INTRODUCTION

Among the oil seed crops grown in India, groundnut is a major one occupying 40 per cent (7.1 m.ha) of the total area and contributing only about 31.7 per cent (5.83 m.ton) of the total production. In other words, the average productivity of both wet and dry season crops is only 820 kg/ha against world average of 900 kg/ha. Due to its high oil content, about 54 per cent of the total edible oil requirement of the country is met by groundnut alone. Thus, this is one of the most potential oil seed crops to achieve the target of self sufficiency and needs adequate attention for a high level of production.

One of the major causes of the low production is attributed to unirrigated condition which accounts for 92 per cent of the total area where the crop often suffers due to vagaries of weather, mainly drought. This becomes apparent by comparing the production level of the remaining 8 per cent of irrigated crop, a major part of which is grown during dry season with good water management. The productivity of irrigated crop in general is 80 per cent more than that of unirrigated crop. The level of productivity is still greater when the irrigated crop is grown during dry season (December to May). Therefore, for meeting the domestic requirement of edible oil, a rapid increase in groundnut production became essential for which the area under irrigated groundnut as well as dry season cultivation has to be increased along with the improvements in agronomic practices. Further, there is need for exploring new potential areas where this crop

is considered to be a good substitute for the less productive traditional crops.

National Commission on Agriculture (1976) has estimated that on full development of water resources by 2025 A.D.,about 110 million hectares would be irrigated in an expected cropped area of 210 million hectares. Thus, a little over 50 per cent of the cropped area will be brought under irrigation. Therefore, efforts have to be made to increase and stabilize the production by utilizing the available resources very effectively to meet the requirements of the teeming millions in the years to come. The fundamental objective in irrigated farming is essentially to be achieved by developing efficient water-management practices for best utilization of water to augment the agricultural production. For this, application of required quantity of water should coincide with the critical growth stages of the crop.

A modified meteorological approach based on the ratio between irrigation water (IW) to cumulative pan evaporation(CPE) as a practical guide for scheduling irrigation is in use in recent days. The advantage of this approach is that the farmer need not change the amount of water from one irrigation to another. In the event of rain, the interval for the next irrigation would have to be only increased, where the annual pattern of pan evaporation during the growing season does not show much variation. It also permits the computation of a time table for irrigation.

In the high rainfall eastern part of this country,as in West Bengal, cultivation of groundnut holds considerable promise

as a second crop after rainy season rice. This is particularly true for areas where irrigation water is limited and inadequate for cultivation of dry season rice crop. Moreover, acid lateritic soils, which occupy about 11 per cent of the coastal states including West Bengal are light-textured and possess the desired physical conditions as required by groundnut. But, in these low pH soils (4.9 to 5.2) the crop often fails to respond to essential inputs due to either deficiency or toxicity of some of the essential nutrient elements, besides the basic inherent characteristics of low cation exchange and poor water holding capacity. Thus, for achieving success through stable and high yields of groundnut, efforts to overcome the infertility of these soils by developing suitable agronomic practices became essential.

Deficiency of calcium, phosphorus, molybdenum, zinc, copper and boron and toxicity of iron are suggested to be possible growth limiting factors in such soils. For most of these nutrients, groundnut is found very responsive and hence deficiency or toxicity would cause adverse effect on the growth and production of this crop. Further, groundnut exerts specific demand for some of the nutrients like phosphorus and calcium, at certain stages of growth for the development of specific parts, like nodulation (Panda, 1979), pegs and Kernels (Omar et al., 1970). Therefore, it is imperative to find out the extent of benefit the crop can accrue if the problems of acid soil infertility can be overcome either by the application of some of the nutrient elements at appropriate stages or by increasing their availability by correcting the soil pH.

The acid lateritic soil is deficient in nutritional status and low in humus. The available fraction of P, Ca, Zn, Cu, Mo and B are relatively low. Application of the nutrient elements through foliar spray at appropriate stages of growth becomes important for their efficient utilization and better performance of the crop. Moreover, any endeavour to find out the quantitative requirement of these nutrients, their interrelationship and method of application would be desirable.

Soil texture is an important index of phosphorus availability. When soluble phosphatic fertilizers are applied to the soil, a large portion is converted into insoluble form of iron, aluminium and calcium phosphate. In acid soil, the phosphorus content being low, it is necessary to add phosphatic fertilizer for groundnut crop. Phosphorus application encourages nodulation and increases the number and density of nodules. Thereby the crop growth and the rate of nitrogen fixation is enhanced. The requirement of phosphorus for groundnut crop is fairly high, therefore, phosphate fertilization would be an index for higher production of groundnut.

Requirement of calcium is also very specific to groundnut. As a component of cell wall, calcium is necessary for cell elongation and division. In calcium deficient soils the crop growth is poor, particularly fruiting and pod filling become very irregular. These being important in the production of groundnut, any method to meet the requirement of calcium at the critical stages of growth, will be of immediate advantage to the crop.

Liming is considered to be a common practice to correct the soil pH for increasing nutrient availability and supplying the crop with calcium. Gypsum can also meet the calcium requirement but it is not effective in correcting the soil acidity. Informations about the beneficial effect of both lime and gypsum application on groundnut is available. However, it is not yet fully known whether the crop derives benefit from Ca supply or through correction of soil pH or both. Therefore, it was deemed necessary to find out the extent to which groundnut crop could respond to the application of gypsum and/or lime.

Keeping the above points in view, an investigation was planned under the acid lateritic soil condition of West Bengal, with irrigated groundnut during dry season. The objective of the studies were as follows :

1. To increase production of groundnut per unit area, under irrigated conditions and develop a suitable irrigation schedule for higher production and water-use-efficiency.

2. To find out a level of phosphatic fertilization for increasing production of groundnut in the acid soils.

3. To overcome the problem of acid soil infertility and identify the micronutrients which can increase production and improve the quality of produce.

4. To decide suitability of lime and/or gypsum application to the groundnut crop in acid soils.