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Production Potentials and Economic Feasibility of Improved Sugarcane Based Cropping Systems

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ABSTRACT

On-farm trials (OFT) were carried out on farmers' fields in Lucknow district of Uttar Pradesh during 2005-06 and 2006-07 with a view to assess the production potentials and economic feasibility of improved sugarcane based cropping system under real farming situations. In general, sugarcane based inter-cropping system was found more productive and remunerative than the system of sole cane cropping being adopted by the farmers in general in the region. Results of OFT indicated that inter-crops viz. mustard, *toria* and coriander in autumn sugarcane and green gram and black gram in spring sugarcane gave considerably higher net returns over sole cropping of autumn and spring seasons cane. The inter-cropping of mustard, toria, coriander, green gram and black gram with sugarcane exhibited benefit : cost ratio of 1.35, 1.42, 1.53, 1.27 and 1.17, respectively as against 1.06, and 1.04 under the autumn sole cane and spring sole cane, respectively.

Keywords : On-farm trials, Inter-cropping system, sugarcane, mustard, toria, coriander, green gram, black gram

INTRODUCTION

Ever rising demand of food and sugar to meet the needs of increasing population necessitate shifting from the crop to cropping system approach in crop production. The objective of cropping system research in sugarcane has been to develop improved systems that would utilize as much of potential cropping period as possible and make efficient use of growth resources so that high productivity could be achieved. The productivity of a system is mainly determined by the efficiency of the system in use of basic resources. This depends not only on the efficiency of individual component crops of the system, but also how well these crops complement each other in time and space (Verma and Verma, 1996). Several sugarcane based cropping systems, giving higher biological and monetary gains, have been tested and preferred (Verma and Yadav, 1985; Verma and Yadav, 1989). However, their production potential and economic feasibility is to be assessed under real farming situations before recommending them for large scale adoption by the farmers. This was the major objective to conduct present study at farmers' fields in Lucknow district of Central Uttar Pradesh.

METHODOLOGY

On-farm trials (OFT) were conducted during 2005-06 and 2006-07 on farmers' fields for sugarcane based inter-cropping systems viz. autumn cane alone, autumn cane + mustard, autumn cane + *toria* and autumn cane + coriander in Kainthi village while spring cane alone, spring cane + green gram and spring cane + black gram inter-cropping systems in Dhanuansand village of Lucknow district in Central Uttar Pradesh. The purposive selection of villages was based on the fact that farmers of these villages grow sugarcane and rabi/zaid crops separately, and moreover in comparison to other villages, more number of farmers grow sugarcane. Before laying out trials on cultivators' fields, a bench mark survey was made in selected villages using pre-structured interview schedule to know the existing resources, crops and cropping patterns, socio-economic status, level of technical know-how and adoption pattern for raising various crops by the farmers. The soil under cultivation in the villages texturally range from sandy loam to clay loam. Recommended package of practices for sugarcane and other crops in the respective cropping systems were followed. Planting of *autumn* and spring sugarcane with inter-crops was done in October and February, respectively. At the time of harvest, the yield of sugarcane and inter-crops were recorded. Gross returns of each cropping systems were calculated by multiplying yields with existing market prices of each crop. To assess the economic feasibility of inter-cropping systems, net returns and benefit: cost ratio were calculated for each inter-cropping system.

RESULTS AND DISCUSSION

Data presented in Table 1 clearly indicated that the inter-cropping of mustard, coriander and *toria* with autumn planted sugarcane in a heatare gave higher gross

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return of ₹ 96,000/-, ₹ 97500/-and ₹ 95,000/- respectively which were considerably higher than the gross return obtained under sole autumn cane *i.e.* ₹ 74,000/- per hectare. Although, the cost of cultivation under the inter-cropping systems was higher than the sole autumn cane that was well compensated by much higher net return accrued under inter-cropping systems. As evident from table 1, the higher net return was obtained in autumn cane + coriander (₹ 58,569/hectare) followed by autumn cane + *toria* (₹ 55,664/hectare) and autumn cane+ mustard (₹ 55 ,164/hectare) and these net returns were higher by ₹ 20,409/-, ₹ 17,500/- and ₹ 17,000/-, respectively over sole autumn cane. Likewise, an increase of 30.72, 25.35 and 21.48 per cent in benefit : cost ratio over sole autumn cane was recorded under coriander, *toria* and mustard inter-cropping respectively.

As far as inter-cropping of green gram and black gram with spring cane is concerned, it also proved economically viable for farmers. As evident from table 1, highest net return of ₹ 51,260/- per hectare was recorded under spring cane + green gram followed by ₹ 47,060/- per hectare under spring cane + black gram which were much higher than the net return of ₹ 35,160/- per hectare obtained in sole spring cane. Under green gram and black gram inter-cropping with spring cane, increase of 18.11 and 11.11 per cent in benefit: cost ratio, respectively, were recorded over sole spring cane. Overall results obtained under present study clearly indicated that inter-cropping of mustard, *toria*, coriander with autumn cane and green gram, black gram with spring cane are beneficial for farmers. In addition to economic benefits, farmers may fulfill requirement of pulses and oilseeds for family consumption without any extra land area under cultivation. At the same time, mid-term income obtained by inter-crops may help farmers to invest more in agri-inputs for sugarcane and other crops in order to enhance productivity and profitability.

The study revealed that farmers felt more convenient in adoption of the cropping systems where *toria* was taken as an inter-crop with autumn planted sugarcane because of its less adverse effect on the yield of cane as compared to cane +black gram cropping system. Similarly, farmers were also convinced with the intercropping of green gram and black gram with spring planted sugarcane because it produced higher production potentials and economic gains as compared to sole cane. Moreover, farmers were

Table 1: Production potentials and economic feasibility of improved sugarcane based cropping systems

Cropping System	Yield (t/ha)		Return from sugarcane (Rs./ha))	Return from intercrop (Rs./ha	Gross return Rs./ha)	Cost of cultivation (Rs./ha	Net return (Rs./ha)	Increase in net return over control (Rs /ha)	Benefit : Cost ratio	% increase in Benefit : Cost ratio over control
	Cane	intercrop								
(A) Autumn can										
(i) Autumn cane Sole (control)	74.00	-	74000	-	74000	35836	38184	-	1.06	-
(ii) Autumn cane + mustard	72.00	1.50	72000	24000	96000	40836	55164	17000	1.35	21.48
(iii) Autumn cane + toria	74.00	1.20	74000	21000	95000	39336	55664	17500	1.42	25.35
(iv) Autumn cane + coriander	70.50	0.90	70500	27000	97500	38935	58569	20409	1.53	30.72
(B) Spring cane										
(i) Spring cane sole (control)	69.00	-	69000	-	69000	33840	35160	-	1.04	-
(ii) Spring cane + green gram	66.00	0.80	66600	25000	91600	40340	51260	16100	1.27	18.11
(iii) Spring cane + black gram	65.00	0.70	66500	20900	87400	40340	47060	11900	1.17	11.11

seen more interested in the above systems because the crops of green gram and black gram are gained by the farmers generally in *zaid* season and sugarcane is taken separately in February as spring cane. The system of growing green gram and black gram with spring cane in the same piece of land attracted the attention of majority of farmers in the area. The system, however, may be found more beneficial to majority of farmers in cane growing areas of Lucknow. Hence, these cropping systems could safely be recommended for large scale adoption by the farmers in order to achieve higher productivity and economic returns.

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