

BATTERY DRIVE MOTORIZED AGRICULTURE WEEDER: A REVIEW

*Kare K.M., ¹Adsul Siddharth, ² Ejgar Shubham, ³ Raut Sangram, ⁴ Vyavhare Nikhil

*Assistant Professor, ^{1,2,3,4} Student of Mechanical Department

S. B. Patil College of Engineering, Indapur, Pune, Maharashtra, India.

Abstract

Agriculture plays a vital role in Indian economy. The reason behind reduction in the productivity of agricultural is weeds. Weed removal is serious problem faced by the farmers that will reduce the farmer interest to continue cultivation. The main objective of this paper is to construct and develop a battery powered weeder to provide the best opportunities for cultivation. The working of this project is depends on the Battery .This is motorized equipment driven by the electrical energy which moves blades to cut the weeds by chain sprocket mechanism. The design is simple and easy to operate. This equipment is designed to minimize the human effort, to reduce the cost and provide the efficient work output. This weeder will fulfill the requirements of the marginal farmers.

Keywords: Agriculture productivity, weed control, Weeder, Women, Ergonomic, Weeding Efficiency, efficient work output.

1. INTRODUCTION

Agriculture is the backbone of India, and weed removal being one of the primary process in the field, there is a necessity for weed to be removed in all the fields to increase the quality of crops and to decrease the effect of weeds on crops [1]. A weed may be defined as any plant or vegetation that interferes with objectives of farming or forestry, such as growing crops, grazing animals or cultivating forest plantations. A weed may also be defined as any plant growing where it is not wanted [2]. For example: a plant may be valuable or useful in a garden, or on a farm or plantation – but if the same plant is growing where it reduces the value of agricultural produce or environmental values, then it is considered a weed. However, some plants are weeds regardless of where they grow. Considered [3]. Weeds are one of the major biological constraints that Limit crop productivity. A weed can be thought of as any plant growing in the wrong place at the wrong time and doing more harm than good. [4] In India about 4.2 billion rupees are spent every year for controlling weeds in the production of major crops. At least 40 million tons of major food grains are lost every year due to weeds alone. [5] Weeding activity is a strenuous one and the odd posture adopted by women while weeding may result in increased heart rate and leads to fatigue. Women generally adopt squatting and bending posture while doing these activities and maintain [6]. Weeding operation is carried out with indigenous hand tools like 'Khurapi' and spade. Recently many improved hand tools have been introduced for weeding [7]. Therefore many researcher design and developed a Battery operated weeder according to

women's capabilities. A brief review of Battery developed weeder has been incorporated into this paper.

2. LITERATURE REVIEW

S.S.Meena.et.al.[8]studied about weed management is an ever-present challenge to crop production. Presence of weeds in general reduces crop yield by 31.5 per cent (22.7 % in Rabi season and 36.5 per cent in Kharif and summer season). Yield losses due to weeds were about 65 per cent depending on the crop, degree of weed infestation, weed species and management practices. Presently available weeder mostly runs by tractor or power tiller, these are large in size, cannot work for low inter row spaced crops. The main working components of power weeder were flexible drive shaft, worm gear box, rotor shaft, flanges [8] Gite and Yadav [9] conducted experiment on optimum handle height for a pushpull type manually operated dry land weeder and used 15-point scale for determining rating of perceived exertion. They found rating of perceived exertion (RPE) values of 16.4, 11.5, 12.1 and B Prasan i.e. 5%-40cm, 10%-40cm, 5%- 44cm, 10%-44cm, 5% -48cm and 10%-48cm. It was observed that heart rate of operator during the operation of modified wheel hoe reduced by 11 beats per minutes as compared to the existing wheel hoe. Correspondingly oxygen consumptions also reduce. There was shift in the category of work load from "heavy" to "moderate". It was observed that the heart rate, oxygen consumption and energy expenditure was least for the workers operating the wheel hoe having cutting blade with 10% reduction and handles width of 44cm [9]. Patil.et.al [10] Indian economy is fully based on the agriculture sector. Rice is the most important staple food in Asia. More than 90 percent of the world's rice is grown and consumed in Asia, where 60 percent of the world's population lives. Rice production accounts for between 35-60 percent of the calorific intake of three billion Asians. India occupies 39.19 Mega-hector areas under paddy cultivation with the production of 106.0 million tonnes. India is second larger producer of rise. In India west Bengal stands first in production of paddy. And it is essential to remove unwanted corps. It is a plant that completes with crop for water, nutrients and light. Weed takes 30 to 40 percent of applied nutrients resulting in yield reduction. Paddy production in India during the year 2012-13 which is about 85.599 million tones and total loss of rice yield due to weeds is about 14.91 percent. More than 33 percent of the cost incurred in cultivation is diverted to weeding operations there by reducing the profit [10].A.K.M Saiful Islam.et.al. ([11] Mechanical intervention in crop production is increasing rapidly in Bangladesh. Researchers are finding ways to manage weeds in rice field using suitable mechanical devices instead of conventional hand weeding. The weeding efficiency was the highest in HW (92%), followed by BPW (78%) and BW (73%). Suchitra [12] developed women friendly cono weeder as per the

