

**Impact of Rotary Tiller in Indian Agriculture : Overview****Dr. R.YADAV^{1*} and G.M. VEGAD²**

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Agriculture is an important sector of the Indian economy, accounting for 14% of the nation's GDP and about 11% of its exports. Agriculture in India is currently growing at an average compound annual growth rate (CAGR) of 2.8%. Agricultural workers, draught animals, tractors, power tillers, diesel engines, electric motors are used as sources of farm power in Indian agriculture. The availability of draught animals power has come down from 0.133 kW/ha in 1971-72 to 0.094 kW/ha in 2012-13, whereas the share of tractors, power tillers, diesel engines and electric motors has increased from 0.020 to 0.844, 0.001 to 0.015, 0.053 to 0.300 and 0.041 to 0.494 kW/ha, respectively during the same period. The total power availability on Indian farms has increased from 0.293 to 1.841 kW/ha at a CAGR of 4.58% during the last forty one years. The share of power tiller is less than one per cent during the period in spite of small size farms in India. The share of tractor power was maximum and increased by 39% over the years from 1971-72 to 2012-13.

Farm mechanization saves time and labour, cuts down crop production costs in the long run, reduces post-harvest losses and boosts crop output and farm income. Steady growth was observed in manually operated tools, animal operated implements, and equipment operated by mechanical and electrical power sources in India.

Tillage is the most important unit operation in agriculture. In India the most widespread method of tilling land is ploughing with moldboard ploughs. However, by the use of moldboard ploughs the upper layer of the soil is not always loosened to the desired extent, nor is the proper mixing of the different layers achieved. Hence, additional operations such as disking, cultivation and harrowing, etc., are carried out to improve on the ploughing.

Rotary tillers are the tillage machine used for accomplishment both the primary and secondary tillage operations. This machine has a huge capacity for cutting, mixing topsoil and preparing the seedbed preparation directly. Additionally, a rotary tiller has a mixing capacity seven times more than a plough. This tool decreases the soil traffic to a great extent by blending the soil. Using rotary tiller is increasing nowadays because of its various benefits. Its components works under miscellaneous forces because of power, vibration, pointless, impact effect of soil parts as after reaching to higher side.

The design optimization and manufacturing errors can be minimized by its components design analysis and optimization. Especially blades and transmission elements have to be reliable in field the performance against to operating forces. Predicting to stress distributions is so important for the designers, manufacturers and end user. Helping with developed technologies and design software which integrated in new generation computers, designs are getting easier and reliable. Designers can design own products in virtual screen and they can evaluate working condition of the products by simulating techniques using the computers. Computer programming are getting so widespread in the industry. Many of computer programming samples can be seen on different engineering disciplines.

The design optimization of tillage tool is obtained by making efficient design with matching proper tractor power to achieve the goal of economize energy consumption for farming systems

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