CSIR-FRI/CU/VKA/1989/001

ADOPTION OF THE IMPROVED MAIZE STORAGE CRIB BY THE SMALL-SCALE FARMER IN GHANA: PROBLEMS AND PROSPECTS.

BY;

M. HALM, P.N.T. JOHNSON AND
K.A. VOWOTOR

FOOD RESEARCH INSTITUTE (C.S.I.R.)
P.O. BOX M. 20 ACCRA, GHANA

A PAPER PRESENTED AT THE
16TH BIENNIAL CONFERENCE OF
THE GHANA SCIENCE
ASSOCIATION, HELD IN CAPE
COAST UNIVERSITY 5 - 9TH JUNE, 1989

ADOPTION OF THE IMPOROVED MAIZE STORAGE CRIB BY THE SMALL-SCALE FARMER IN GHANA: PROBLEMS AND PROSPECTS

BY:

M. Halm: P.N.T. Johnson
and K. Vowotor.

Food Research Institute (CSIR)
P.O. Box M. 20 Accra, Ghana.

ABSTRACT:

This paper briefly examines some technical, socio-economic and cultural problems which appear to hinder the extension of the improved maize storage crib to the small-scale maize farmer.

These problems were noted by the Maize Storage Team of the Food Research Institute during its work in some of the main maize-growing areas in the Central Region.

Problems like the traditional practice of using the uder-neath of the crib as a kitchen, the storability of newly introduced high yielding maize types, application of insecticides and the amount of loss which the farmer considers tolerable, have all been examined.

Some recommendations have been made which hopefully will help develop better approaches towards extending the improved maize storage crib.

1.0 INTRODUCTION

As part of the general programmes to improve the maize industry in Ghana, the Government has recently obtained foreign assistance to increase the maize storage capacity of the Ghana Food Distribution Corporation from 17,000 metric tonnes to 120,000 metric tonnes. This is being done in anticipation of increased maize production from an annual average tonnage of 1.2 to 5 tonnes per hectare.

This anticipated increase in maize production is due to efforts being made to improve extension work for maize farmers, such as the Global 2000 Programme.

It is estimated that the Ghana Food Distribution Corporation would be able to handle about 15 percent of the total maize produced in the country. This means that the remaining 85 percent would have to be managed on small storage holdings by the individual farmers themselves.

In the Ghana Agricultural Policy of 1982, the Government reiterated that it is committed to self-sufficiency in the production of cereals, especially maize. This called for maintenance of adequate buffer stocks for price stabilization and food security.

It is for the above reasons why the present attempts at introducing the improved maize storage crib, also referred to as the "narrow crib", have special significance.

2.0 THE IMPROVED CRIB

The improved crib looks like the traditional Ashanti crib, and is usually rectangular in shape. The FRI Maize Storage Group, sponsored by DAPIT have been studing and working in collaboration with the Extension Division of Ministry of Agric., Winneba, the traditional crib with respect to design, construction materials used, capacities, location and efficiency.

The improved crib was therefore introduced with the following advantages over the traditional one.

a. It is a strong durable structure having a life span of about 10 years if well constructed.

b. Locally available materials like thatch, bamboo can be used for nearly 100 percent of the structure.

c. It is easy to load and unload.

d. It can be utilized for drying as well as storage of maize.

e. It can be fitted with rat-guards to make it rodent-proof.

f. The wall structure protects the maize from sun, rain and can be locked to protect against theft.

g. Its maintenance costs are very low.

A very important feature of the improved crib is its width, which should be between 1.0 to 1.5 metres under the climatic conditions in the Winneba district. The height of the crib floor is 1.0 metre above the ground and all its legs are fitted with rat guards. It should be placed in a site with one facade facing the prevailing wind or perpendicular to the direction from where the wind blows, since wind velocity and frequency are important factors for a good drying preformance. The site and nearby area must be well cleared to prevent insect reinfestation, and free from waste maize and lodging water.

The crib can be used thus:-

(i) Harvesting of maize: The major constraint of the traditional crib is that it does not allow for optimal free ventilation and therefore, the maize needs a long pre-harvest field drying to safe moisture levels for storage. As a result of this long pre-harvest drying, the maize is exposed to the negative effects of wind, rain, and to attacks of moulds, birds, rodents, termites and more especially insects.

The insect infestation might not be noticeable immediately after harvest but the build-up will accelerate later during the normally ~~high~~ long storage periods leading to high losses. The use of the improved crib elminates this long pre-harvest drying by harvesting the maize soon after it is matured ie. with a moisture content of 28 percent (wet basis). This early harvest also allows for an early preparation of the fields for the next crops.

(ii) Dehusking of maize: The cobs should be dehusked before filling the crib in order to obtain the maximum drying performance and control of mould infestation. Highly mouldy or insect infested cobs are rejected or dried separately.

(iii) Drying in the improved crib: The cobs are dried in the improved crib whose walls are designed to give 30 - 50% wall openings. It must be emphasised here that the recommended crib width be proportional to the mean daily relative hmidities (R.H.) such that the higher the R.H. the smaller the width to effect a moisture reduction of 3% per day (F.A.O).

Mean daily R.H.	Recommended crib width
above 80%	0.6
75 —80%	1.0
65 - 75%	1.5
Below 35%	2.0

(iv) Shelling of maize: After about 60 day or 8 weeks of drying under the Winneba climatic conditions, the maize is shelled. If the maize is well protected against rain and the drying rate is ideal, the moisture content of the maize should be between 13 - 15%. During shelling, heavy mould and insect infested grains are rejected, and the grain admixed with an insecticide, such as Actellic 25, in the recommended way before bagging.

