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Research Paper :

Evaluation for cost effective combination of different seed bed preparation implements with large size tractors

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ABSTRACT

Land development, tillage and seedbed preparation, together account for a major share of power utilization in the crop cycle. The implements used for seedbed preparation needs to be evaluated for maximum field capacity with reduced cost of operation. The field tests were conducted in 65 x 150 m size plot .Two tractors 45 and 55 HP were selected for seedbed preparation with single bottom and double bottom reversible M.B. Plough for ploughing operation, two rotavators with working width of 1.2 m and 1.5 m for clod crushing after the ploughing and a two bottom ridger and single bottom reversible M.B.Plough for making ridges and furrows .The average depth of operation was 30 cm and both the tractors were operated in II –L gear for all the operations with all implements. The parameters selected for the study namely effective field capacity, theoretical field capacity, field efficiency, fuel consumption were measured and calculated as per RNAM test code. Among all the implements evaluated the total cost of seedbed preparation was found minimum (Rs. 5110.58/-per ha) in case of 45 HP tractor with 2 bottom reversible M.B.Plough, rotavator with 1.2 m working width and 2 bottom ridger . Tractor 55 HP accounted least total cost of seedbed preparation (Rs. 5345.66/- per ha) with a 2 bottom reversible M.B.Plough, rotavator with 1.5 m working width and 2 bottom ridger.

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The use of animals and animal drawn implements have been replaced by tractors and tractor drawn implements. The growing population in India calls for the mechanization for timely field operations to reduce cost of farm operations. The growth in use of tractor drawn machinery has been in the range of 9-17%. It is generally believed that only large size farm holding farmers have adopted mechanization inputs. However, data from Input Survey 1981-82, 1986-87 and 1992 of Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, reveal that farmers of all farm holding sizes have adopted implements and equipments from bullock-drawn implements to pump sets, threshers and tractors. Infact, the data shows that the percentage growth of tractors, pump sets and threshers was higher in the marginal and small farm holding categories.

Tractors are manufactured in India ranging from less than 25 HP to more than 45 HP but most popular range is 31-35 HP. The market is segmented in terms of horsepower into the 30 HP and less (lower) segment, the 30 HP – 40 HP segment and the higher segment above 40 HP. All major manufacturers cater to all the three segments. There has been a trend to move towards higher HP tractors, in recent years. This has been prompted by the need for newer applications and increasing awareness among farmers about new mechanization options. Punjab, Uttar Pradesh and Haryana have large demand for markets for tractors. These status account for more than 50 per cent of sales. Land development, tillage and seedbed preparation, together account for a major share of power utilization in the crop cycle (Mani and Panwar, 1992). Keeping these points in view a study was conducted to evaluate cost effective combination of different implements with different sizes used for the seed bed preparation with two different Hp tractors.

METHODOLOGY

The field tests were conducted in the field left after the harvest of sugarcane crop. Tractors of 45 HP and 55 HP were selected for the study of operation of different implements used for ploughing, clod crushing and making ridges and furrows. The details of implements used for various operations are given in Table 1.

The average depth of ploughing was 30 cm and both the tractors were operated in II-L gear. The fuel consumption was measured by connecting an auxiliary fuel supply system on the tractors. The different parameters selected for the evaluation of performance were measured in the field and calculated as per RNAM test code.