



VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION

ANNUAL RESEARCH JOURNAL

ISSN(ONLINE): 2581-7280

Sustainable E-Ploughing in Agriculture

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Abstract : *The main goal is to design a tool which can be a source of multiple usage in the field of Agriculture. In today's modern era machines have a vital role to play in the field of agriculture to make the process smooth and time saving, but in the past due to the lack of technological ideologies there was a lot of manual work involved which indeed was time consuming, fast forward to present conditions due to the increase in demand, time became an important commodity to satisfy the needs of the society. The proposed idea primarily focuses on e-ploughing which can be smooth and time saving, along with that, processes such as seeding, bedding, chopping of weeds/dead plants, etc. all can be done with the facility of detachable plough tool arrangement. In this way a lot of help can be offered to the farmers by making their work efficient and smooth through the process of e-ploughing.*

Keywords - *Agriculture, Detachable. E-ploughing, Efficient, Multi-purpose, Smooth.*

I. INTRODUCTION

Agriculture plays an important role in the Indian economy so creating an efficient process in this field should be the top priority. Traditional farming was led by the use of Animals and Humans itself. But once the modern era arrived the main problems the agricultural field faced were lack of labor availability, lack of knowledge regarding soil testing, increase in labor wages, wastage of seeds and water. To overcome all of the above demerits the idea of developing a sustainable e-ploughing for agriculture seem to be a necessity. The goal is to use the right kind of technology to efficiently perform all the tasks involved in Agriculture such as ploughing, seeding, mud levelling, watering, bedding of the field, etc. We know that Farming is the oldest industry in the world. The Historians are generally in agreement that the earlier model was to implement a crude pointed bent stick or tree branch which was used to plough the soil surface. In effect of that, a hand-held hoe in which the operator scratched at the earth to bring nutrients up to the surface and let the moisture penetrate the soil. This would then produce a suitable condition in which seeds could be sown on the respective surface. Then after around over 4000 years these basic hand-held tools soon developed into simple 'scratch' ploughs. These primitive ploughs were pulled by various animals such as oxen, camels or even elephants and in some instances even their women folk were used. Animals enabled the land to be tilled more easily and faster, which results in producing more food for their families. These 'scratch' ploughs continued to be used for more thousands of years.

The search went on and on to search out enhancements and within the middle 1800's, there has been monumental modification in plough tool development. Horse ploughs shortly became negligible and were replaced by the additional economical steam units with giant multi furrow balance ploughs. These ploughs were force by cable up and down fields, with solely the sound of a whistle to point a modification of tilling direction. mistreatment regenerate horse ploughs, the additional economical wheeled tractor slowly took over from steam units within the early 1900's and was the beginning of the fashionable system we tend to be conversant nowadays. this method of attaching Associate in Nursing implement to a tractor is currently universally used throughout the agricultural business. however, as we tend to quick forward to gift generation, all those charming ornamental grasses, flowers and shrubbery accents at our native farming centers and large fields are of massive plug. The industrial greenhouse market is poised to become a billion business at intervals succeeding four years, and growers ar progressively mistreatment robots to assist fill the high labor demand.

