INTRODUCTION

In India, rice is the principal food crop occupying about 30 per cent of the total area under cereals and constituting 40 per cent of the total food grain out-put of the country. Nevertheless, about 94 per cent of the total rice area (38.01 m.ha) is covered during 'kharif' season. Though major part of the irrigation water in the country is diverted to rice, yet it covers only 38 per cent of the rice area leaving 62 per cent of the crop as rain fed (Anon., 1975). The cultivation of 'kharif' season rice faces many-fold problems, including vagaries of monsoon, with either too much of rain water bringing flood or too little, causing draught, both resulting in very poor yield and some times total failure of the crop. Further, as rice is grown under submerged condition, high seepage and percolation losses, amounting to as much as 60 per cent of the total water need of crop, pose another problem for water management in the rice field. The high rain-fall regions in general and the agroclimatic region of West Bengal in particular, receive 1300 to 1500 mm of rain annually, mostly concentrated during the monsoon from June to October. During August/September the water-table often rises and sometimes reaches close to the surface, ranging from 0.0 to 1.5 m (Krishna Rao, 1973) - a situation where part of the water requirement of rice crop

may be met from the sub-surface perched water-table. Under these situations, a suitable water management schedule, considering the water table fluctuations, may prove to be a worthwhile endeavour for increasing the water-use-efficiency. Nevertheless, the variation in the soil capillary flux and the extent of the contribution from the ground water-table will need to be precisely known and at times to be manipulated suitably with cultural practices for exploiting the situation to the maximum benefit of the crop. But, no information is available as yet on these aspects. Therefore, a water management schedule which is planned, taking into account the water-table fluctuation in a particular situation during 'kharif', would be more scientific, having greater applicability. It will significantly help in economising the water requirement of the rice crop in addition to suggesting a suitable soil moisture regime in the rhizosphere. However, the information on atmospheric evaporative demands and ground water fluctuations in different seasons of the year would be essential to arrive at any meaningful conclusion. This will further help in formulating an efficient water-budget for a potential irrigation source in rice cultivation, by developing a suitable water management practice without sacrificing the yield. This, may in turn, increase the command area of rice under an irrigation source.

With the above points in view, an investigation on the studies of water management of rice crop in relation to ground water-table was undertaken. The broad objectives of the study are as follows.

1. To monitor the dynamic aspects of ground water in the rice field under different water management schedules like submergence and saturation, each or both and to study their influence on rice crop performance.

2. To evaluate the contribution of ground water towards meeting the consumptive use of rice crop, the ground water-table being at varying depths.

3. To study and assess a suitable depth of ground water-table along with an efficient surface water management practice for the optimum benefit of the crop under varying atmospheric evaporative demand.