Design and Fabrication of Automatic Potato Harvester

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Abstract : This project mainly focuses on the current application and method to improve its efficiency. It adopts very easy machining and operating system which uses minimum mechanical effort. It is ensured that the driver of the machine as no work except monitoring the movement of the machine. Our method of using this existing machine is to basically improve the efficiency of this machine and to give more comfort to the farmer. We are also devising a method by which we can reduce the cost of the existing machine so that it can be made available to even the poorest farmers in India. We believe that our project will definitely be useful for all the farmers in India and thus will boost our country's agricultural economy and enhance our farming sector's income.

INTRODUCTION

Potato harvesters are machines designed for potato harvesting. This machine can finish mining, soil and potato separation in one time and can harvest the potato with the potato stems. It is a multifunctional machine which can used for variety kinds of underground plants such as peanut, carrot, onion, etc. Agriculture plays a dynamic role in Indian economy. So any development in the productivity related task help to escalation Indian farmer's status and economy. Although agro industry is accreted of lingering peace.

The sole culprit for slogging in pace of accretion (in agro industry) is dependency on customary approaches and equipment. In Brazil, harvesting is usually performed manually or semi-mechanized, and share responsibility for the high cost of production. In the semi-mechanized harvesting, diggers are used, coupled to a tractor, which degrade the furrows and expose the tubers. Later, the collection is done manually by men or young women who also carry out a preliminary selection field. However, self-propelled harvesters have been used in advanced countries for potato culture. The trend toward mechanization of the total harvest is related to the availability and cost of manpower. These harvesters chop the furrows apart and collect the potatoes, in two or more rows, directing them to the carrier trucks. They are larger machines, which require elongated rows to avoid manoeuvres and frequent loss of time, which reduce the operational capability of the machine.

The process of mechanized harvesting of potatoes can represent a great advance for the producing regions, mainly to optimize the production process, with increased production area, faster removal of tubers from the ground when free risk of attack from pests and diseases, and stronger compliance with delivery dates of production. However, the decision to invest invariably involves risks, which must be provided when one decide to invest in certain useful equipments for this purpose.

.LITERATURE SURVEY

Potato is one of the main human alimentary resources. It was the sixth alimentary product in the world after sugar cane, maze, rice and paddy, wheat and milk (FAO, 2011) and the third product in Iran after wheat and sugar cane (Ministry of agriculture, 2011) There are problems regarding potato cultivation and storage in Iran. Early potato diggers were in the form of spinners, diggers, and potato plows. The harvesting process, though mechanically assisted by the late 1800s, still relied on hand pickers to collect the crops, and continued to do so until the mid-20th century.

The first mechanical potato diggers were developed in England in the late 19th century. The first such machines were similar to plows, with a flat share in place of a moldboard, and a row of prongs, angled to bring the potatoes to the surface. Vasta *et al. (*1993) made a potato digger with oscillatory sieves and studied effects of blade shape, advance seed and sieve vibration on potato digger operation. The best results were related to V shape blade with 99.23% intact potato and minimum cut damages of

0.65% and zero bruise According to Muhhamad *et al. (*2003), The Mechanical harvest of potato relative to manual harvest causes 65% frugality at harvest time and 45% at harvest costs.

REMARKABLE FEATURES OF POTATO HARVESTER MACHINE:

This potato harvester machine can used for harvesting varieties of underground plants. High efficient. This machine can harvest 0.27 hectare field per hour and the feed capacity is about 180kg/s.Wide working width. Compared with other potato harvester, this potato harvesting machine has a wider working width about 800mm.Low loss rate. The loss rate of this machine is less than 0.1%.Wide adaptation. The machine is suitable for all kinds of soil, such as sandy soil, clayey soil and roam.Good performance. This potato harvesting equipment can harvest the potatoes without hurting the peel of the potatoes and harvest the potatoes with the potato vine.Easy operation. The machine is with simple and compact structure and can connect with the tractors easily.

DESCRIPTION

BASIC PRINCIPLE

In majority of potato growing area digging is done with hand tools like khurpa, spade, plow and animal drawn plows. In recent years improvements have been made and multipurpose digger, digger shaker and digger windrower have been developed. So, for save the man power & time required for harvesting we design a suitable machine for easy to harvest root crops.potato harvesting,peanuts harvesting,sugar beet harvesting,sweet potato harvesting

COMPONENTS

1. Steering Wheel
2. Engine
3. Wheel
4. Steel blade
5. Conveyor
6. Basket

FABRICATION

WORKING PRINCIPLE

The potato harvester dig the potatoes by the digger web and then lift them to the sieving webs. The machine harvests the potatoes by lifting the potatoes from the bed using a share. Soil and potatoes are transferred onto a series of webs where the soil and the potatoes are sieved out and the potatoes are separated from the soil. As harvesters move through rows of potato crops, adjustable steel discs cut any debris or foliage that may block the mouth of the elevator. These discs can be set to cut soil away from the sides of a row's ridges in order to reduce soil uptake by the elevator. Harvesters comprise a digging share, fixed in front of the elevator and attached to its frame, which must be set to cut beneath the lowest potatoes. Once the digging share has undercut and loosened the lowest level of potatoes, the soil and crop is moved onto the elevator web. Soil and debris then fall through the chain web, while the potatoes conveyed rearward to the top of the harvester; this is the primary separation process.

Once at the peak of the harvester, the tops of the potatoes are taken off by an elevator with fitted bars, and carried away; the potatoes fall through the web onto another cross-web conveyor, often consisting of rubber-covered bars. They are transferred to two additional web conveyors in order to remove soil before reaching an adjustable separator. This separator, an endless rotating belt, can be lifted or lowered at the end nearest to the potato conveyor.

Potatoes roll down the separator toward a potato conveyor, while other flat or rough objects remain on the separator to be transported onto a stone and trash conveyor. Once fully separated, the potatoes are transferred.

FABRICATION

CONCLUSION

This paper presents theoretical aspects of potato harvesting machine. In this work we considered all the effort taken by human being that has to be reduce. The future work is

smooth moving and optimization of size. We improve the design world marked demand and customer requirement is quality product within time in a low cost. The present works only included the design of components. We can also modify this design for two row harvesting as well as reduce the height as well as system loads by increase wheel size and by modifying in design.As to the assumption, the exposing efficiency was averagely increased by around 4% compared to the traditional lifter. The modified potato digger has the qualities desired at the start of the project.

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