

## Energy analysis of different sowing equipment for cultivation of wheat crop (*Triticum aestivum* G.)

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■ **ABSTRACT** : The energy analysis and performance of four sowing equipment treatment was determined for cultivation of wheat crop. Four different treatment such as zero till seed-cum-fertilizer drill, roto till seed-cum-fertilizer drill, 1x cultivator + 1 x disc harrow + seed-cum-fertilizer drill, 1x cultivator + 2 x disc harrow + raised bed planter at all prevailing environmental condition such climatic condition *i.e.* temperature and relative humidity, physical properties of soil *i.e.* soil moisture content, bulk density and shear strength, as well as machine and crop parameters were studied before sowing treatment (Aikins and Afuakwa, 2010). There are several drills like conventional, zero till, roto till, raised bed planting etc. can be used for sowing wheat. The improved machines not only deliver the desired amount of seed and fertilizer but also save time and energy. In each treatment the energy consumed in the form of direct energy, indirect energy, renewable energy, non-renewable energy, commercial energy and non-commercial energy was estimated taking into account all the inputs like seed, fertilizer, FYM, machines, human labour, diesel, etc. The source wise energy was minimum (13178.30MJ/ha) in treatment  $T_2$  and 13300.19MJ/ha, 14236.79MJ/ha and 14686.61MJ/ha in treatments  $T_1$ ,  $T_3$  and  $T_4$ , respectively. The operation wise energy was minimum (5066.30MJ/ha) in treatment  $T_2$  and 5188.19MJ/ha, 6124.79MJ/ha and 6574.61MJ/ha in treatments  $T_1$ ,  $T_3$  and  $T_4$ , respectively (Arvidsson, 2010). The performance of seed drill is improved by manipulating the depth of sowing and thickness of soil cover over the seed as well as pressing the soil cover. Better soil pulverization was observed in case of treatment  $T_2$  where seed bed was prepared by rotary tiller. Cone index was found to be minimum at different depths in treatment  $T_4$  which includes 1 x cultivator followed by 2 x disc harrow then sowing by using raised bed planter. The similar trend was observed even at 100 DAS. The field efficiency was found to be maximum (77.02%) in treatment  $T_1$  and minimum (60.91%) in treatment  $T_4$ . Number of plants/m length, seed emergence, plant population were also less in treatment  $T_1$  and similar in treatment  $T_2$ ,  $T_3$  and  $T_4$ . It was found more in treatment  $T_4$  (Atkinson *et al.*, 2007).

■ **KEY WORDS** : Energy, Fertilizer, FYM, Machines, Human labour, Diesel, Seed drill, Planter, Economics

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