INTRODUCTION
CHAPTER - I

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India holds a premier position in the global oilseeds scenario accounting for 19% of the total area and 9% of production. However, the productivity in India is only 999 kg ha\(^{-1}\) (2001-2002) as compared to the world level of 1632 kg ha\(^{-1}\). Oilseeds form the second largest agricultural commodity after cereal in India, sowing nearly 14% of the country’s grossed cropped area and accounting for nearly 5% of the gross national product and 10% of the agricultural products. There has been a phenomenal growth in mustard production in the last 18 years. The production which was around 2.68 million tones with a productivity level of 650 kg ha\(^{-1}\) until 99 kg ha\(^{-1}\) (Indian Economic Survey, 2002-2003). In Uttar Pradesh rapeseed-mustard was grown on an area of 0.64 million hectare with a production of 0.90 million tones with the productivity of 1025 kg ha\(^{-1}\) during the last decade. This has been largely due to adoption of improved varieties, agro production and protection technologies, subsidies on fertilizer and remunerative support price after launching of the Technology mission on oil seeds in 1986.

Increased production indicates beyond doubt that the country witnessed yellow revolution in rapeseed-mustard production. Sustainable production of rapeseed-mustard has opened up new opportunities to earn valuable foreign exchange through export of oil meal and value added products. From a chronic importer of vegetable oil and oil meals in mid eighties, the country has now become an exporter of rapeseed-mustard seed, means earning a foreign exchange of Rs. 5000 million during 1999-2000. This could establish India’s position as an exporter in the international oil seed trade.
The major area under rapeseed-mustard exist in Rajasthan followed by Uttar Pradesh, Haryana, M.P. and Gujrat. These states account about 80% of the total area.

Oils and fats comprise a vital component of human diet as these are good source of energy and act as carriers of fat soluble vitamins. Oil cake or meal has high nutritional values in animal feed owing to its high content of good quality protein. In general 55 g edible oils or about 11 g oilseeds per day per head is essential for human diet (Indian Economic Survey, 2002-2003).

The general tendency of Indian farmers is to use only inorganic fertilizers specially nitrogen alone to the mustard coupled with their limited production, fertilizer cost, soil health.

Sustainability and pollution have led to a renewed interest in the use of organic manures. Available evidences suggest that the even balanced application of chemical fertilizer alone can not improve the soil productivity, under continuous cropping where as inclusion of FYM regulated the nutrients uptake, improve crop yields (Mandal and Sinha, 2002) and physical status of soil (Gauri Shankar et al. 2002).

Micronutrients play an important role in plant system for the proper growth and development. It is becoming evident that without use of micronutrients, the maximum benefit of N, P, K fertilizers from high yielding varieties of rapeseed-mustard is not possible. Application of micro nutrients like zinc, molybdenum, boron and manganese has been found to increase yield, oil content, protein content and dry matter significantly in mustard (Singh et al. 1998).
Integrated plant nutrient management is an old age concept but its importance was not realized earlier due to low nutrient turnover in soil plant system and almost all the nutrients needed were met through organic sources which supply secondary and micronutrients also besides major nutrients. Integrated nutrient management has now assumed great significance mainly because of two reasons, first the need for continued increase in agricultural production based on increase in per hectare yield, requires growing application of nutrients, and the present level of fertilizer production in India is not enough to meet the total plant nutrients requirements, secondary a large number of experiments on manures and fertilizers conducted in the country revealed that neither the chemical fertilizer alone nor the organic sources exclusively can crops under highly intensive cropping systems. Energy crises resulted to the high price index of chemical fertilizer is almost free from infestation of insect, pest and diseases.

Mustard is a common crop grown in a *Rabi* season. Due to uncertainty of weather condition moong grown as *Zaid* crop after harvesting of mustard. Hence mustard moong crop sequence is becoming popular and being widely accepted by the farmers under assumes irrigated condition.

It is also well recognized that the proportion of fertilizers taken up by single crop is often quite low and these fertilizers have residual value, which the succeeding crops can utilize. The magnitude of the residual effect depend on the rate and kind of the fertilizer used, the cropping and management system followed and to a great extent of the type of soil. The residual value of applied fertilizers and manures being greater in summer crops.

Keeping in view the above facts, it is now imperative to formulate scientific procedure to work out the "*Effect of integrated plant nutrient"
management on soils nutrient uptake and yield of mustard” with following objectives:

1. To study the effect of Integrate Plant Nutrient Management (INM) on yield of mustard.
2. To study the effect of Integrated Plant Nutrient Management on soil properties.
3. To find out the effect of Integrated Plant Nutrient Management on nutrient uptake by mustard.
4. To work out the economics of different nutrient combinations in mustard crop.