

DESIGN AND DEVELOPMENT OF CORN REAPER MACHINE

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ABSTRACT—this machine for farmers who have land area of less than 2 acres. This machine small in size and it covers area up to 2.5feet.in this machine cutting blades are used for cutting purpose. Cutting action done by reciprocating scotch yoke mechanism.

It runs on IC engine, rotating motion transmitted from machine to cutter blade through pulley and bevel gear box transmission system. Whatever cutting material are collecting by chain sprocket mechanism to one side after cutting.

This compact harvester will be fabricating using locally available spare parts and thus, it is easily maintainable. This harvester might be overcome all problems faced by a small-scale farmer regarding cost and labor implementation. After testing this machine in farm, the cost of harvesting using this harvester will considerably less as compare to manual harvesting it will be found that this machine affordable to farmer ..

Keywords- scotch yoke mechanism, gear box, chain & sprocket

I. INTRODUCTION

India's agriculture is composed of many crops, with the foremost food staples being rice and wheat. Indian farmers also grow pulses, potatoes, sugarcane, oilseeds, and such non-food items as cotton, tea, coffee, rubber, and jute (a glossy fiber used to make burlap and twine). India is a fisheries giant as well. A total catch of about 3 million metric tons annually ranks India among the world's top 10 fishing nations. Despite the overwhelming size of the agricultural sector, however, yields per hectare of crops in India are generally low compared to international standards. Improper water management is another problem affecting India's agriculture. At a time of increasing water shortages and environmental crises, for example, the rice crop in India is allocated disproportionately high amounts of water. One result of

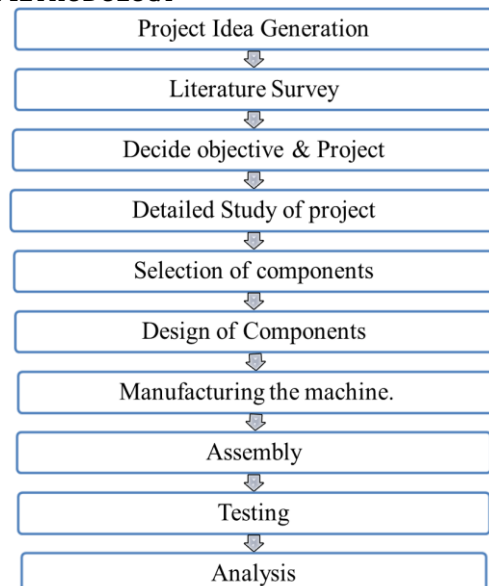
the inefficient use of water is that water tables in regions of rice cultivation, such as Punjab, are on the rise, while soil fertility is on the decline.

Aggravating the agricultural situation is an ongoing Asian drought and inclement weather. Although during 2000-01 a monsoon with average rainfall had been expected, prospects of agricultural production during that period were not considered bright. This has partially been due to relatively unfavorable distribution of rainfall, leading to floods in certain parts of the country and droughts in some others.

II. OBJECTIVES

1. To reduce the man power.
2. To reduce harvesting cost.
3. To design & develop crop reaper for small farms.
- 4.

III. METHODOLOGY



IV. WORKING PRINCIPLE

Engine output shaft power transmitted small pulley to large pulley by v-belt drive which is attached to bevel gear input shaft to get correct speed aspect ratio, after that horizontal rotation of shaft convert into vertical rotation shaft of bevel gear. Scotch yoke mechanism attach to another end of bevel gear output shaft which is mounted on disk to convert rotary motion into reciprocating motion to get scissoring operation for cutting corn.

V. PROBLEM STATEMENT

1. Manual labor takes time and is not effective as they can work for 3-4 hours at a stretch.
2. Even if the land holding is small, it takes two or three days to completely harvest the crop.
3. High costs of machines and maintenance, non-availability of appropriate agricultural machines and equipment that cater to and suit the requirements of small scale farms.

