

## OPTIMIZATION OF FARMYARD MANURE TO SUBSTITUTE MINERAL FERTILIZER FOR SUSTAINABLE PRODUCTIVITY AND HIGHER CARBON SEQUESTRATION POTENTIAL AND PROFITABILITY UNDER GARDENPEA-FRENCH BEAN CROPPING SYSTEM IN THE INDIAN HIMALAYAS

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□ Carbon sequestration potential (CSP) and sustainability of gardenpea-french bean cropping system was assessed with farmyard manure (FYM) application vis-à-vis mineral fertilization as recommended NPK (NPK) and integrated nutrient management practices (INM) after six years' cropping in Indian Himalayas. Application of 20 tons FYM ha<sup>-1</sup> provided highest CSP (0.527 Mg C ha<sup>-1</sup> year<sup>-1</sup>) in soil and sustainability index. With the help of quadratic equations, it was estimated that maximum profit (optimum yield) and turn over of invested money could be achieved with application of 20.0 and 15.6 t FYM ha<sup>-1</sup>, respectively. Application of 5.9 and 8.9 tons FYM ha<sup>-1</sup> would substitute NPK and INM, respectively. Pod number plant<sup>-1</sup> was the most important yield-contributing attribute as found from principal component analysis. Pod yield could be modelled through multiple linear equation with help of yield attributes.

**Keywords:** carbon sequestration potential, farmyard manure, gardenpea-french bean cropping system, model, optimum FYM application rate, principal component analysis, quadratic response, sustainable yield index

### INTRODUCTION

Modern agriculture has deteriorated the soil environment; hence crop production sustainability is under severe criticism. Rapid decline in soil

Received 23 November 2012; accepted 21 November 2013.

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