

DESIGN AND DEVELOPEMENT OF COMPACT SOLAR AGRICULTURAL HARVESTER USING QUICK RETURN MECHANISM

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Abstract: Agricultural provides highest contribution to national income. This mainly for increased nonfarm job opportunities having highest wages, migration of labor force to cities and low status of agricultural labors in the society. Hence, it's required to design and analysis the crop cutter machine which is help to the Indian farmer which is in rural side and small farm. It will reduce the cost of crop cutting in fields. This research includes various problems associated with harvesting of agricultural food where identified. The aim of research was to design low cost, high efficiency, multipurpose, mini combined harvester for production using locally available materials at reasonable cost. The research was to ensure improved performance and low cost maintains of harvester for use by farmers in developing nations. The selection of materials for the design was achieved using Cambridge Engineering Selector (CES) 2014.



Key Words Agricultural, Cost, Farmers, Solar Panel, Cutting Blade.

1. INTRODUCTION:

Development in industry and transport is impossible without progress of agriculture. Stability of prices also depends on agriculture growth. Recently, In India has seen a shortage of skilled labor available for agriculture. Because of this shortage the farmers have transitioned to using harvester. This harvester is available for purchase but because of their high cost, they are not affordable. However, agricultural shops make these harvesters available rent on an hourly basis. But the small holding farm owners generally do not require the full feature combine harvesters. Also, these combine harvesters are not available in all parts of rural places due to financial and transport reasons. There is a need for a small and efficient combine harvester which would be more accessible and also considerably cheaper. The mission is to create a portable, friendly and low-cost mini harvester.

2. PROBLEM STATEMENT:

Small scale farmers cannot afford such costly harvesters which are available in market, hence we have developed low cost multipurpose mini combined harvester. The estimated cutting force will be used for finding the cutting force.

3. OBJECTIVES:

1. To minimize time of harvesting.
2. To minimize human effort.
3. To encourage use of non-conventional energy sources.
4. To reduce release of Pollutants.
5. To grab attention of small-scale farmers to use machinery.

4. COMPONENT TO BE USED:

1. Solar panel
2. Cutting blade
3. Gear assembly
4. Battery (12V)
5. DC Motor

5. WORKING OF MECHANISM:

It is a walk behind type of harvester which is powered by the 1HP,1440 rpm electric motor. With the help of V-belt, drive power is transmitted gearbox. As the required rpm at cutter is as less as 200 rpm, Here, high torque Johnson type motor is used to collecting the crop cut by cutter blade. One end of this output shaft is connected to slider crank mechanism which converts rotary motion of shaft into reciprocating motion of cutter blade. Reciprocating cutter blade slides over fixed blade and creates scissoring action responsible for cutting the crops. Collecting mechanism consist of flat belt with collecting plates bolted on it. We give input electric supply to electric motor, when electric motor start it transmit the power to the gearbox with the help of V-belt drive through pulley arrangement. Shaft is connected to the quick return mechanism. Quick return mechanism which converts rotary motion of shaft of reciprocating motion of cutter blade.

Working of Solar Panel – Photovoltaic modules use light energy(photons)from sun to generate electricity through the photovoltaic effect. The majority of modules used wafer based crystalline silicon cell or thin film cells. The structural (load carrying) member of a module can either be top layer or back layer. Cells must also be protected from mechanical damage and moisture. Most modules are rigid, but semi-flexible ones based on thin film cells are also available. The cells must be connected electrically in series one to another.

6. ADVANTAGES:

- Self-sustained machinery.
- Comact Design.
- Affordable to small scale farmers.
- Especially for small farming areas (3-6 Acres).

7. FUTURE SCOPE:

- The laborious and repetitive task once performed by man are replaced with autonomous machines.
- The whole of the harvesting process can be automized by using multitasking harvesters, which can perform various tasks simultaneously.
- Use of remote control can be also introduced.
- The collector of the machine can be replaced by storing facility.

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- 5) Prof. N.S.L. Srivastava stated that the problems which farmer facing while harvesting and maintaining the agricultural field. This paper was an in-depth study of the farming.