

Single Pass Seedbed Preparation Attachment for Low Power Tractors - Literature Review

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Abstract— It is reported that 65% of Indian population is dependent upon the agriculture. Since the demand for different crops is increasing day by day with the increases in population. Due to the shortage of manpower and unpredictable weather conditions land remains attained from farming. The land preparation is the key process in farming activities. It includes cultivation, spreading of compost manure, mixing of crop residues from previous season and making it ready for next season. These three processes are carried out separately so it is time consuming and costly. This project is an attempt made to develop an agricultural engineering solution in the form of an attachment combining all three operations at a time. This will help in time saving and cost cutting. To carry out this project some literature is referred from various journals. This paper is a review of research work carried by various researchers in this area. The paper will give different considerations and calculations to proceed with the attachment unit. A primary solution to the problems presented in various research papers are proposed as a conclusion of this paper.

Key words: Cultivation, Compost Manure, Crop Residues

I. INTRODUCTION

Farming is the main business in India; mostly it is carried out with the help of conventional instruments and processes. Conventional agricultural processes are time consuming and costly too. Diverse weather conditions prevails the preparatory agricultural processes. For small-scale farming, to get the manpower with the reasonable cost is very difficult. Thus the agricultural business is becoming the last choice, even for traditional farmers. Therefore it is of top priority to develop the cost effective mechanism and raised the yield. In this regard, brief information collected from some research papers and presented in this paper. It's relevance and scope is discussed. For this an attempt is made too combine the several land preparation processes in a single pass, so that the time and cost for the land preparation can be optimized.

II. SMALL FORMERS IN INDIA: CHALLENGES AND OPPORTUNITIES

S. Mahendra Dev this paper gives the detail discussion about the roles and challenges of small land holding agriculture in India. It includes the trends in agriculture growth cultivation pattern, and participation of small land holding agriculture. It also consists of the study of productive performance of small holders, their linkage with market including value chain. Role of small land holders in food security and employment generation. This paper also focused on the different sources on information regarding the policies and institutional support for small land holders about the challenges and future options. It provides the lesson from the experience of agriculture in India on small land holder's for other countries.

III. ANALYSIS OF TRENDS IN INDIA'S AGRICULTURE GROWTH

Elumalai karnam et. al. has study and analyze the trends of agricultural growth and pattern change in food grains and pulses has been observed. The increased in the production is only observed after 1960, Because of the use of technological inventions in the cultivations of crops. The study conducted on the growth from 1968-69 to 2007-08 with reference to the crop like rice, wheat, pulses etc. An attempt has been made to examine the to determinates of aggregate growth of crop output at different levels through the neo-classical growth model. Similarly compound annual growth rates of area for major crops buy states has been observed and concluded. There is potential for enhancing production of major crops through better soil and water management.

IV. ORGANIC MANURES

Dr. Krishan Chandra detailed the use of organic manures. The ill effect of using modern agricultural practices, such as, using chemicals and fertilizers on human health. The author attempted to collect the practical information on the form of booklet on organic manures, gives the practical and theoretical information about different organic manure. Also studies different sources and chemical compositions of manure such as from animal refuse, cattle dung, house dung etc.

The factors influencing the pre composting process such as particles size, nutrients, moisture contents, aerations and agitation. The benefits of organic manures are discussed. It is helpful in maintaining environment health by reducing the level of pollution.

V. ROTARY TILLER DESIGN PROPORTIONAL TO A POWER TILLER USING SPECIFIC WORK METHOD (SWM)

Hemad zareiforoush et.al. conducted the theoretical method for designing of rotary tiller. In this the rotary tillers are design for the power with the model Mitsubishi VST SHAKTI130 DI which is made up for primary and secondary tillage. In this the study of tiller is carried out under the static and dynamic work conditions on the basis of the work width determine which are 70 mm width and 15 mm depth at gear 1. The tillers are subjected to tortional moment and flexural moment by increasing stresses. It shows that the designs of rotary tillers, blades are mostly subjected to the fracture caused by the incoming stresses. The rotary diameter is optimizes by considering the value of maximum tangent forces and it is determined about 3.94 cm.