feedback received from women workers with ergonomic consideration. The mean value of working heart rate of all the selected subjects for cono weeder was 117.96 beats/min and mean value of corresponding oxygen consumption were 0.58 l/min [12].

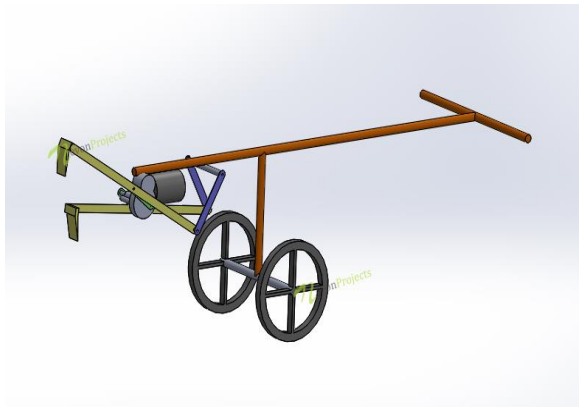


Fig1: Battery drive Motorized Agriculture Weeder.

3. WORKING

Battery drive Motorized Agriculture weeder offered by us are devices used for removing the weeds, stirring and pulverizing the soil and for loosening the soil after the crop has begun to grow. We manufacture these power weeder using high quality raw materials with the help of latest machines. These machines are widely used for weeding cotton, tomato, tapioca, paddy, sugarcane, pulses and various other plant fields. Weeder cycle is the equipment used in the agricultural field. In this equipment consist of Handle, Sprocket wheel, Rotor, Planet Gear, Chain, etc. The rotor and wheel are joined by the chain that will be attached to a frame. The motors in this machine are battery operated and can work efficiently for a longer time. The blades present in this paddy power weeder rotate efficiently for cutting and mulching of soil the weeding between the rows can be easily achieved since this machine is well suited for inter crop weeding. We offer these Battery drive Motorized Agriculture weeder fly in different grades based on the requirements of our clients. Our weeder is widely appreciated in various Indian and international markets for its longer life, durability, higher cutting efficiency etc. Customers can avail this mini power.

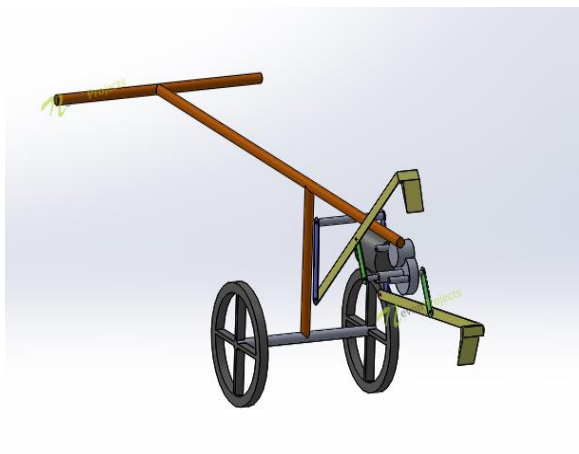


Fig2: Battery drives Motorized Agriculture Weeder.

4. CONCLUSION / DISCUSSION

Agricultural development plays important role as a driver of rural poverty reduction. The effort require to develop a weeder will meet the demand of farmers. The efficiency of weeder should be satisfactory and it is easy to operate. It was faster than the traditional method of moving weed. Less labor needed and it is more economical than hand weeding. Here do not use any fuel and power, Hence maintenance cost is very less. Cost of weeding by this machine comes to only one-third of the corresponding cost by manual laborers. The fabrication of Low cost Weeder is done with locally available material. The overall performance of the weeder was satisfactory.

