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# Conceptual Design and Fabrication of Mulching Paper & Drip-laying Machine

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**ABSTRACT:** In today's modern world the use of mulching paper in agriculture is increasing day by day due growing importance in increasing crop yield. Deficit rain poses a big problem for any agricultural activity In order to increase crop production with scarcity of water farmers are moving towards technical solutions like plastic mulching paper. Mulching as a practice to conserve soil moisture, check weed control, moderate soil temperature and provide a micro climate to the plant is age old. With the advent of plastic films for mulching application, this practice has got further importance. Research studies have shown, when mulching is practiced along with drip irrigation, it gives best results. Plastic mulching paper retains soil moisture and prohibits weed growth at the same also maintaining soil temperature. Even though this technology is quite old and versatile, its use in India is still limited due to difficulty of laying the mulching paper manually. This is because lack of availability of labor and high cost of labor. There are automatic machines but they are either not available in India or the use is limited to large scale farming.

**KEYWORDS:** Mulching, Moderate, Irrigation.

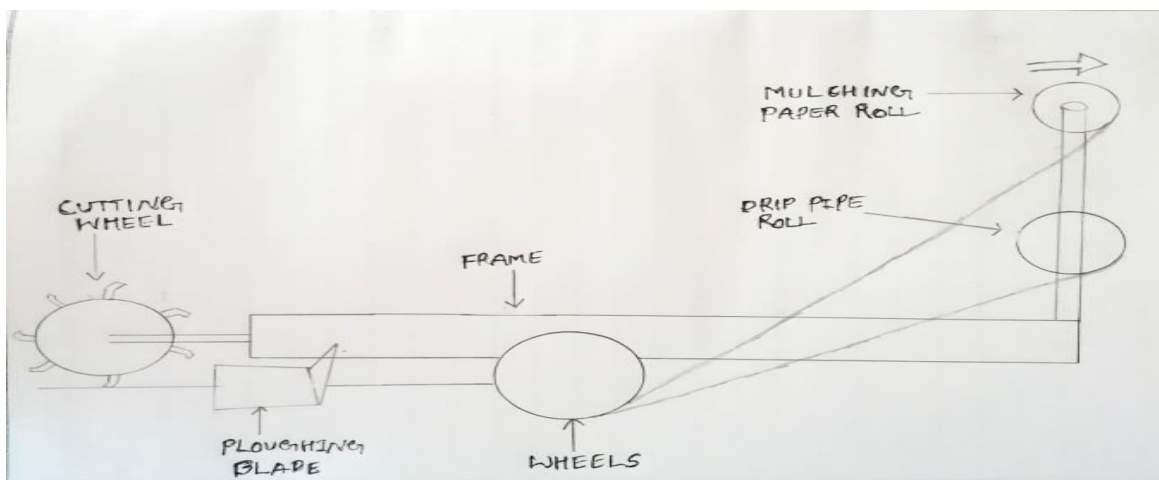
## I. INTRODUCTION

Mulching is a process of covering the soil and makes more favorable conditions for plant growth and development. Mulching is the practice of covering the soil around plants to improve the growing conditions for the crop. Mulching can do with organic or inorganic materials. That aims to cover the soils and forms a physical barrier to limit the evaporation of water from the soil, automatic control of weeds, preserve a good soil structure, and protecting the crops from soil contamination. Naturally available mulches are those derived from animal and plant materials, if they are used accurately they can give all profits which a plastic mulch give. Natural mulches help in maintaining soil organic matter and provide food and shelter for earthworms and another desirable soil biota. However, natural mulching materials are not available in sufficient amounts, their quality is inconsistent, and they require more lab us for spreading. Natural mulches do not always provide sufficient weed control, they may also carry weed seeds and repeatedly slow down the soil warming in the spring season and such condition can delay the growth and ripening in warm season vegetables. To meet the growing needs of the farers and to increase the profitability by using more efficient types of machinery in the least capital cost, the manual mulching machine can be the one. The use of plastic mulch in agriculture gives benefits such as an increase in soil temperatures, easy of weed management, moisture conversation, reduction of certain insect pests, high crop yields, and more efficient use of soil nutrients. Historically natural mulches such as straw, compost, hay and wood chippings have been used but over the last 40 years, paper and plastics have been tried. Because of its poor wet strength and price, the paper has been found less effective and more costly than plastic. The result is that plastic mulch film the primary choice for agricultural application. Plastic mulch film is widely used on high- value crops, such as Tomatoes, Melons, Cucumbers, Squash, Peppers and Strawberries increasingly on lower value crops such as Corn and Ginger. For arable soils, the most effective conservation practices for reducing water loss through surface evaporation are those that provide some degree of surface cover for the soil. A cover can be best provided by mulches or by tillage practices that leave plant residues on the soil surface. Mulching is a long-time practice of gardeners to prevent loss of moisture and to control weeds. It also increasing in favor as municipalities restricts the use of water for lawns and landscapes. Mulch is a layer of organic or inorganic material placed over the root zone of a plant to benefit the roots and the soil. Organic materials may include wood chips, bark, pine needles, and straw, leaves, or grass

