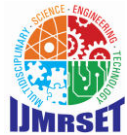
2.1.Experimental principle

The saw cutting machine is provided with "v" pulley of cast iron slider having belt drive. This pulley is connected to the motor by a "v" belt. When the motor is started, the main shaft of the cutter also starts revolving at the same speed. The running speed is 1440 R.P.M. the rotation will be of vertical direction because of cam mechanism. The main shaft drives the horizontal shaft. The speed is also reduced in the ratio of 1:12. When the main shaft rotates 12 times the horizontal shaft will rotate only once. The machine enables us to get 12-strokes/ minute. The cam is keyed to the horizontal shaft. The cam is made up of cast iron piece. The link is connected to the cam stud.

2.2.Experimentl setup and purpose

2.2.1.Frame

The body varieties the base aiding the total shape of the vice. Both the jaws are equipped over the body body. The jaws slide over this body physique and it prevents the jaws from vibrating whilst clamping the work piece.



2.2.2.Round rod

- ❖ MATERIAL: MILD STEEL
- ❖ DIAMETER: 16MM

The rod is placed under the jaws to prevent the slipping of jaws, while moving forward and backward.



2.2.3.Bevel gears



Bevel gears are gears the place the axes of the two shafts intersect and the tooth-bearing faces of the gears themselves are conically shaped. Bevel gears are most regularly hooked up on shafts that are ninety stages apart, however can be designed to work at different angles as well. The pitch floor of bevel gears is a cone.

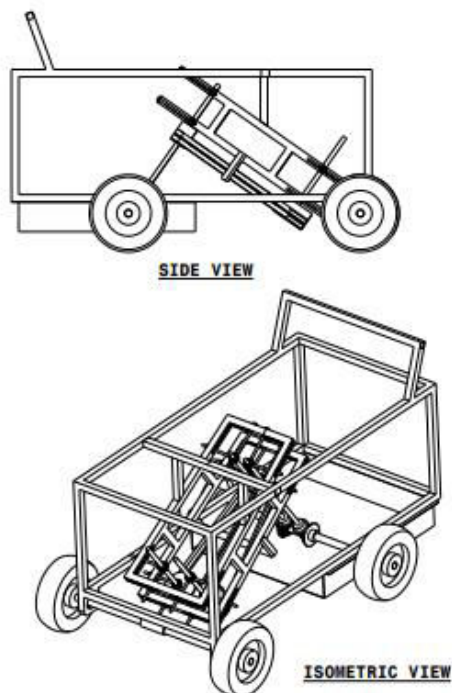


Fig.2.2.4.The schematic diagram of the experimental set up

2.2.4.Calculation

Efficiency = Area/time

Where ,

Area in m²

Time in hr

Speed of motor 1hp = 1440 rpm

- Speed of main shaft N = 240mm
- Motor pulley diameter, D1 = 75mm
- Shaft pulley diameter, D2 = 450mm
- For v-belt drive V =300 to 1500 m/min

2.2.5 Cost estimation

III. RESULTS AND DISCUSSION

3.1.Result

Testing of the onion harvester in small farm land showed a slight variation in the uniformity in cutting and it was easy to handle in small farm land. 10 persons used for harvest one acre of land by eight hours. The single machine takes only four hours to finish one acre of land.

3.2. Discussion

Traditional onion harvesting process is time consuming. In this process first onion pulled up by hand manually gather them latter cut is steam by using blades. In this process more time and more man power require but now a days there is shortage of man power. By another method there is use huge machine use for onion harvesting but it is not economical for small fields

Considering the above problems, it is necessity to design, develop and fabrication such a machine that will eliminate most of the problems. To reduce the human fatigue, cost and time the design and fabrication of machine is important.



IV. FUTURE SCOPE

The design can evolve further by giving additional attachments to it. The following design inputs can be added if required

- A attachment can be provided for cutting the onion leaf at the time of harvesting.
- Collecting baskets can be provided for collecting the harvested onion.
- In case the soil is stuck to the onion bulb and is not coming off easily in this case a vibrating conveyor mechanism can be provided.
- With some small changes same mechanism can also be used of potato harvesting

V.CONCLUSION

The current scenario in our united states all agricultural is working on guide operation in any other case by using petrol engine or tractor which is expensive, farmer can not work for lengthy time manually to keep away from this problem, we want to have some form of strength supply device to function the digging machine. In this challenge we have considered the simplest. approach of onion root and stem reducing process. In conventional way of slicing root and stem. we require extra price and manpower comparatively & this approach is absolutely primarily based on the work of human effort consequently greater time ingesting so it requires extra people and different fee is additionally very high. Sowe are going to invent a laptop which will reduce that value and time for onion root and stem slicing and the process is additionally simple. Also we be successful to make it very small and affordable to all farmers and it will increase the speed of work so our goal is fulfilled in this project.

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