

INTRODUCTION

Of all crops grown in the Tropics none appears to show older techniques still in use and such a wide range of variation in the methods employed in its production than rice. The man-power requirement per acre varies upwards from two days for the well mechanised areas of the United States, to four-hundred man-days per acre in the older rice growing areas (Asia). These differences in labour requirement have been produced by mechanisation. In many under-developed countries, mechanisation is yet in its infancy and peasant annual incomes are still low. The unsatisfactory economic position of the padi farmer and the all round desire for more rice on the world market has led those concerned with world food problems to make suggestions which if put into practice would not only overcome world rice shortage but also increase the standard of living of the peasant. Every section of the Agricultural Industry has its part to play in the abundant production of this most important Agricultural commodity. The Agricultural machinery manufacturer has a responsibility equal to that of the plant breeder, soil physicist, entomologist, fertiliser manufacturer and educationist. The agricultural engineer while aware of the non-Agricultural difficulties in the way of mechanising Tropical Agriculture has continued experimenting and developing machines which would be used immediately the opportunities exist.

The problem of mechanising rice divides itself into two. There is the purely engineering side; how to get the machine to work in wet padi conditions, how to transport the machine when available; repairing facilities, procuring parts etc., and secondly, the agronomic side; what cultivation to do with these machines when they work. This second problem is almost nearing solution. One aspect (the threshing and winnowing of rice) is receiving serious attention and may soon be solved completely. The engineering problems have been approached

in two ways after fairly good information has been obtained about the agronomic side of things. Attempts have been made (a) to modify existing machinery and (b) to synthesis new machines using fundamental knowledge. Following is a review of work which had been done previously on the threshing and winnowing of padi.

Much of the padi grown in the Tropics is threshed by simple indigenous equipment such as the threshing tub and ladder. This is a large four-foot tub or box having a short ladder placed inside it at an inclination to the side. The rounds of the ladder are usually placed about four inches apart. Around the tub a fence of grass matting is placed to catch flying grains and direct them into the tub. The bundles of padi are beaten two or three times against the rounds of the ladder and ninety-five percent of the grain readily becomes detached from the straw and drops into the tub. As the box fills up, the padi is removed and winnowed by either tossing repeatedly in a tray-shaped basket or by dropping it through, the meshes of a suspended basket exposed to a breeze. The padi may be put through a simple winnowing machine. This method of threshing rice is always used in the field and suits the economic conditions of the peasant for at harvest, scarcity of labour which is keenly felt in all large padi growing districts renders it impossible to convert all harvested padi into rice, consequently, the padi is stored as such and is milled at leisure according to immediate requirements. More-over, stored padi is less subject to pests than stored rice and stored rice does not retain its flavour whereas stored padi does.

Rice straw is tough and is large in volume in proportion to the grain: so is chaff. The grain cracks easily if its moisture content is below twenty percent and the hulls come off easily if care is not taken. Where straw is used for rope or mat making, it should not be broken or bruised.