SUMMARY AND CONCLUSIONS

The results of the various individual experiments have already been discussed at the end of relevant chapters. A general conclusion may be drawn from a consideration of the results as a whole.

1. Seasonal fluctuation of microbial population in the rice field soil was studied. Rice field soil is subjected to alternate drying and water-logging throughout the year. It is noted from the results that the microbial population is subjected to change in quantity in response to the change in the moisture level of the soil. It is observed that submergence causes more harmful effect on microbial population than by desiccation. Highest number of microbial population was observed in the pre-water-logged period. The results of the experiment further showed that the microbial population of rice field soil gradually declined with increasing depths of the soil.

2. In a study of the qualitative nature of micro-fungi occurring in rice field soil and their seasonal fluctuation, it was noted that fungal population showed a sharp seasonal variation in quantity. Some fungi were found to dominate in the dry (February and March) period and some other in
the pre-water-logged period (May and June). In the submerged period, the quantity of fungal population decreased, but the quality remained the same.

3. Fungistatic effect is found to be widespread in the surface soil of agricultural field in general. It was noted from the results that the fungistatic effect was distinct in the low-lying water-logged rice field soil. The degree of fungistasis, however, could not be ascertained by simple method such as percentage of spore germination. It could not be definitely known whether the fungistatic effect as observed was due to the toxic substances of microbial origin or it was due to the products of various biochemical processes undergoing in soil with the seasonal variation of moisture level, and the nature and composition of various organic matter.

4. Rhizosphere of rice were found to contain greater number of microbial population even under submerged condition. Rhizosphere population sampled at various stages of the life of the crop showed divergence in their qualitative as well as quantitative nature. Actinomycetes population was found to increase in the rhizosphere zone, at the mature stages of the life of the crop. The microbial pattern in soil is greatly influenced by the rhizosphere effects. It is probable that the physiological activities of the root-systems.
greatly reduce the unfavourable conditions created by submergence.

5. Cultural operations greatly change the microbiological and biochemical status of agricultural soil. Puddling the soil before transplantation, brings about great changes in the chemical as well as microbiological status. The results of the experiment indicate that addition of easily decomposable plant materials into the rice field soil show a considerable increase in the quantitative nature of microorganisms, which in turn increase the power of mineralization of the soil organic matter and consequently change the biochemical status of agricultural soil. Puddling the soil with added easily decomposable green grasses stimulate the microbial activities and as a result of which the microorganisms decompose greater range of substrates including the more resistant organic substances and as a result the C/N ratios of the soil are further lowered.

6. The quantitative estimation of microorganisms in rice field soil may not give a true picture of microbial activities, because, the dilution plate method gives only the sporing capacity of soil fungi. Attempts to assess the fungal activities by other methods were also not successful. Therefore, various workers have suggested alternative methods. In the present investigation an attempt was made to
estimate, (i) the enzymatic activity, (ii) quantitative estimation of amino acids present in the soil and (iii) the measurement of oxygen uptake by soil samples. It was noted that these methods can be successfully used to estimate the microbial activities in the rice field soil.