II. METHODOLOGY

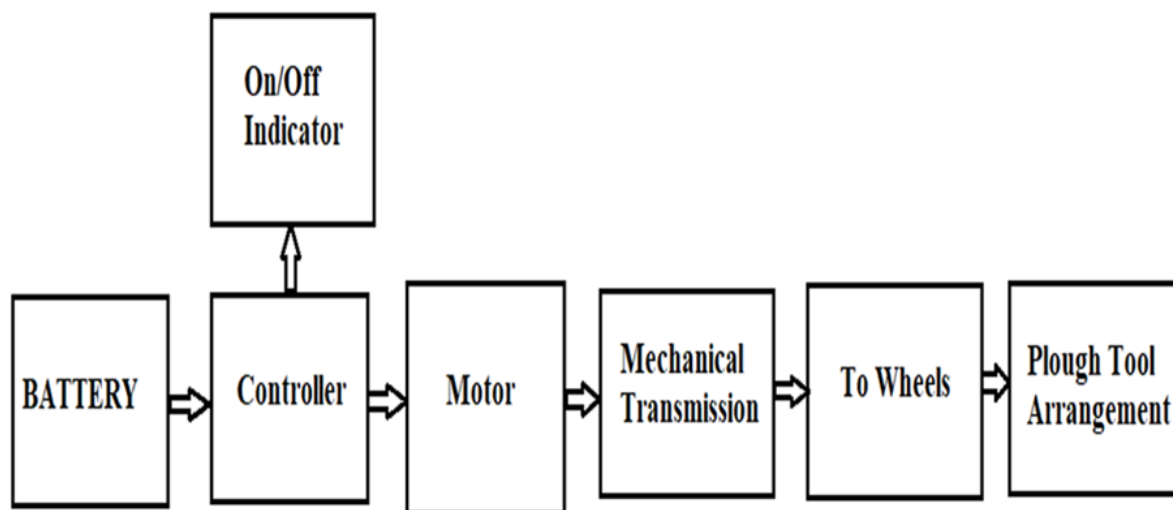


Fig 1: Flow Chart Representation of the Model

A plough could be a farm tool for loosening or turning the soil before sowing seed or planting. Ploughs were historically drawn by oxen and horses, however in trendy farms area unit drawn by tractors. A plough could have a wood, iron or steel frame, with a blade hooked up to chop and loosen the soil. it's been elementary to farming for many of history.

The prime purpose of tilling is to show over the topmost soil, transfer recent nutrients to the surface whereas burial weeds and crop remains to decay. Trenches cut by the plough area unit known as furrows. In trendy use, a plowed field is generally left to dry then harrowed before planting. tilling and cultivating soil evens the content of the higher twelve to twenty-five centimeters (5 to ten in) layer of soil, wherever most plant-feeder roots grow. Ploughs were at first hopped-up by humans, however the utilization of domestic animals was significantly additional economical. The earliest animals worked were oxen. Later, horses and mules were employed in several areas. With the economic revolution came the likelihood of steam engines to tug ploughs. These successively were outdated by burning hopped-up tractors within the early twentieth century.

From Fig.1 Starting from the left i.e. is the lithium ion battery which herein is of 12V which provides supply to drive the controller circuitry, the electric motor gets energy from the controller, which regulates the amount of power flow as soon as it does that the indicator block's LED flashes ON which indicates that the motor supply is now ON. After that power is transmitted from the Motor to the rear axle by means of a tubular propeller shaft. The rear axle must be able to move up and down on the suspension according to variations of the road surface. The movement causes the angle of the propeller shaft, the distance of the rear axle, to change constantly. To allow for the constant movement, splines on the front end of the propeller shaft slide in and out of the gearbox as the distance changes; the shaft also has universal joints at each end, and sometimes in the middle. The universal joints allow the propeller shaft to be flexible, while constantly transmitting power.

The last part of the transmission is the final drive, which incorporates the differential which is in turn designed to drive a pair of wheels while allowing them to rotate at different speeds. If we don't consider the use of it i.e. without a differential, such as in kart-wheel cars, both driving wheels are forced to rotate at the same speed, usually on a common axle driven by a simple chain-drive mechanism.

III. LITERATURE REVIEW

We have gone through in total of twelve reference papers all of them are mentioned below, out of all of them we have shortlisted a few from which we have taken some reference which helps us build our idea as a good and helpful one.

IV. RESEARCH GAP

Every year some or the other advancement is done so in the field of agriculture so there has been no such a gap in researching. The problem lies in the implementation of the research which is already been made in the past. For example: a vast amount of ideas and technologies are already invented and researched upon but the farmer is unable to bring them into practice that is due to various reasons such as unfavorable/constant changing climate patterns, overpriced new technologies, lack of proper knowledge, etc.