VI. LITERATURE SURVEY

1. **Design and Fabrication of Agricultural Crop Reaper**
 Shravan U. Burade, Rohit S. Ghatule, Varad G. Kannadkar, Neel V. Sonawane(2017)
 This machine able to cut crop like corn and sugarcane.Machine driven automatically using by engine.
2. **Design & Development of Mini Paddy Harvester**
 Aravind C Shivashankar V Vikas R Vikas(2015)
 - The machine was tested in laboratory to check its cutting capability and efficiency.
 - Cost of harvesting by this machine is considerably less as compare to manual harvesting.
3. **Design And Analysis Of Arm Of Reaper And Binder Machine(2016)**
 - They had Compare deformation of existing material aluminum alloy and mild steel.
 - It concludes that the reduced deformation reduces losses of cut stores which are collected.
4. **Design and Fabrication of Agricultural Crops Reaper**
 A R Bhabad , G S Puranik I S Sonawane , M R Pawar , A.R.Mali(2015)
 - The design of efficient reaping machine which will counter the problem of cutting corn plant manually for small scale farm.

VII. CALCULATION

1. Engine Specification

Mileage: - 67 Km/L
 Engine Displacement: - 99.7 cc
 Speed: - 6000 rpm max
 Max Power: - 4.35 PS
 Weight: - 5 Kg
 Starting: - Kick Start Only
 Standard Warranty (Years):-1 Year

VIII. MODEL

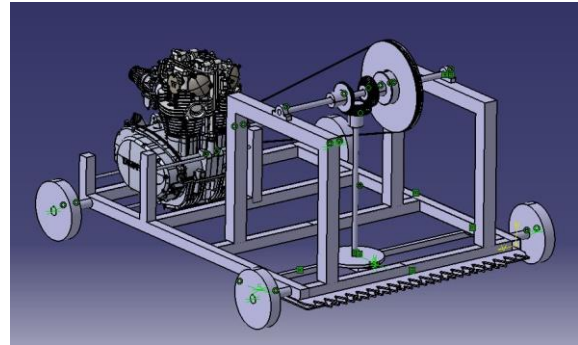


Fig.1: 3D View

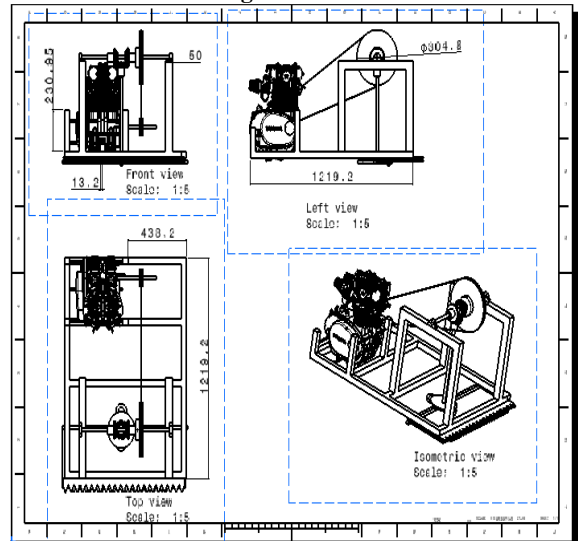


Fig.2 : 2D View

IX. REASERCH GAP

- 1.While converting rotary motion into reciprocating motion they are using single slider mechanism which is complicated in construction and more design part so automatically cost increase , that's why we are using Scotch yoke mechanism instead of single slider mechanism for same transmission.
2. There is a need for a smaller and efficient combine reaper which would be more accessible and also considerably cheaper.
3. Reducing human efforts by introducing driving system in crop reaper.

X. ADVANTAGES

1. The cost of harvesting using this machine is considerably less as compare to manual harvesting.
2. Simple to construct.
3. Low capacity motor is sufficient.
4. Easy maintenance.
5. Less skilled operator is sufficient.
6. Less power consumption.
7. Noise of operation is reduced.

XI. CONCLUSION

1. Fabricating corn reaper machine with maximum work done by system.
2. Area covered 0.5 ha/hr with fuel consumption 5.27 l/ha.

3. Evaluate harvesting losses for mechanical and manual harvesting.
4. Harvesting cost of corn reaper machine reduce as compare to manual harvesting.

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