Studies on sugarcane based intercropping system for additional return in western Uttar Pradesh

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ABSTRACT
The present investigation was carried out by Sardar Vallabhbhai University of Agriculture and Technology, Krishi Vigyan Kendra, Baghra, Muzaaffarnagar (S.V.P.U.A. and T., Meerut), U.P., at the progressive farmers field of Distt. Muzaaffarnagar, for two crop seasons i.e. 2006-07 and 2008-09 to find out the feasible remunerative intercrop in intercropping system with preseasonal sugarcane. The results indicated that the gross monitary return was higher in sugarcane + gladiolus. intercropping system in comparaison to cucumber, okra and Frenchbean. The maximum sugarcane yield (900 q/ha) was in found French bean intercropping with sugarcane and soil health also improved. Among the intercropping system sugarcane with gladiolus was more remunerative in respect of net return.

RESULTS AND DISCUSSION
The findings of the present study as well as relevant

INTRODUCTION
Muzaffarnagar is known as sugarcane district of Uttar Pradesh. About 68 per cent area is covered by sugarcane. The cost of production of sugarcane is increasing day by day. The increasign cost of production was mainly on account of increase in the inputs such as fertilizer, irrigation water, plant protection and human labour charges. The increasing cost of production of sugarcane and reducing profit has compelled scientists and farmers to think about the cropping system which are economically feasible. In Western U.P., sugarcane provides considerable scope for intercropping with short duration horticultural crops and thus productivity of sugarcane and overall profitability of the sugarcane growers. Keeping this in view, the present investigation was carried out with the suitable and profitable intercrops with sugarcane to the Western U.P.

MATERIALS AND METHODS
The field investigation was undertaken on sandy loam soil having 7.6 pH and organic carbon 0.56 per cent at the progressive farmers field of Distt. Muzaffarnagar, U.P. as autumn and spring sugarcane in 2006-07 and 2008 to 2009 with object to find out remunerative and compatible intercrop in sugarcane. The treatments of comprising of two intercrop autumn intercropping system viz., sugarcane + gladiolus, sugarcane + Frenchbean and two intercrop spring intercropping system viz., sugarcane + okra and sugarcane + cucumber along with sole crop of sugarcane. In sugarcane + cucumber intercropping the cucumber nursery of cucumber was prepared at protected place by frast and after sowing of spring sugarcane cucumber plants were transplanted at the 2x2 meter in first week of February. Irrigation, cultural operations and plant protect measures were provided as per the recommendation and need of the component crops.

The economic analysis net return, gross return and B.C ratio were carried out based on cost of cultivation, sugarcane yield and intercrop yield. The gross return (Rs./ha) occurred due to different treatments were worked out by considering market prices during the experimental year.

The net returns (NR) in Rs./ha of each treatment = Gross Return (GR) of treatment – Cost of cultivation of treatment.

B.C. Ratio = \( \frac{GR \text{ of a treatment}}{\text{Cost of cultivation}} \)