REFERENCES

- [1] M. Rajshekhar et al. 2014. "Simulation and analysis of low cost weeder". International Journal of Research in Engineering and Technology, e-ISSN: 2319-1163, p-ISSN: 2321-7308
- [2] R.Yadav and S. Pund "Development and Ergonomic Evaluation of Manual Weeder". Agricultural Engineering International: the CIGR Ejournal. Manuscript PM 07 022. Vol. IX. October, 2007.
- [3] Sridhar H .S "Development of Single Wheel Multi Use Manually Operated Weed Remover",International Journal of Modern Engineering Research, 2013, Vol. 3, Issue. 6, Pp-3836-3840.
- [4] Dhatchanamoorthy.N, Arunkumar.J, Dinesh Kumar.P,Jagadeesh.K, Madhavan.P, "Design and Fabrication of Multipurpose Agriculture Vehicle", IJESC, Volume 8 Issue No.5 2018.
- [5] D. Ramesh and H. P. Girishkumar, "Agriculture Weeder Equipments: A Review", International Journal of Science, Engineering and Technology Research, 2014, Volume 3, Issue 7, Pp-1987-1992.
- [6] A.Hari Kumar, V. Deepanjali "Design & Analysis of Automobile Chassis" International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 5,Issue 1, January 2016.
- [7] Laukik P. Raut, Smit B. Jaiswal and Nitin Y. Mohite, "Design, development and fabrication of agricultural pesticides sprayer with weeder", International Journal of Applied Research and Studies, 2013, Volume 2, Issue 11, Pp-1-8.
- [8] B.Devojee, S. S. Meena. A. K. Sharma and C, Agarwal et.al "Development of portable knapsack power weeder" on volume 11 issue April 2018 pp. (35-40)
- [9] Gite LP, Yadav BG (1990) Optimum handle height for a push-pull type manually operated dryland weeder. Ergonomics 33(12): 1487-1494.

- [10] Keshavalu, B Prasan Patil, V. Ragavedra and Shafat khan et.al “Performance Evaluation of Wet Land Power Weeder for Paddy” on July 2017pp (1-8).
- [11] A.K.M Saiful Islam, M. T. Islam, M. Sh. Islam, A. K. M. Lutfor Rahman and M. A, Rahman et.al “Performance Evaluation of BRRRI Power Weeder for Low Land Rice Cultivation” on June 2017 pp (40-48).
- [12] Manish Chavan, Sachin Chile, Ashutosh Raut , et.al “Design, development and analysis of weed removal machine” on volume3 issue may 2015 pp-(526-532)
- [13] Keshavalu, B Prasan Patil, V. Ragavedra and Shafat khan et.al “Performance Evaluation of Wet Land Power Weeder for Paddy” on July 2017pp (1-8)
- [14] Sharma V (1999) Ergonomic assessment of weeding activity with conventional and modified tool. M.Sc. Thesis (Unpublished). Maharana Pratap University of Agriculture & Technology, Udaipur.
- [15] Amrita T (2017) Development and Performance Evaluation of Push Type Weeder for Women. M.Tech. Thesis (Unpublished). Junagadh Agricultural University, Junagadh.
- [16] Suchitra C (2016) Development of Women Friendly Cono Weeder for Paddy. MTech Thesis (Unpublished). DBSKKV, Dapoli.
- [17] Jaya S (2016) Ergonomic Design Modification in Intercultural Hand Tools to Make Female Worker Friendly. MTech Thesis (Unpublished), Indian Agricultural Research Institute, New delhi.
- [18] Yadav R, Pund S, Gite LP (2010) Ergonomic evaluation of male and female operators during weeding operation. *Agricultural Mechanization in Asia, Africa and Latin America* 41(2): 26-29.
- [19] Gite LP, Yadav BG (1990) Optimum handle height for a push-pull type manually operated dryland weeder. *Ergonomics* 33(12): 1487-1494
- [20] Yadav R, Jakasania RG, Vadher AL (2018) Segmental Proportions Based on Anthropometry of Female Agricultural Workers, India. *Ergonomics International Journal* 2(7): 1-9.