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RESEARCH PAPER

Effect of intercropping on productivity of the system and available nutrient status of soil

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Abstract **:** The intercropping of maize and French bean was studied to increase productivity per unit area to feed ever increasing population without deteriorating soil nutrient status. The treatments comprised of 3 row ratios (1:1,1:2 and 2:2) for both grain and vegetable purpose French bean, 4 sole crops (French bean for grain and vegetable, soybean and maize). Total number of treatments were eleven. Intercropping of maize + French bean in 1:2 row ratio either for grain or vegetable recorded significantly higher maize equivalent yield (7897 and 8027 kg ha^{-1}, respectively), land equivalent ratio (1.35 and 1.38, respectively), system productivity index (7452 and 7318, respectively), than other row ratios of intercropping and sole crops of maize and French bean. Where, maize + French bean in 1:2 row ratio for grain recorded significantly higher area time equivalent ratio (1.21), protein (0.75 x 10^6 g ha^{-1}), carbohydrate (3.91 x 10^6 g ha^{-1}) and energy yield (20.57 x 10^6 k cal ha^{-1}) than maize + French bean for vegetable in all the row ratios. The available N, P_2O_5 and K_2O status was imroved by growing soybean and French bean in 1:2 row ratio with maize (221.33 and 245.43 kg ha^{-1}, 36.42 and 35.32 kg ha^{-1} and 366.45 and 369.62 kg ha^{-1}, respectively) compared to sole maize (221.33,32.28 and 361.58 kg ha^{-1}, respectively).

Key Words **:** Intercropping, Row ratio, Production efficiencies of the system, Energetics, Available nutrients

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INTRODUCTION

The present food production in India is 221 million tonnes and its production has to be increased to 294 million tonnes by 2020. Reduced per capita availability of land due to increasing population forcing us to produce more per unit area through multiple cropping systems. In Northern Transition Zone of Karnataka, maize (*Zea mays* L.) is predominate crop among the *Kharif* (rainy season) crops. Being wider spaced, maize provides an opportunity for introducing a short duration pulse crop like French bean as an intercrop in additive series since the rainfall received in the zone is in excess of single crop need. Moreover, such a system helps in efficient utilization of natural resources (space, moisture and light) to harness maximum productivity per unit area. Further, to avoid adverse effect on main crop by addition of intercrop, suitable adjustment in plant population and crop geometry has to be worked out. Experiments carried out elsewhere in India clearly indicated that urdbean, soybean, French bean and cowpea as intercrops in maize had no detrimental effect on main crop. However, information on comparison of productivity of French bean as vegetable and grain with maize in Karnataka is meagre. Hence, this experiment was conducted.

MATERIALS AND METHODS

The experiment was conducted at Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad during 2005-06 and 2006-07 during rainy season. In maize + French bean intercropping, French bean was grown as intercrop with maize in additive series in three row ratios *viz*., 1:1 (50% population of French bean), 1:2 (66% population

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