DESIGN AND FABRICATION OF MULTI PURPOSE ROBUST CUTTING MACHINE FOR AGRICULTURAL

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Introduction:
In India agriculture has been facing serious challenges like scarcity of agricultural labour, not only in peak working seasons but also in normal time. On the other hand cultivable land is decreasing due to urbanization. Agricultural mechanization is one way to overcome this problem. The main agriculture products in India are groundnut, paddy, sugarcane and wheat. Some of these agriculture products are explained below-

For plantation of sugarcane, the sugarcane seed has to be planted in wet soil. This sugarcane seed is nothing but part of sugarcane. In traditional way farmers use to cut whole sugarcane in 5-6 parts, in such a way that each part having 2-3 seeds. Then those cut parts are planted in soil. Straw is remaining part of Jowar and Maize plant, after removal of corn part. Farmer use to cut this straw and use this cut parts as a food for pet animals like buffalos, ox, cows and goat etc. Groundnut is one of the important agriculture products in India. Farmer use to separate groundnuts from its plants by manually. This require more man power as 20-30 labours per acre, and also this is time consuming operation. Rice is one of the favorite foods of India. Paddy is the initial stage of it. Farmers removing this paddy from paddy plant called as paddy stripping, and this is done by several methods. Most of the time farmers use to remove paddy from its plant by manually.

Objectives:
- To perform more than one operation at a time.
- It is suitable for high volume production of agriculture product.
- To reduce most of processing time.
- To reduce labour cost.
- To overcome the problem of labour crises.

Methodology:
For the successful completion of our project the following methodology is adopted. The number of components required for the project are fabricated and assembled separately to form a low cost energy efficient multi-purpose robust cutting machine.
In this project, the idea is to make mechanization of some agriculture and designed and fabricated a Machine, where it can do the following operations,

Methodologies used in this machine are explained below.

1) **Sugarcane Seed Cutting**
   The sugarcane seed cutting machine is mainly based on CAM OPERATION. One shaft placed vertically, the sharp blade is placed at the bottom of this shaft. Rotator motion of the cam is converted into reciprocating motion of shaft. A pin is placed at the base so that waste of sugarcane and sugarcane with seeds will be separated.

2) **Groundnut Stripper**
   Groundnut stripper consists of rubber blades mounted on the small shaft which will rotated by motor. The power of motor is transmitted to the blades through shaft. The groundnut plant will be feed to blades with the help of slider by manually. Then rotating blades will separate the groundnut from the plant.

3) **Straw Cutter**
   Straw cutter consists of three blades which are mounted in circular ring that is connected to motor through belt drive. The power of motor is transmitted to the ring with the help of pulleys and belts. That rotating blades will cut the straw in small pieces.

4) **Paddy Stripper**
   Paddy stripper consists of two rims. These rims are mounted on one central shaft, and that shaft will connected to motor through pulleys and belt. The power of motor is transmitted to rims. The rotating rims will separate the paddy from plants.

![Model of multipurpose robust cutting machine](image-url)
Conclusion:

In multipurpose robust cutting machine, four individual operations are combined. By using this machine the problem of labour crises can be reduced, because it makes the process faster and labour required for operate the machine is also less.

It performs more than one operation, so processing time can be saved. In the sugarcane seed cutting operation wastage of sugarcane can be controlled and cut seeds are easy to sowing. In the groundnut stripping operation instead of 10-20 labours per acre only two labours can separate the groundnuts from plant by using this machine. In the paddy stripping operation while separating paddy from plant wastage will be more in traditional methods. By using this machine wastage will be less and instead of 5-6 labours only 2 labours can do the same operations in minimum time. If this machine is used by maximum number of farmers definitely farmer can overcome the labour crises problem, which reduces the labours cost and process become faster and easy.

Future scope:

The future scope for this machine is very wide. In market separate machines are available for individual operation and also these machines are costlier. Some more number of operations can be combined. And some of the operations can be done by manually handling. If wheels are provided to machine then it can moved from one place to another place. By using worm gears automatic feeding of straw can be done in straw cutting operation.