ISSN : 2455-9679
SJIF Impact Factor : 6.008

IJRTSM
INTERNATIONAL JOURNAL OF RECENT TECHNOLOGY SCIENCE & MANAGEMENT

"A STUDY ON CULTIVATOR DESIGN OF AGRICULTURE EQUIPMENT"

Devendra Kumar Yadav [1], ***Dr. P.K.Sharma*** [2]
[1] *P. G. Scholar, Department of Mechanical Engineering, NIRT, College, Bhopal, Madhya Pradesh, India*
[2]*Professor, Department of Mechanical Engineering, NIRT, College, Bhopal, Madhya Pradesh, India*

ABSTRACT

In Recent years we have seen remarkable development in the field of agriculture. Big farmers are using advance machine tools now a days like harvester, cultivator, tractor. In India where 65-70% farmers are still doing farming traditionally. They also need improved agriculture tools. In this article we study on failure and analysis of nine tine cultivator in different soil conditions. As an important agriculture equipment for soil preparation cultivator is used in which stress are form due to contact with soil where tine works as actual member of cultivator which is direct contact with soil. We can reduce the stress from changing the design of tine of cultivator. The soil tiller and weeder is one of the many farm mechanization in promoting soil tiller and weeders especially considering the fact that the majority of farmers are having small land. It reduces human effort. The implements are mostly self guided.

Key Words: *Agriculture, Machine tool, soil. Weeder, Cultivator, Tiller.*

I. INTRODUCTION

Because of some environmental concerns in the use of herbicides, alternative methods of weed control such as mechanical row crop cultivation is required. Crop cultivation is an excellent method of weed control. There are basically three types of cultivators: field cultivators, row crop cultivators, and rotary cultivators. Field cultivators are often used as secondary tillage tools for seedbed preparation. They are similar to chisel plows in appearance but they operate at much shallower depths. Cultivators used in residue-covered fields must allow residue to flow through the implement without clogging. Figure 1 shows the different types of tools that can be attached to a cultivator shank for different applications

Fig.1 Cultivator

ISSN : 2455-9679
SJIF Impact Factor : 6.008

II. LITERATURE REVIEW

In order to carry out this work we have undergone extensive literature survey and contribution of by various authors is as follows,

D.A. Mada, Sunday Mahai, [2013], In this research paper author has mentioned importance of mechanization in agricultural by giving examples. The conclusion from the paper was need of multifunctional single axel vehicle for pre and post harvesting . We have taken this as base for our research and further production of our multifunctional agricultural vehicle.

V.K. Tewari, A. Ashok Kumar, Satya Prakash Kumar, Brajesh Nare [2012] In this research papers author have done case study on farm mechanization in west Bengal as being part of India it give clear status about availability and progress in India. This ensured us to take right steps compared to current steps.

F.A. Adamu, B. G. Jahun and B. Babangida [2014]In this paper authors draws our attention towards the performance factor of a power tiller. Among those demand for light weight power tiller was sought out most. Fuel efficiency and field capacity such parameters are also discussed. We taken those points in consideration while designing a sustainable multifunctional agricultural vehicle.

David D. Wilson and John H. Lumkes[2015] In this papers authors have used certain multipurpose machine with help of this paper we were able to derive our attention to broader way also how attachments can be used for making a model more useful in efficient and sustainable way.

Mohammad Muneer Uz Zaman [2012] Author have emphasized on designing parameters of the grass cutter and he done research on reduction of cost of the material to be used. We taken this information for our design our one of the attachment which is related to grass cutter.

M. A. Quayami & Amin Muhamaad Ali [2012] Author have done extensive study by taking case study of Bangladesh. They have come with growth scope and other terms. We used their conclusion as one of the basic points to start our design for the multifunctional agricultural vehicle.

Adamade, C.A. and Jackson B.A. [2014] fellow researcher worked on Mechanization is recognized as the necessary major means needed to accelerate agricultural production and create a period of surplus in Nigeria. Indeed food sufficiency can only be attained in Nigeria by encouraging and promoting local designs and manufacture of implements and equipment at low cost. We have taken the useful data from this research paper.

Parminder Kamboj, Rohinish Khurana, Anoop Dixit [2012] Disc harrow, tractor, lase eveller, rotavator, BT cotton seed drill are available in more than 85% of societies. Tractors which are available in societies are ranging from 50-60 hp. Most of the hiring charges vary from 25-40 Rs. h-1 except that of laser leveler whose hiring charge is 500 Rs. h-1 and tractor hiring charge is 150-250 Rs. h-1 and rotavator hiring charge is 70-80 Rs. h-1. In more than 70% of the societies, annual use of the rotavator was 550 h. and annual usage of tractor.

