



Evaluation of Power Tiller Operated Vertical Rotary Plough for Tillage

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Abstract: The small size fields with uneven topography, lack of skilled labour, poor repair and maintenance facilities, low purchasing capacity of farming community and non-availability of improved farm implements and machines are some of the main reasons for low level of mechanization in the hilly region of the state. In hilly areas to promote farm mechanization a new type of rotary plough is designed. Power from main engine shaft is transmitted to the rotary blades by using bevel and spur gear transmission system. The maximum actual field capacity of vertical rotary plough (0.097 ha h^{-1}) was obtained when the rotor speed was 350 rpm, with the forward speed 2 km h^{-1} and the soil moisture content of at 14 %. The highest field efficiency of vertical rotary plough was 88.09 % when the soil moisture content was 14 % with a rotor speed 350 rpm and 2 km h^{-1} forward speed. The minimum fuel consumption of vertical rotary plough was 0.84 l h^{-1} when the rotary plough operated at 350 rpm of rotor speed with 1.5 km h^{-1} forward speed of operation and soil moisture content was 14 %. The maximum energy per unit area of vertical rotary plough $1298.71 \text{ MJ ha}^{-1}$ was obtained when the machine is operated at 2 km h^{-1} forward speed, 12 % soil moisture content with 550 rpm of rotor speed.

Keywords: Rotor speed, Forward speed, Rotary plough, Depth of operation