clippings. Mulch changes the environment in which the plant is growing. These changes have the most influence on crop development during periods when growing conditions are less than ideal. The weather conditions that commonly result in plant stresses are low rainfall, cool air temperatures, and cool soil temperatures etc.

## II. METHODOLOGY

The main purpose of the machine is to lay the mulching paper and drip pip on the beds of the soil and punching the holes on the mulching paper. It can help to reduce the capital cost and time of laying the mulching paper and drip pip using the most convenient methods well placing the all operation in one pass of the machine. When the operator operates the machine by the handle and pushes it's to the front towards the bed. Though the wheels start rotating and at the same time paper is placed under the front wheels because of that the mulching paper roll is also started rotating and starts unwound. The mulching paper operated through the roller operated mechanism. As the machine moves forward the paper is also continues un- winding and lay on the beds. the paper cutting wheel is mounted on the rear side of the frame and the wheel starts rotates with the axle it also starts making holes on the paper and as the machine speed varies at the same rate the cutting wheels speed varies and hence the hole are made at specified fixed length at any speed. The cutting wheels are operated using the self-weight operated mechanism in which due to the gravitational force the operation of punching Holes can be done. The drip pip all ready underneath the mulching paper which is fixed in one end, the role of the drip pip also states un winding along with the mulching paper. The ploughing blade help to plough the soil on the sides of the bed that causes the mulch paper tightly hold and no chances of the get realize it will keep the paper up to 7 to 10 cm



(a) Concept design



(b) Actual model



### III. EXPERIMENTAL RESULTS

A performance test was carried out, It can be carried from one place to another its mobile Application. Simple in construction economically worth full. There is no fuel consumption hence environmental friendly. Mulching paper laying machine has a good future scope in an agricultural sector. The main constraint of this machine is it has low operating costs. This machine will make it pay for itself with in short period of time and it can be a great companion in any field dealing with rusted and unused metals. The machine affords plenty of scope for modifications such as: Increasing machine efficiency. The machine affords plenty of scope for modifications such as: Increasing machine efficiency.

### IV. CONCLUSIONS

The laying of plastic mulch film entails considerable time, labour expenditure and is extremely tiring. Laying of plastic mulch film by means of machines increases efficiency and results in less expenditure on labours the increasing demand for horticultural produce and health consciousness among people it has become imperative for us to produce more as well as good quality produce to sustain in the international market. Plasticulture is crucial to Indian agriculture in view of the changing technological scenario for boosting crop yields and productivity. To minimize the time consumption and capital requirement during laying operation and to increase the efficiency, with low cost, it demands appropriate technology. Since the majority of farmers are small and marginal using the manual as a source of power, an effort he has been made to developed manual plastic mulch laying machine. The developed manual plastic mulch laying machine was fabricated for laying mulch film on the pre-prepared bed for different vegetable crops.

### REFERENCES

1. Prof. Amay Tipayale, Mayur S. Salunke, Samadhan U. Thete, Tushar S. Thete, Sandip B. Thete, "Advance Mulching Paper Laying Machine", IJSRD - International Journal for Scientific Research & Development| Vol. 5, Issue 03 2017
2. Chitra Madhu Sudhan Gowd, Prof. B. Durga Prasad, "Design and development of plastic mulch laying machine in agriculture", International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES), Volume 3, Issue 11 November 2017.
3. M. J. Lawrence, D. R. Buckmaster, W. J. Lamont, Jr.[1], "A pneumatic dibbling machine for plastic mulch", American society of agricultural and biological, Volume 2, Issue 16 November 2016.
4. P. Zemanek , Z. Abraham, P. Burg, "Economic effectiveness of mulching machines operations", American society for horticultural science, Volume 6, Issue 2 November 2012.
5. M. J. Lawrence, D. R. Buckmaster, W. J. Lamont, Jr., "a pneumatic dibbling machine for plastic mulch", American Society of agricultural and biological



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