Population of India will be around 150 crores in 2020 as against 120 crores in 2010-11. The increase in population would necessitate in increase of food grain production from 217 million tonnes in 2009-10 to about 260 million tonnes in 2020. Area under food grains is not likely to increase because of the population load. Therefore, the additional requirement of food grains has to be met by increasing productivity through intensive cultivation practices. Intensive agricultural practices without restorative inputs will be a threat to soil fertility. Deterioration of soil fertility of the cropped land has to be guarded against for sustaining agricultural production and productivity.

The dramatic increase in food grain productivity in the country was attributed to fertilizer use (Randhawa and Velayutham, 1989). While there is no doubt about the role of fertilizers in enhancing crop productivity, concerns have been expressed on their declining efficiency, i.e., the additional economic yield per unit of fertilizer nutrient. It was 12 kg of food grains per kg of NPK during 1960-69 and 9 kg food grains per kg of NPK during 1990-99. The falling efficiency makes fertilizer use economically prohibitive. Additionally, inefficient use of fertilizers is likely to produce adverse effect on the environment because the unutilized/lost nutrients dangerously enrich the hydrosphere and biosphere (Katyal, 1989). Indiscriminate use of fertilizers casts doubts on the sustainability of agricultural development. Therefore, efforts should be made to augment nutrient supply through combined use of fertilizers, crop residues, organic manures and bioagents. Fertilizers may form the major component of nutrient input because of the assured supply of nutrients, but in order to maintain soil health, at least 25 % of nutrient supply should come from crop residues, organic manures and bioagents.
It has been well established by long term fertilizer experiments that sole dependence on chemical-input-based agriculture is not sustainable in the long run. Integrated nutrient management systems involving use of a combination of chemical fertilizers, green manures, crop residues, organic manures and biofertilizers are necessary to maintain soil health and sustain crop productivity.

Biological nitrogen fixation (BNF) in the terrestrial ecosystem is to the tune of 140 million tonnes of $\text{N}_2$ per annum. This includes 33 million tonnes of $\text{N}_2$ per annum through cultivation-induced BNF in agricultural fields. Such nutrient harvesting system has taken the shape of microbial technologies that can balance some of the shortcomings of the conventional fertilizer use. The role of microorganisms in solubilizing the soil-bound phosphorus and increasing its availability to crops is well documented. Microbial inoculants are popularly known as “biofertilizers”. They synthesize various compounds and release nutrients into outer medium in the vicinity of the plant roots. They improve soil fertility and increase crop productivity.

The biofertilizers (microbial inoculants) include nitrogen fixers (*Rhizobium, Azotobacter, Azospirillum, Azolla, Blue Green Algae*), phosphate solubilizers (*Bacillus, Pseudomonas*), nutrient mobilizers and water absorption aiders (*Arbuscular mycorrhizae*) and compost accelerators for effective recycling of organic waste (*Trichoderma, Pleurotus*). In addition to these functions, the microorganisms secrete growth promoting substances like indole acetic acid, gibberelic acid, cytokinin etc., which stimulate seed germination and induce changes in root morphology that increase nutrient use efficiency (Swain *et al.*, 2003; Pattanayak, *et al.*, 2008). They improve availability of phosphorus and other nutrients and produce antifungal and antibacterial substances which can prevent fungal and bacterial infection. Pandey (1998) reported significant increase in yield (8 to 40 %) in different vegetable crops as a result of application of biofertilizers (nitrogen fixers
and phosphate solubilizers) with lower doses of chemical fertilizers. The application of biofertilizers also improved the quality of different vegetables.

Vegetables are rich sources of nutrients and play a significant role in improving the nutritional intake especially of the vegetarian population. Dieticians emphasize that an adult individual should take at least 285 g of vegetables per day, but the per capita availability of vegetables in India is only 160 g (The Hindu, 2002). Increasing vegetable production will go a long way in meeting the dietary requirement of the masses and reducing malnutrition. India is the second largest producer of vegetables in the world, producing about 111.8 million tonnes of vegetables per annum (The Hindu, 2009). Compared to cereals, vegetables give three times higher productivity and higher profitability. The gross return from vegetable crops ranges from Rs.27,000 to Rs.45,000 per hectare (Sidhu, 2008). Vegetables have a significant role to play in agricultural diversification. Vegetable cultivation being labour intensive would provide employment opportunities for rural poor.

In Orissa, vegetables cover an area of 6.8 lakh hectares with a production of 79.2 lakh tonnes (Orissa Agril. Statistics, 2007-08). Productivity of vegetables in the state is low (12.8 t/ha) compared to the national average of 15.2 t/ha. Technology generation is the key to increasing productivity and production of vegetables. Production targets can be achieved by increasing the area under vegetables and by improving productivity per unit area. Significant breakthrough has been achieved by multinational companies, in development of varieties with high yield potential, resistance to diseases and pests, better organoleptic and nutritional qualities and better storability. It is necessary to develop better production technology for higher productivity and profitability. Nutrient management practices form an important aspect of crop production technology. The concept of “Integrated Nutrient Management” is well recognized for sustaining crop productivity and safeguarding soil fertility and soil health.
Broccoli (*Brassica oleracea* L.var. *italica* Plenck) is a member of the family Brassicaceae and native of the Mediterranean region. It is an important winter vegetable that has high nutritional and good commercial value (Yoldas *et al*., 2008). Broccoli is a recent introduction to India. It is becoming popular among the rich because of its low fat content, low in calories, high vitamin C and good source of Vitamin A, B2 and calcium (Decoteau, 2000). The stalk of broccoli has also much nutrient as the curd. Most of the beta carotene is stored in florets, but there is a plenty of nutrition such as calcium, iron, thiamin, niacin, and Vitamin C in its stalk (Singh *et al*. 2011).

Broccoli is a new crop in Orissa but is becoming popular because of its good organoleptic and nutritional qualities, and the area under the crop is increasing. The crop being a recent introduction to India, not much work has been done in India either on its genetic improvement or on production techniques. It is necessary to develop cost-effective production technology for this popular high value vegetable. The present study on integrated nutrient management (INM) on broccoli involving combined use of two forms of organic manures (FYM, vermicompost), chemical fertilizers and biofertilizers was undertaken with the following objectives.

(i) To find out the comparative effects of two forms of organic manures and their combination on growth and yield.

(ii) To find out suitable dose of NPK fertilizers for higher yield.

(iii) To asses the effect of biofertilizers on yield and quality of the produce.

(iv) To find out the efficacy of different INM schedules for improving productivity and quality.

(v) To find out the profitability (benefit-cost ratio) of different INM schedules.