

Economic layout of Raingun for sugarcane crop

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■ **Abstract** : The research study entitled economic layout of raingun for sugarcane crop was carried out at different operating pressures viz., 2.0, 2.5, 3 and 3.5 kg/cm². The raingun of Jain-Komet twin 95 plus with nozzle size 16 mm diameter was used. Increase in pressure (2.0 to 3.5 kg/cm²) increased discharge from 216 to 300 lpm and radius of throw from 27 to 32.4 m. The uniformity coefficient was maximum (75.27 per cent) at 3.5 kg/cm² and minimum (72.59 per cent) at 2.5 kg/cm². The optimum spacing with maximum uniformity coefficient was 50 m at 3.0 kg/cm² with 30 per cent overlap. For square field of sugarcane the optimum length should be 55 m at 3.5 kg/cm² followed by 50 m at 3.0 kg/cm² and 40 m at 2.5 kg/cm² operating pressure. For rectangular field maximum uniformity was obtained when raingun spacing was 50x50x45m dimensions.

■ **Key words** : Raingun, Uniformity coefficient, Economic layout, Optimization

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Water has a key role to play in the progressive agriculture and economic development of the country. The stress in availability of water for agricultural sector is increasing due to stiff competition from industry as well as increasing demand from constantly growing population of the country. So its efficient utilization is very much essential for sustainable crop production. Maharashtra state is the third largest state in India with total geographical area of 30.8 mha and cultivable area of 21.89 mha. However, area under irrigation is only 3.87 mha which is 15.41 per cent of total cultivable area of state. The raingun irrigation system is recently introduced in the market as it is being adopted on small scale. In addition to study the economics, it is, therefore, necessary to study the labour, time, distribution pattern, uniformity coefficient, pressure-discharge relationship and maintenance of the system (Shinde *et al.*, 2005). The Raingun system is useful for close growing crops like sugarcane, potato, groundnut, wheat, gram, vegetables etc. Sugarcane is important cash crop of Maharashtra state having 0.578 mha area and 45.14 MT production (Singhal, 2003). The success of sugarcane farming depends upon efficient utilization of irrigation water through suitable method. Raingun sprinkler not only found cost saving but also an efficient method for sugarcane over conventional method of irrigation (Khedkar, 2004). The efficiency of any sprinkler irrigation system depends on selection of optimum spacing with maximum uniformity coefficient at various operating pressures in the field.

Therefore, the present study was carried out to develop economic layout with optimum spacing of raingun system.

■ METHODOLOGY

With a view to develop economic layout with optimum spacing of Raingun system for sugarcane a field experiment was conducted at Zonal Agricultural Research Station Shenda Park Farm, Kolhapur which is located at 16.43° N latitude and 74.59° E longitude during July, 2007 to June, 2008. The rainguns of Jain-Komet twin 95 plus with nozzle size 16 mm diameter and 7.5 hp centrifugal pump were used for present study to provide prerequisite operating pressure for controlling the discharge with discharge regulating valve on delivery side. The field was fairly leveled. The type of soil is clayey with moderate infiltration rate. The catch cans were placed at each grade point. The raingun rotation was adjusted with the help of adjusting mechanism. The tests were conducted at pressures of 2.0, 2.5, 3.0 and 3.5 kg/cm². The discharge was measured by using watermeter for operating the system 5 minutes. The pressure-discharge relationship was established by plotting discharge against operating pressures. The radius of throw was measured using measuring tape.

Uniformity coefficient:

Uniformity coefficient was worked out using Christiansen's formula (Michel, 1978).