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<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Intercrop</th>
<th>Variety</th>
<th>Season</th>
<th>Yield/ha</th>
<th>Cost of cultivation (Rs. in 2006)</th>
<th>Gross Income (Rs. in 2006)</th>
<th>Net Return (Rs. in 2006)</th>
<th>I.C.R.</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Comm. Intercropping</td>
<td>S. cerea</td>
<td>Spring</td>
<td>60 Q</td>
<td>2.78</td>
<td>2.73</td>
<td>2.47</td>
<td>2.51</td>
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<tr>
<td></td>
<td>with S. cerea</td>
<td>COS B/32</td>
<td></td>
<td></td>
<td>Comm. 120 Q</td>
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</tr>
<tr>
<td>2</td>
<td>Comm. Intercropping</td>
<td>S. cerea</td>
<td>Spring</td>
<td>85 Q</td>
<td>2.74</td>
<td>2.73</td>
<td>2.47</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td>with S. cerea</td>
<td>COS B/32</td>
<td></td>
<td></td>
<td>Comm. 120 Q</td>
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<tr>
<td>3</td>
<td>White Hybrid</td>
<td>S. cerea</td>
<td>Autumn</td>
<td>90 Q</td>
<td>2.69</td>
<td>2.73</td>
<td>2.47</td>
<td>2.51</td>
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<tr>
<td></td>
<td></td>
<td>COS B/36</td>
<td></td>
<td></td>
<td>White 225 Q</td>
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<tr>
<td>4</td>
<td>Gladiolus intercropping</td>
<td>S. cerea</td>
<td>Autumn</td>
<td>85 Q</td>
<td>2.73</td>
<td>2.73</td>
<td>2.47</td>
<td>2.51</td>
</tr>
<tr>
<td></td>
<td>with S. cerea</td>
<td>COS B/36</td>
<td></td>
<td></td>
<td>Gladiolus 150 Q</td>
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<td>5</td>
<td>Sole crop (S. cerea)</td>
<td></td>
<td>Autumn</td>
<td>64 Q</td>
<td>0.90</td>
<td>1.03</td>
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<tr>
<td></td>
<td></td>
<td>COS 757</td>
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<td></td>
<td>S. cerea 900 Q</td>
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</table>

**Remarks:** S. cerea @ 500 kg/ha, Gladiolus @ 2.5 kg/ha, White @ 2.5 kg/ha, Gladiolus @ 2.5 kg/ha, & S. cerea @ 1.5 kg/ha.
discussion have been summarized under following heads:

**Gross returns (GR):**
During first year of experiment (Table 1), the maximum gross return was obtained from sugarcane + gladiolus (5.82 lacs/ha) followed by sugarcane + Frenchbean (2.90 lacs/ha) while lowest gross return was observed in sole sugarcane (1.04 lacs). The intercrop have contributed to increase the returns. The sugarcane + gladiolus (5.82 lacs/ha) and sugarcane + Frenchbean (2.90 lacs/ha) recorded significantly higher gross returns than rest of the cropping system. The lowest gross return was noticed in sole sugarcane. In pooled analysis, sugarcane + gladiolus intercropping system (Rs. 5.82 lacs/ha) and sugarcane + Frenchbean (2.90 lacs/ha) recorded significantly more gross return than sugarcane + okra (2.10 lacs/ha) and sole sugarcane (1.04 lacs/ha). However, sugarcane + cucumber (2.51 lacs/ha) gross returns by intercropping system of sugarcane + soybean were reported by Roodagi et al. (2000).

**Net returns (NR):**
The net return obtained from sugarcane + gladiolus (3.06 lacs/ha), sugarcane + Frenchbean (1.80 lacs/ha) was at par with each other and found significantly superior over rest of the cropping system during first year of experimentation (Table 1) and during second year, sugarcane + Frenchbean (1.70 lacs/ha) recorded significantly higher net return than sole sugarcane.

The pooled analysis indicated that higher net return was obtained from sugarcane + gladiolus (3.04 lacs/ha) followed by sugarcane + frenchbean (1.70 lacs/ha) which were at par with each other and found significantly superior over sole sugarcane. The results are in conformity with singh et al. (2003).

**Benefit : cost ratio:**
Among different intercropping systems, the maximum B.C. ratio was obtained from sugarcane + Frenchbean (3.22:1) during first year, while during second year, sugarcane + Frenchbean (3.1:1) and sugarcane + cucumber (3.20:1) and sugarcane + okra (2.9:1), sugarcane + gladiolus (2.09:1) recorded similar B.C. ratio. The B.C. ratio for sole sugarcane was 1.92:1 and 1.94:1 during first and second year of experimentation, respectively. Similar result of higher B.C. ratio due to intercropping were recorded by Nigade et al. (2004).

**Conclusion:**
Based on the intercropping system, result in both the years of the experimentation and pooled analysis, it can be concluded that sugarcane + Frenchbean and sugarcane + cucumber, sugarcane + okra were the highly remunerative intercropping than sole sugarcane.

**REFERENCES**