G. Moitzi, T. Szalay, M. Schüller, H. Wagentristl, K. Refenner, H. Weingartmann, P. Liebhard, J.Boxberger, A. Gronauer [2013] The tractor-implement combination influenced via working speed and working width, the work time and fuel consumption. A tractor-implement combination operated in a high engine load had a great potential in reducing fuel consumption A well loaded “small tractor” with small implements are more fuel efficient than a worse loaded “big tractor”. This data have been used accordingly.

III. PROBLEM DEFINITION

Small-size farms are a huge issue in mechanization because of it’s against of the economics of scale”. These problems are classified into technological constraints, financial and economic problems, and environmental issues. There are machines available in the market nowadays which are generally used for large-scale farming and thus are not suitable

ISSN : 2455-9679
SJIF Impact Factor : 6.008

for small-scale farming conditions of the user. Big machineries involve higher cost and also high maintenance cost, which are not affordable for the users. Poor rural infrastructures such as roads, bridges, canals, and power network are one of the main obstacles in this sector. Also, in developing countries, farm labor is also a big issue. The income of farmers remains also very low and the wages for farm labors are increasing day by day. As Indian farmers are not much educated and are from rural area, they don't possess much machine operating skills; hence usage of complicated machines is not useful.

IV. CONCLUSION

The present study has analyzed the various literatures. After a careful analysis of various research studies conducted so for it has been found that sufficient studies have not been conducted on variable types of cultivator concept. Conclusion of the project work is that it helps the students to their extended imagination, engineering skills and fundamental knowledge.

REFERENCES

[1] D.A. Mada, Sunday Mahai, "The Role of Agricultural Mechanization in the Economic Development for Small Scale Farms In Adamawa State",The International Journal Of Engineering And Science (IJES) ||Volume|| 2 ||Issue|| 11 ||Pages|| 91-96 || 2013 || ISSN (e): 2319 2319 – 1805.

[2] V.K. Tewari, A. Ashok Kumar, Satya Prakash Kumar, Brajesh Nare"Farm mechanization status of West Bengal in India", of Agricultural Science and Review ISSN 2315 6880 Vol. 1(6) pp. 139-146 December 2012.

[3] M. A. Quayum& A"Adoption and Diffusion of Power Tiller in Bangladesh", ISSN 0258 Agril. Res. 37(2): 307-325, June 2012.

[4] Adamade, C.A. and Jackson B.A. " Agricultural mechanization: a strategy for food sufficiency", Scholarly Jou Science Vol. 4(3), pp. 152 Available online at http://www.scholarlyjournals.com/SJAS ISSN 2276 Scholarly-Journals.

[5] F.A. Adamu, B. G. Jahun and B. Babangida"Performance Evaluation of Power Tiller in Bauchi State Nigeria Agriculture and Healthcare 2224-3208 (Paper) ISSN 2225 Vol.4, No.9, 2014.

[6] David D. Wilson and John H. Lumkes "Design of a multipurpose agricultural vehicle and attachments for developing countrie", Agric Eng Int: CIGR Journal Open access at http://www.cigrjournal.org Special issue 2015.

[7] G. Moitzi1, T. Szalay, M. Schüller K. Refenner, H. Weingartmann Boxberger, A. Gronauer"Effects of tillage systems and mechanization on work time,fuel and energy consumption for cereal cropping in Austria",December, 2013 Agric Eng Int: CIGR Journal Open access at http://www.cigrjournal.org Vol. 15, No.4.

[8] Parminder Kamboj, Rohinish Khurana, Anoop Dixit "Farm machinery services provided by selected cooperative societies", December, 2012Agric Eng Int: CIGR Journal Open access at http://www.cigrjournal.org Vol. 14, No.4.

[9] P. Sarec, O. Sarec"Employment characteristics of tine cultivators at deeper soil loosening", Vol. 61, 2015 (2): 80–86 Res. Agr. Eng.doi 10.17221/72/2014-RAE.

[10] Sirisak Chertkiattipol , Tanya Niyamapa , Wanwisa Jantaradach , and Kridsada Saensuwan"The performance of rotary power tiller using prototype rotary blades in dry-land field",Maejo International Journal of Science and Technology ISSN 1905-7873.

ISSN : 2455-9679
SJIF Impact Factor : 6.008

[11] Subrata Kr .Mandal, Atanu Maity "Development and Performance Evaluation of a Light Weight Power Tiller", 15th National Conference on Machines and Mechanisms NaCoMM2011-35.

[12] Jeevarathinam A. Velmurugan C. Design modification and analysis of rotavator blade IOSR journal of mechanical and civil engineering e-IISN 2278-1684 p-IISN 2230-334X

[13] Jonathan Kuje Yohanna, Agno Usman Fulani & Y 'Williams Aka'ama "A Survey of Mechanization Problems of the Small Scale (Peasant)Farmers in the Middle Belt of Nigeria", Journal of Agricultural Science Vol. 3, No. 2; June 2011.