Wheat is one of the most important food crops of the world. In India, wheat occupies 14.5 per cent of the total area under food grain crops and is only surpassed by rice. More than 13 million hectares of India's crop land are devoted to the production of wheat. Experts agree that in the past few years, more stress has been laid on food production by increasing the yield potential per unit area per unit time rather than the extension of cultivated areas. In this respect production increases will depend on the agricultural inputs such as fertilizers, improved seeds, irrigation, pesticides and machinery. Among them, fertilizer is the most important single factor. The beneficial effects of nitrogenous fertilizers in boosting up production and protein content of wheat have been amply demonstrated. Nitrogen favours vegetative growth, grain yield and other vital processes of plant life. Phosphate and potash are added for balanced nutrition of crop plants. These two are also added to counteract the deleterious effects of nitrogen. It supports the plants and keep them erect and thus enables the plants to better utilise the nutrients.

The fertilizer responses of crop plants to N, P and K are reported to be all the more spectacular with the
introduction of high yielding dwarf varieties of wheat as compared to tall varieties. The results obtained in the various experiments and in the National demonstration trials clearly lend support to the fact that non-lodging varieties display a positive response to high fertilization. In recent years a large number of non-lodging, disease-resistant dwarf varieties of wheat is made available at the doorstep of farmers. Single, double and triple genes introduced in the chromosomes accounts for this dwarfism. The plant breeding technique acts as an elegant tool for incorporating the dwarfing genes in a wheat variety for creation of an efficient plant type, which makes the best use of soil nutrients and solar energy, that contribute a great deal towards maximization of yield per unit time and unit area.

The micronutrients have shown much promise in the nutrition of crop plants. Data on soil analysis conducted in many districts of India have revealed that large number of soil samples are deficient in zinc. It has been reported that the addition of zinc to soils normally increases the yield by about 10 - 30 per cent, and in case of acute deficiency the increase is even as high as 80 - 90 per cent. The micronutrient deficiency is further aggravated by the use of high yielding varieties, intensive cropping, use of large quantities of fertilizers, and inadequate application of organic manures. Moreover, the effect of phosphatic fertilizers on the availability of zinc has received considerable attention and a sound philosophy for the application of major and micronutrients is being developed. Besides, experts in this field of study report...
that the high yielding varieties deplete the soil rapidly of the micronutrients like zinc which, unless suitably replaced may adversely effect the yields.

National Demonstration Trials reveal that dwarf wheat varieties are reputed to give high yields which are very much related to improved agronomic practices. In wheat cultivation soil and atmospheric conditions play important roles. Early sowings associated with high soil temperature results in heavy mortality of the young seedlings, while delayed seeding exposes the plants to the vagaries of high temperature at grain development stage. Thus it is of paramount importance to adjust the time of sowing of wheat in such a way that the crop may suffer least at both the extremeties of temperature.

The soil and climatic conditions of Assam are favourable for the cultivation of wheat. But due to various reasons this crop is not extensively cultivated in this state. However, in recent years attempts have been made to grow this crop on a large scale in different parts of Assam. Unlike in other wheat growing areas, pre-monsoon rains (locally known as North-Western rains) commence in Assam from the middle of March and continue upto the end of May and finally merge with the South-west monsoon. The pre-monsoon rains in the months of March and April coincide with the wheat harvest. This leads to difficulties in the harvest and post harvest operations of this crop in this State. To overcome these difficulties it is necessary to adjust the sowing date of wheat in such a way that the crop is made to escape or avoid the pre-monsoon
rain at the time of harvest.

In Rabi season (winter) of Assam, most of the agricultural lands are left fallow after the harvest of the rice crop. These temporary fallow lands can be profitably utilized for another crop such as wheat. But the farmers of Assam are generally not familiar with the application of manures and fertilizers during this season. A survey conducted by the Agricultural Research Statistics brings to light the fact that barring Assam, the wheat crop is invariably manured and fertilized in the other wheat growing areas of India. Again, in Assam, wheat is grown under rain-fed conditions.

A vast mass of information has now accumulated regarding fertilizer application to wheat crop. But the results have not been found to be consistent and conclusive regarding the role of macro and micro elements in the growth and yield of this crop, particularly with reference to the new high yielding varieties of wheat. In this respect work done in Assam on this crop is very limited and published results are scanty.

So, with a view to investigate in detail the performance of high yielding varieties of wheat under the agro-climatic conditions of the Gauhati area of Assam, a series of four field experiments was conducted in the experimental Farm of the Department of Agricultural Botany, Gauhati University, during the crop years 1969-1973. The investigation includes the effect of sowing dates, individual effect of N, P, K, Ca, individual effect of Zinc (Zn), Boron (B) and Molybdenum (Mo) and finally combined effect of certain promising combinations of micro and macro elements. The detailed results of this study are presented in the succeeding chapters.