

Design and Development of Low Cost Tiller for Indian Cultivation Practices



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Abstract:

Agriculture in India is the most important, powerful sector and backbone of the Indian economy. India holds the second place globally in agricultural output. An account of 17% of the Gross Domestic Product and 51% of work force belongs to agriculture sector in India in 2012. As a result of mechanization in agriculture, a range of machinery and equipment arrived in this sector due to labour scarcity, to improve the productivity and to reduce the labour cost; subsequently all of the animal work is currently carried out by power tillers. Still complete mechanization in agriculture is an isolated dream for an Indian farmer due to high cost on purchase of agriculture machinery in India. This project is an effort to bring a solution for small farmers in India.

Design process has been started with primary research and identified the needs in the power tiller such as low cost, easy to maintenance and ease of transportation. Therefore data collection was carried out such as literature review, product study and market study. Ethnography and personal interviews have been conducted to understand the need and identification of the farmer. Ergonomic study has been carried out for deciding product parameter and user interface. According to Data analysis, QFD (Quality Function Deployment) and PDS (Product Design Specification) has been generated. Arrive at three different concepts that related to PDS and final concept was selected through weighted ranking method. Final concept was digital rendered using software such as Creo, Catia V5 and Keyshot.

A 1:1 working model has been fabricated at affordable cost. Major User requirements were fulfilled in the final product. Validation and feedback has been carried out with the user group for the final product. Results from users were positive and satisfactory.



3D Model of tiller



Digital rendering



Final working model of tiller