ABSTRACT

There is a growing need for mechanisation of rural industry in the Tropic regions due to the advancement of the indigenous population to an improved way of life.

The work carried out has been primarily involved with the investigation of cultivation techniques and rainfall effect upon the cultivated soil tilth, with reference to the effect on growth of representative short term crops. In this case the experimental work was carried out mainly on Maize.

The investigation work was carried out on the New College Farm area. The soil type being described as River Estate Loam having approximately 50% fine sand content. The climate is typical of the wet humid tropics having a rainfall of approximately 80" per annum.

The soil pattern developed by Plough discing has shown to improve crop yield more than the soil pattern developed by a Rotary Hoe for pre-sowing cultivation. Subsoiling has shown to improve crop yields, when used as a pre-sowing cultivation. The best method for interow cultivation has not been evaluated but it appears that the rotary hoe may not be the best implement for this work. It is thought that the differing effect on crop yield by the use of different cultivation patterns is a question of differing soil moisture and aeration factors.

The use of machinery has proved to be economic and the use of hand labour proved uneconomical.

Rapid breakdown of cultivated soil tilth was witnessed due to the impact of falling rain drops. This breakdown of tilth resulted in the formation of a surface crust which greatly reduced the permeability of the surface soil.

An attempt was made to develop an artificial rain

/ - simulator -

simulator to facilitate the study of the stability of structure achieved by the various cultivation techniques. Further work is required to complete the apparatus and fully test its operation.

Laboratory tests have tended to show that soil crust formation retards the rate of drainage of free ground water in the soil due to the development of a partial vacuum effect.

To minimise the formation of surface crust and maintain soil structure, suggestions are made for the design of an implement for use on the New Farm area. In all probability it will have wider application. The implement has been designed for presowing and inter-row cultivation for maintaining soil aggregate formation and utilising weed growth as a surface trash mulch.

It is felt that the high cambered bed system used for cultivation of crops should be modified in order to make mechanical cultivation easier and to increase the productive area of such a system.