

## Performance evaluation of bullock cart mounted engine operated sprayer

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■ **ABSTRACT** : The bullock drawn engine operated sprayer was tested for cotton crop during the *Kharif* of 2011-12. The diesel engine of 4 HP was used as power source for operating the sprayer and the bullocks were used for hauling purpose. The sprayer unit consisted of 15 hollow cone nozzles adjustable according to row spacing of crop. During performance evaluation, the field capacity of the sprayer was 1.89 ha/h and average speed of bullock cart during the spraying operation in cotton crop was 2.8 kmph. The draft measurement for spraying operation was found to be 804.42 N. The unit cost of sprayer was Rs.70,000 and the cost of operation for spraying was Rs.69.81. The financial and labour savings were found to be of 23.9 per cent and 64.96 per cent, respectively.

■ **KEY WORDS** : Bullock drawn sprayer, Cart mounted sprayer, Field capacity, Nozzle

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The application of pesticides is one of the most important operations in agricultural production. According to Rao (1980) unless production inputs are matched with protection measures, yield increases are not possible. It has been observed that about one third of reliable global output is estimated to be lost due to insect pests, disease and weeds. In India, the value of crop lost due to pests was estimated at Rs.6,000 crores in 1983 (Atwal, 1986), which reported to have further increased to Rs.29,000 crores in early 1990s (Dhaliwal and Arora, 1996). The agro-chemical policy group- an apex body of 200 crop protection companies has reported that agriculture produce lost in 2007 due to pest was about at Rs.1.40 lakh crores (Kumarswamy, 2008).

Cotton (*Gossypium* spp.) the 'white gold' and 'king of fibers', is cultivated in tropical and subtropical regions of more than seventy countries across the world and enjoys a predominant position amongst all cash crops in India. India occupies first place among cotton growing countries of the world in respect of area (10.33 mha), fourth with respect to production (295 lakh bales) during 2009-10 and in productivity compared to an average yield of 963, 912 and 613 kg/ha in Egypt, USSR and USA, respectively. The cotton average yield of India is only 440 kg lint/ha (Sen, 2003). This clearly stresses the need for further efforts to increase productivity of the most important commercial crop of the country. Cotton crop is infested by various pests. About 10 per cent of insecticides on global basis and 45 per cent in India are used for control of

insects in cotton crop alone (Singh, 2004).

Cotton is one of the important crops in Raichur district where the farmers are facing acute labour shortage for spraying operation. Normally, the farmers are using knapsack sprayers and inaccurate application of pesticides may result higher farming cost and causes the environmental problems. Inaccurate application of pesticides could result in more contaminated environment and higher farming cost (Al-Gaadi, 1998).

The use of mechanical power in agriculture has been increased due to use of more tractors. Even though the tractor operated boom sprayer is available for spraying but due to low ground clearance, the crop may damage during spraying. Even though draught animal power is in decreasing trend, Indian farmers still predominantly use the bullocks for agricultural purpose. The small and marginal farmers are maintaining a pair of bullocks for carrying out field operations. In order to cover large area and to avoid labour scarcity the bullock cart mounted diesel engine operated sprayer has been developed for field crops at College of Agricultural Engineering, Raichur. The bullock cart mounted diesel engine operated sprayer has been tested for cotton crop and its performance evaluation has been carried out during the year 2011-12.

### ■ METHODOLOGY

The bullock cart mounted diesel engine operated sprayer basically consists of a steel cart in which the diesel engine