V. WORKING MECHANISM

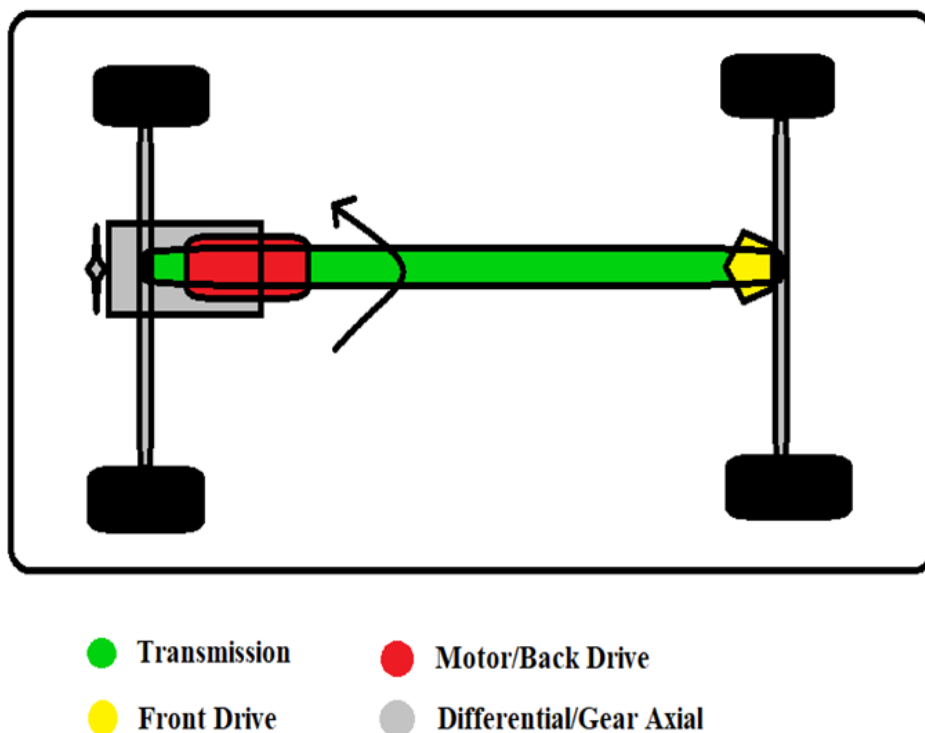


Fig. 2: Working Mechanism

The below diagram represents the basic working mechanism of the model which contains four main parts/blocks i.e. Motor drive system, Differential, Transmission and Front drive system.

Here the back wheels are driven and the front two wheels are left to be dummy. This is mainly done to make the transfer of load much easier. As the primary purpose of the vehicle is to plough which is going to be the main load here so as to efficient carry the load along and perform the respective task with smoothness such system is used.

VI. PROTOTYPE MODEL

The above figure represents the Basic Prototype model design of the machine, the concept here is to build a machine along with the detachable plough tool arrangement which can be attached at the backend part of the structure after the wheels and is designed in such a way that it is able to withstand all weather conditions and all tough terrains. Along with the plough tool the few other attachments are water/fertilizer spray and soil moisture measurement sensor, which can come in handy and can indicate the dryness of the soil.



Fig. 3: Prototype Model

VII. CONCLUSION

Machine introduced is multi-purpose i.e. it comes with a detachable plough tool arrangement so as to help the farmer achieve multi-tasking and avoid unnecessary machinery for various tasks, the primary focus is to achieve ploughing which is sustainable so as to keep the farmer care-free regarding its tools and equipment's in the long run. The model can be further expanded by making use of various equipment's such as surrounding temperature and humidity sensors, Battery ranging, automation of various parts, etc.

Acknowledgements

We shall be failing in our duty, if we will not express our sincere gratitude to all those distinguished personalities with the help of whom we have successfully completed our project. My deep gratitude to Dr. Arun Kumar, PRINCIPAL, VIVA INSTITUTE OF TECHNOLOGY, who have always played a great role in all round development of all students. My deep gratitude to Prof. Bhushan Save, THE HEAD OF ELECTRICAL DEPARTMENT and our project coordinator Prof Mukeshkumar Mishra and our project guide Prof. Anojkumar Yadav for their valuable guidance, advice and constant inputs to our work, also a big thankyou to all teaching and non-teaching staff for their kind support, help and assistance, which they extended as and when required.

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VIVA Institute of Technology
10th National Conference on Role of Engineers in Nation Building – 2022 (NCRENB-2022)

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