VI. EFFECT OF OPERATING SPEED, MOISTURE CONTENT OF SOIL AND APPROACH ANGLE OF SWEEP ON SPECIFIC DRAFT AND WEEDING EFFICIENCY

U.S. Kankal et.al design, developed self-propelled low cost , drag type weeder to counter the problem of weeding. The proposed weeder is tested for different soil with varying moisture and the varied approach angles. The study is carried out for three types of soil having moisture contents 13%, 15% and 18% an approach angle is varied from 60, 70, and 80 degree with the forward speed of 0.28 m/s, 0.42m/s, and 0.56m/s. the draft required for weeding is studied for above mentioned conditions. Out of which the approach angle 70, at the forward speed of 0.42 M/s of 15 % moisture content is optimized and the lowest specific draft required is 0.619 N/MM with the weeding efficiency of 89.58 % is observed. It is also observed that the increase in moisture content increases the draft required for weeding. The study concluded the draft force required to weeding increased with increase in moisture contents. The weeding efficiency is depends upon the forward speed. As the forward speed increases the weeding efficiency decreases.

VII. THE POWER REQUIREMENT OF ROTARY CULTIVATOR

B.N.Ghosh this paper describes the study of power requirement of rotary cultivator at different rotor and travel speed. When working at different speed, different soil types and moisture contents. The data regarding the torque requirement is collected with the help of various electronic equipments'. The collected data is validated with the help of dimensional analysis approach, which leads to the correlation equation gives reference for soil and moisture contents. the torque requirement is directly proportional to the depth of working and forward speed of operation and the inversely proportional to the speed of rotation of rotary cultivator.

VIII. COMPARISON OF TILLAGE FORCES AND WEAR RATES OF PRESSED AND CAST CULTIVATOR SHARES

I.M.Fielke et.al. Study has made on the different materials and dimensions of the cultivator shares, by considering different types of soil and its moisture contents for several years. The effect of forces on the wear rates of the cultivator as per the thickness. It is observed that the wear rate to be independent of speed of tillage, but the soil type and condition i.e. moisture contents had a large effect on its wear rate and tillage forces. Wear rate also measured in relation to the different parameters like draft forces, vertical up forces and mass loss per unit of distance travelled.

For the measurement of forces the single line dynamometer was used for all test. The draft forces were measured using spectrum STC "S" shaped load cell of 10 KN capacity. The measurement also done as per the rain i.e. capacity of moist soil conditions. The result shows that the maximum value of draft forces is 685 N @ 12 km/hr speed for the dry soil condition and 459N for the wet soil conditions @12km/hr.

IX. FARM EQUIPMENTS INDUSTRY PERFORMANCE PAST AND FUTURE

Bruce Bjornson et.al. Study the farm equipments manufacturing company's developments and examine the

trends and fundamental uncertainties in the business. Review the prospectus by collecting data and analyzing data from the different equipment manufacturing companies in USA. Identified the important factors and uncertainties which may affect the future prospects. Tried to make the general interference based on expected form performance. Development of new products, farm equipments for the precision agriculture system represents the industry potential for adding new economic value. Economic growth of Asia is picking up which will eventually increase farm demand.

X. CONCLUSION

Considering the challenges and opportunities of small farmers in India, it is required for the agricultural sector to minimize the cost and time in preparation of land. It will also be helpful,

- 1) In increasing the yield from farm,
- 2) Promoting the use of compost manure(organic farming)
- 3) Reduce the air pollution due to less fuel consumption.

In view of above, it is intended to design and develop mechanical system which will suitable for Indian small and marginal farmers. Therefore it is decided to take the above mentioned topic as a research project work/desertation.

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