Rural Broadcasts—II.

METHODS OF STORING PADDY AND MILLED RICE, AND PROTECTION OF THE STORED PRODUCT

This talk is an extract from the report of Mr. W. Poggendorff, Chief of the Division of Plant Industry in the New South Wales Department of Agriculture and an expert on all phases of rice production, who visited the Territory during March and June, 1952, making a survey of the rice industry in the Territory. As rice, like most food products, presents a considerable storage problem in this Territory, the chapter from his report dealing with this subject is being presented for the interest of rice growers.

Successful storage of both paddy and milled rice requires :—

(1) Reduction of moisture content to within safe limits.

(2) Maintenance of low moisture content.

(3) Protection from insects and rodents.

Paddy is easier to store safely than milled rice.

Moisture content is by far the most important single factor. The maximum permissible moisture content varies with temperature and storage conditions.

Ideally, storage for paddy or milled rice should :—

(i) Have the physical strength to withstand the pressure of the grain.

(ii) Be designed to facilitate filling and emptying.

(iii) Be weatherproof and prevent entrance of water either as liquid or vapour.

(iv) Be free of cracks and flaws which cannot be cleaned out and afford harbour for insects.

(v) Be capable of effective and economical fumigation.

Perhaps the ubiquitous oil drum affords the readiest efficient means of small-scale storage in the Territory.

A.—PADDY.

Many Native peoples harvest their crops in the form of small hand-sheaves consisting of 50 to 100 heads with a few inches of stem still attached; these are hung, well spaced, under ventilated shelter. The initial moisture content may be dangerously high, but rapidly attains equilibrium with atmospheric moisture; ample air circulation prevents heating and resultant damage. Moulds can still occur if the average moisture content of the air is high and under such conditions the paddy is best threshed after thorough drying in the sun and stored in drums to prevent re-absorption of moisture. Frequent inspection is necessary and further parching in the sun may be needed; this is usually accomplished by spreading the paddy in a thin layer on rock, sheets of iron, concrete floors or even clean earth threshing floors, and stirring at intervals. These principles are obviously well understood by some Territory Natives.

In all tropical countries approximately 13.5 per cent. moisture is considered the maximum safe moisture content for paddy to be stored in bulk, possibly up to 14 per cent. for paddy in bags in small stacks or in baskets. The premissible moisture figure rises with decreasing average temperature; for instance, 14.5 per cent. in southern United States of America, 16 per cent. in southern New South Wales.

Great difficulty occurs during wet harvest periods or under naturally high atmospheric humidity in reducing moisture to within these limits and in commercial practice, it becomes necessary to employ forced ventilation of bins, sheds or silos, or special drying equipment. Such containers should be as air-tight as possible, and for forced ventilation a perforated false floor should be provided, or numerous air ducts. Paddy which has been heated may be cooled by forcing normal air through it, but little drying occurs unless the air is at least 10

degrees Fahr. higher in temperature than the paddy. For this reason some provision is usually made for heating the air to be forced through the grain, usually by running the air duct between the compressor or fan and the bin through an enclosed fire.

Commercial mechanical driers are an elaboration of this principle: the paddy or other grain is elevated to a hopper and may flow down in a continuous thin sheet, regulated at the base, between wire mesh screens through which hot air is forced, or in a stream regulated down a baffled enclosed duct, open only at the top and bottom, through which hot air is forced from below.

By whatever means paddy is dried particularly if by parching in the sun or by hot air, great care should be taken not to reduce the moisture content too rapidly or internal cracking (checking) of the grain will occur, resulting in a higher proportion of broken rice on milling. Four per cent. reduction in any one operation within twenty-four hours is considered the permissible maximum.

B.—MILLED RICE.

Most of the foregoing remarks apply equally well to milled rice, but because the latter has lost the insulating effect of the husk, permissible maximum moisture content must be reduced at least 1 per cent. A safe milled rice moisture content for storing under average Territory conditions would be no higher than 12 per cent. and preferably 10 to 11 per cent.

It must be admitted that this objective is difficult to attain without artificial means; failing suitable equipment, storage should be in the paddy stage which allows slightly more latitude and milled rice should be promptly used to avoid deterioration.

Dry paddy will keep indefinitely, as will also completely milled rice, but brown and undermilled rices are subject to rapid deterioration by oxidation of the germ oil and consequent rancidity, unless they are dehydrated to less than 5 per cent. moisture and sealed hermetically.

Milled rice is much more susceptible than paddy to infestation by weevils, grain moth and other insects, but both need protection, particularly under conditions of high humidity and temperature. Insect and rodent-proof storage, in which grain may be fumigated if necessary, is desirable but often difficult to provide unless sheet iron is available for lining wooden bins. Concrete is excellent provided it is damp-coursed to prevent rise of ground moisture.

Where difficulty is experienced in cleaning out the container thoroughly, the empty container may be sprayed with a residual spray such as D.D.T., 2.5 per cent., but only in the case of paddy storage.

Fumigation of infested paddy for milled rice may be carried out with the usual foodstuff fumigants—carbon tetrachloride, ethylene dichloride, ethylene dibromide, carbon disulphide—at the rate of 3 to 6 gallons per 1,000 bushels, according to circumstances, and with all necessary precautions against risk to life.