

INTRODUCTION

Wider use of machinery in rice cultivation and harvesting in British Guiana.

The general practice in British Guiana for the cultivation and harvesting of rice by the peasants and small proprietors is as described by Burnett (1) in the Agricultural Journal of British Guiana. The practice is to plough the field, puddle it under water with ox-drawn harrows and transplant five to six weeks old seedlings when the land has been made free from weeds. The crop is harvested by cutting with sickles or "grass-knives" and threshed by trampling or "mashing" with oxen.

But tractors were already used for ploughing a large percentage of the area in the Mahaicony district by 1936. Threshing machines were also already in use in this district. On a small area in Berbice both reaping and threshing machines were already in use by 1936. Recently however, machinery has been used more widely for the cultivation of rice-fields and harvesting the rice crop.

In 1942 a Rice Development Scheme was initiated at Mahaicony/Abary with the object of determining whether cultivation and harvesting of rice could be mechanised successfully on a commercial scale. Results of this Scheme achieved up to 31st December, 1948 were reported on in 1950 (2).

A further discussion on this subject is reported on in the Farm Journal of British Guiana (3).

The problem of lodging or falling of the crop before harvest-time.

While discussing the type of padi that is suitable for mechanical harvesting, Gadd (3) mentioned that it may be more profitable to harvest eighteen bags per acre from a standing

crop than twenty bags per acre from a crop that has lodged or fallen. The variety grown at present for mechanical harvesting is No. 79. It lodges earlier than a variety suitable for mechanical harvesting should do.

Efforts are being made by the Department of Agriculture to produce a variety more suitable for mechanical harvesting than No. 79, and certain new varieties are actually being compared with No. 79 in planned varietal trials at the Mahaicony/Abary Rice Experiment Station.

Windrowing is a possible solution to the problem of lodging and has other advantages.

But while a variety that will stand erect for a longer period than No. 79 is being awaited, a possible solution to the problem of lodging of the padi crop at harvest-time is to cut it with windrowing machines while it is still standing, allow it to dry in windrows and thresh it with combines equipped with special pick-up reels. Gadd (3) considers that after the straw has dried in windrows, the threshing machines would choke less frequently than in direct combining. In the latter method of harvesting a lodged crop, the number of chokes and stoppages is further increased by the great quantity of straw that must be cut in order to gather the maximum number of lodged ears off the ground. Even then a fair number of ears are left on the ground. An average of 2.2 ears per square foot was lost in direct combining a lodged crop in Field 79 in Autumn 1950. (See Appendix A).

An examination of a windrowed field and a combined field which was about 54% lodged, showed that the loss of yield in harvesting was significantly less in the windrowed

field. (See Appendix B).

Two other disadvantages of direct combining may be mentioned here. Firstly, due to the fact that combining cannot be applied to a green crop it must start so late that lodging generally occurs before harvesting is complete. Lodging delays harvesting and the farmer may run into the rains which make harvesting impossible. Secondly, the great amount of seed lost in direct combining is later ploughed in. This makes it difficult to change over to a better variety when necessary because the seed appears to remain viable in the soil for several years. Incidentally, the writer has started an experiment to test how long the padi seed can remain viable in the soil.

Windrowing before the crop lodges may therefore meet the problem of lodging and would at the same time obviate some serious disadvantages associated with direct combining.

But it is necessary to know if windrowing before the crop lodges would cause a lower yield and quality of rice than would result from harvesting after lodging.

Previous Work.

W.D. Smith (4) mentions that the best stage for harvesting padi (harvesting was not by windrowing as in the present work) in the Southern part of the U.S.A., is when the grain has a moisture content of 23% to 28%. He also states that if harvesting is done before this stage, many shrivelled, chalky and light grains occur among the harvested grains. This suggests that harvesting at an early stage may result in loss in yield.

Jones, Jenkins, Wyche and Nelson (5) also state that 23% to 28% grain moisture content is the best stage for harvesting the crop.

Stahel (6) (using a technique of harvesting not imitating windrowing as in the present work) found that there is an optimum stage in terms of grain moisture during which breakage in milling is at a minimum. This stage varies to a small extent with the variety used.

It is suggested that further studies be made to determine if the optimum stage of windrowing varies significantly for different dates of windrowing of the same crop and then to go further and investigate if these factors are associated with the moisture content of the grain at the time of windrowing which is used here as a measure of maturity. Such a study would enable one to decide if yield of padi and breakage in milling can be predicted by reference to grain moisture content at the time of windrowing.

The opportunity was also taken to investigate if there is any relationship between maturity at the time of windrowing as measured by grain moisture content and two factors which may contribute to yield, namely, hard grains percent at windrowing, and weight per 500 grains of windrowed and threshed padi. The study of these factors should, because of their contribution to yield, assist in confirming the existence of any relationship between yield of padi and maturity at the time of windrowing as measured by grain moisture content.

Moreover, if the relationship between the contributory factors and maturity at the time of windrowing is sufficiently strong, these factors may even be developed into measures of maturity which can be useful in the field and in the mill. (See Part II for development of these factors into field and factory guides.)