(v) Storing of bags: The inner walls of the crib are covered with thatch straw or any suitable material to protect it against the weather. The miaze is stored in the crib and inspected occassionally for any mould infestation and dried or retreated with the insecticide.

It is clearly evedent from the description of the improved crib that it is not too different from the traditional one. As a result, one would have expected that there would not have been problem with its adoption by the small-scale farmer as an appropriate technology to reduce post-harvest losses. Unfor-tunately, the FRI Maize Storage Group observed a number of problems and factors that appear to inhibit its general adoption. The factors are many but can be discussed under the following sub-headings;-

3.1 Technical Problems:

3 types of the improved crib have been identified with respect to the materials used for their construction.

TYPE I Where the crib is constructed from locally available materials on the farm eg. sticks, thatch, etc. and the farmer pays nothing or very little for its construction. This needs maintenance at least once in 3 months.

TYPE II This type is made from locally available material which the farmer has to pay for because he does not grow or have the materials around him eg. Bomboos, thatch etc. This type needs maintenance at least once in a year.

TYPE III This is mainly different from the previous ones because in addition to the locally available materials, he uses some other manufactured items such as sawn timber, conrugated roofing sheets, nails, wire mesh, solignum etc. This type is very durable as it has very little maintenance costs, but requires relatively in inital investment. It also needs some amount of craftsmanship in its construction.

In some of the rural areas, if one needs to construct Type III the problems to be encountered would be:

(i) Unavailability of roofing sheets in very windy areas.

(ii) Unavailibility of metal sheets for rat-guards.

(iii) Unavailability of bamboo is certain areas.

Another technical problem is in the use of insecticides:

(i) Unavailability of insecticides in the rural areas

(ii) High relative costs of insecticides, if available, to the rural users (Quote real figures)

(iii) No convenient package size for small-scale farmers who cannot afford to buy whole cans of the technical or concentrated solutions. This suggests that, smaller volumers be made for the small-scale users.

(iv) Lack of good extension campaign to teach farmers recommended usage of insecticides eg. at Oguaakurom. some maize farmers become sceptical about the use of Actellic 25 because one farmer unfortunately dipped whole cobs into the dilute solution instead of just the tips of the cob. This resulted in high mould growth on his produce.

(v) Problem of measuring exact quantities of concentrated solution for tratment of very small volumes of maize.

3.2 Cultural Problems

(i) Acceptance of the crib in the first place since some farmers claim it is quite similar to the traditional one and can not hold large volumes of the produce, whereas the critical points.

They fail to appreciate that the critical features such as:-

(a) its smal width

(b) cribs facing prevailing wind

(c) adequate wall openings for good frying performance

(d) presence of rat-guards are the main differences between the traditional and improved types

(ii) Some of the farmers accept the losses they incur as a result of the use of the traditional crib as normal and do not see the need to reduce this through the adoption of the improved crib.

(iii) Some farmers who even adopt the improved crib, are reluctant to follow the recommended method of crib usage as mentioned earlier ie. early harvesting, dehusking of maize, drying to safe moisture levels (13 - 15%) before shelling, treatment with insecticides, and bagging. It is very important here to note that farmers in the district fo not dehusk the maize before filling into their cribs. This, they claim protects their maize from further attacks of the insect pests.

(iv) This habit of the long pre-harvest drying in the field is changing due to the introduction of new high-yielding varieties which are more susceptible to pre-harvest infestation than the local or traditional varieties due to their poor husk cover. Therefore using the improved crib in the recommended way would go best with the cultivation of the high yielding varieties. Some farmers still preferred growing the traditional varieties and this is another factor why the adoptiong of the improved crib is slow.

(v) Reluctance of farmers to adopt the improved crib because the traditional crib serves the dual purpose of a crib and the household kitchen. The kitchen is constructed under the crib and the kitchen fire dries the maize and the smoked drives away the insects.

(vi) Some farmers' reluctance to treat the maize for fear of food poisoning by the inseticides.

3.3 <u>Socio Economic Problems</u>

One feature of the improved crib is that site must be at windy area in order to achieve a maximum drying performance. It is obvious from this feature that the crib cannot be sited in the normally enclosed low-windy compound homes typical of the rural farmers. Therefore locating the crib out of sight which is prone to theft is just unacceptable to the farmer, because some of the farmers use their produce as security for loans from the banks and money-lenders.

4. RECOMMENDATIONS

Adoption of the imporved crib is very slow in the areas the FRI. Maize Storage Group has been working. This is because of the initial costs involved if a farmer is constructing a durable crib.

The FRI Maize Storage Group recommends that Co-operatives, Agricultural Extension Officers, Schools community farms should adopt the crib and use it as demonstration untits for the communities in which they live.

There is the need for more education and extension work on the advantages and use of the crib to farmers. This can be through demonstration and local workshop.

There is also the need for education and extension work on good storage practices such as storage hygiene

REFERENCES

1. Dapaah, S.K. (1988), Policy Issues in the promotion of cereal and legume production Proc. Workshop on Effective Post-harvest Management of Cereals and Legumes, University of Ghana, Legon Ghana.

2. F.A.O. (1985), Construction of Cribs for drying and storage of maize, Bul: 66

3. Ofosu, A(1988), Grain Storage in Ghana - some critical issues. Proc. Workshop on Effective Post - harvest Management of Cereals and Legumes, University of Ghana, Legon Ghana.