Fusing tradition and science to design a better granary

Proper storage of harvested grains is important to small-scale farmers. For a strong and efficient store, the right materials must be chosen to construct it. Most of these used to be found in the natural environment but, with increasing population pressure, they are not always freely available any more. Farmers need to adjust their designs, and benefit from experiences from elsewhere. A few years ago, in a course for extension staff in the Moru area of Southern Sudan, the best of traditional ideas and new ideas from outside were brought together.

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Amongst the Moru people the most important storage container for most of the main staple, sorghum, is the granary called *kiro*. Each wife, or other independent woman, has her own granary and kitchen. The women have the responsibility to keep enough grain. Men build the stores. So both men and women must be involved in looking for improved technology.

The Moru granary, still widely used, consists of a large woven basket raised on a timber platform. The basket is plastered and protected by a grass roof. Access is from the top by raising the roof. The capacity of a granary relates well to what a family needs to store. It lasts for a long time, and can be carried to a new home when the family decides to move.

Traditions and changes

Each part of the granary is named and should be made from the right materials, to assure that it will be strong and lasting. Suitable trees are readily available in remoter areas, but are in short supply in more densely populated areas. Ten different species of timber and creeper may be used in constructing one granary. A raised granary normally has many uprights including the legs, the supports for the basket and the supports for the roof. It is not unusual to find 18-20 uprights reaching from the ground.

The basket was traditionally plastered with buffalo dung, giving a smooth finish and good protection against insects, but this is now very difficult to get. Cow dung is occasionally used, but is not widespread.

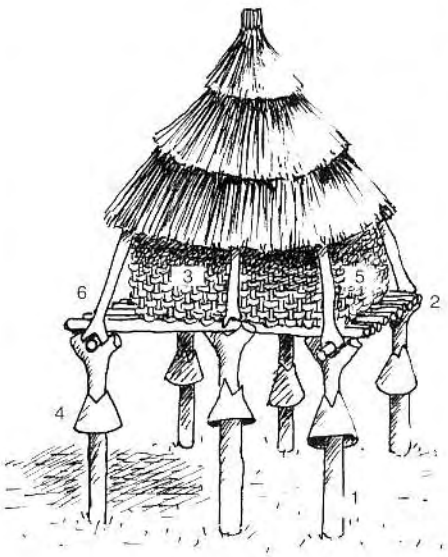
Bringing in outside knowledge

However, there were problems with the traditional storage system. We therefore wanted to bring together the indigenous technical knowledge of the local farmers with outside, scientific understanding of pests and diseases, in order to design a more efficient granary. In October 1986 a one-week course on storage was arranged for all extension staff in Mundri District, both men and women. It was originally planned that an expert from outside would conduct the course. The programme included building his design of an "improved granary". Materials were collected and ready. Unfortunately, the outside expert could not travel from the regional capital, Juba. Nevertheless, the course went ahead.

Theoretical teaching was given on the main enemies of stored grain (mould, insects, rats and mice) and the four main environmental factors affecting their multiplication (heat, moisture, air and dirt). Then some practical recommendations, applicable in many situations, were given. This theoretical teaching was straightforward. The problem was the practical part: building the "improved granary". No-one present had ever done this, although all the participants had built traditional granaries. And at this very point, the theoretical scientific knowledge needed to be linked with the participants' traditional knowledge and skills. The problem was solved by passing the design of the "improved granary" into the hands of the participants. They built it using their traditional skills and knowledge, supplemented with the new knowledge which they had just gained during the course. The result was a new granary with its roots firmly in the traditional design but incorporating adaptations based on the "outside" knowledge. The main factors incorporated were (see figure):

1. using only six legs, thus reducing the number;
2. raising the platform slightly to a level above 1 m (rats and mice can not jump up);
3. using supports for the basket that rise from the raised platform rather then the ground;
4. rat guards are put on the legs;
5. the inside of the basket is coated smoothly with anthill mud and slime from a vine (*Cissus integrifolia*);
6. attaching the roof to the basket with poles reaching the platform rather than the ground.

A major improvement was the reduced number of uprights (easy access for rodents) and the protection of these uprights with rat guards. The use of rat guards was introduced by reference to the existing practice to prevent rats getting at maize cobs hung from the roof: half a gourd is threaded through a rope, with the concave upwards, so that the rats cannot get round it. Rat guards on a granary are new, but the idea was already in the community.



The improved granary: combining old practice and new knowledge.

Combining "old" and "new"

This design proved both practical and efficient in reducing the amount of grain destroyed by rodents and insects. It could not have been reached purely from traditional knowledge and experience. It likewise could not have been designed in a practical way except by those used to building the traditional granary and familiar with the materials and their limitations. This was further facilitated by having course participants from different parts of the district, each knowing slightly different methods of construction, although with a uniform basic design. The pros and cons of different ideas could then be discussed.

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