



*Cleome gynandra L. - Flowering and fruiting shoot**

Indigenous knowledge has both strengths and weaknesses. It is strong in what can be observed and weaker at understanding what is not visible. Concepts such as soil fertility and nutrients are difficult to see, but with understanding can be explained in terms acceptable to the farmer. The Moru of the Southern Sudan recognise that accumulations of wood ash provide valuable sites for cultivating ecologically specialised plants. This article demonstrates how traditional perceptions of soil and fertility were developed to teach notions of soil husbandry which the Moru, traditional shifting cultivators, could use in conditions of agricultural intensification. Understanding what the Moru already knew helped bridge the communication gap.

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The Moru live in Mundri county, where land is plentiful, external inputs are scarce and shifting cultivation continues to be the main way of restoring soil fertility. As more people are drawn to population centres and adapt their cultivation to their new circumstances farmers need to have a better understanding of the role soil nutrients play in cultivation. Soils in the area are largely acid, so potassium soon becomes a limiting fac-

tor once land is cleared. With no synthetic fertilisers available, wood ash has a clear and significant effect on the growth and yield of many crops.

In Mundri county, ash obtained from burning trees and bush is recognised as a way of improving soil fertility and is an important reason for using fire to clear land. Areas with particularly high concentrations of ash such as those where a large tree or mound of rubbish has been burnt, are regarded as ecologically significant and suitable for ecologically specialised crops. Ash from domestic household fires, however, is seen

Understanding a means of con

in rather a different way even though it can provide depleted soils with an appreciable amount of nutrients.

Although during burning most of the nitrogen is lost to the atmosphere, phosphorus, potassium and other minerals are released from plant materials and enter the soil in a readily available form. The mineral composition of the ash is very similar to that of its source materials, each of which has its own nutrition pattern and specific assortment of minerals. The type of plant burnt determines the types of mineral salts released. This difference has long been recognised by Moru housewives who know that some plants are a particularly good source of the lye they use in cooking and which they make by burning certain favoured plants.

Burning in the garden

When clearing new land for cultivation, the Moru make extensive use of burning and the ash produced is highly valued. Wood ash temporarily raises soil alkalinity making potassium and phosphate more available to the crop. Two main methods are used to clear new land and both leave a significant amount of ash. First, on second year and older land, crop residues and one-year-old coppiced tree and shrub growth are collected together into piles, left to dry and then burned. Sometimes this rubble is collected together towards the end of the growing season, left to dry and burned before the rains start. The ash area created in this way is then used to cultivate ecologically specialised crops. In this procedure, ash is deliberately generated and concentrated into one place.

Second, fire is used to kill large trees and remove fallen trunks that would otherwise hinder crop growth. Firewood is plentiful in Mundri so, although smaller branches may be broken off and used as household firewood, the trees themselves are set alight and left to burn slowly in the field for several days. The result is a concentrated area of wood ash which is subsequently used to cultivate ecologically specialised crops. In a fertile area such concentrations of wood ash are avoided when sorghum is being planted for farmers know from experience that ash stimulates over-vigorous growth and lodging.

Farmers also understand that ecologically specialised crops such as finger millet, maize, pumpkin, okra and spider flower

traditional perceptions of wood ash: *municating soil fertility*

(*Cleome* spp) as well as banana and papaya thrive where there are dead trees, rotting vegetation (bunds of last seasons' weeds, heaps of groundnut haulms) termite mounds and wood ash. This recognition shows that farmers understand their environment, but they do not know why these differences affect their crops.

Ash from the hearth

Hearth ash is not used in the same way. The Moru, living in an area where there is no scarcity of wood, generate an appreciable amount of ash in the course of their household activities. This ash is swept up into a pile: it is not spread on the land or taken to nearby gardens. The ash heap has a special status. It has taken time to develop and a large heap shows that a woman has been in the compound for a long time and enjoys a stable marriage. Even today when there is considerably less virtue in having a large pile of ash, the habit of heaping it up in one place still persists.

Kumbo: ash for lye

There are other domestic uses for ash. One use not directly related to agriculture is the making of kumbo, a local salt. The way the Moru make salt reflects their environmental understanding and provides an excellent parallel with processes basic to soil fertility. In the Moru situation, salt making has all the right elements for creating a teaching tool.

When the women of the village make kumbo, they carefully choose particular plants. These include crop residues, wild plants and some exotics. Once these have been selected they are cut, added to brushwood when they are still green and burnt in a well-swept area. The ash generated is collected and stored in a pot or similar container. It is recognised that if this ash is to retain its saltiness it must be kept dry. When salt is needed, the ash is put into a perforated bowl and a small amount of water is added allowing the soluble salts to leach out in the form of lye. This lye is then added to cooking water when salt is needed.

Significance of wood ash

The importance of potassium in the soil is difficult to teach, but the effect of wood ash is easy to see. Teaching, however, must be situation orientated. Burning has often been condemned. However, as long as the Moru maintain the tradition of clearing land and using it for a period of two to four

years, farmers continue to see that burning is an efficient (ash gives quick results) and effective way of saving labour. However, change has brought agricultural intensification and with it new problems and learning needs. Burning is clearly detrimental to old land because it causes baking, low percolation and low water retention.

In the past, farmers were taught that all burning was bad. They rejected this teaching because they saw the beneficial effects ash had on their traditional shifting agriculture. Once this position has been understood it becomes possible to relate it to the issue of burning in the areas where it causes the most damage. In this way teaching can be situated in the context of late hot burning, the changes associated with a more intensive land use and the need for more soil husbandry because old land is being kept in production.

Not only does burning destroy organic matter and soil texture, it also damages the nutrient supply. Compost or cruder rotted vegetation contain nutrients similar to those found in wood ash but releases them at a less dramatic rate. Since the Moru recognise wood ash and decomposed plant material sites as places suitable for cultivating ecologically specialised crops, established farming practices can be used as a basis for further learning.

Traditionally, ecological niches are used in an opportunistic way and rarely involve the deliberate creation of specialised conditions. As land use practices change amongst the Moru and new crops and vegetables are grown for market, household ash becomes an important resource for maintaining soil fertility.

Many farmers find the idea of nutrients difficult to understand. They do not know why some soils are good and some are poor or why wood ash, for example, is beneficial. The community's familiarity with preparing kumbo provides a way of helping farmers understand what nutrients are, how they become available and how they work. The following learning steps proved useful when discussing the subject of soil fertility with several Moru women's groups and helped them see the soil in a new light.

Kumbo from ash: nutrients from soil

- Kumbo is salty, it is useful in cooking.
- The saltiness is in the plant. It becomes available when the plant is burnt to ash.
- The saltiness is drawn out by adding

water to the ash. The salt is then washed out.

- This saltiness is what plants have taken from the soil as nutrients.
- Plants take their food from the soil dissolved in water. If there is not enough water, plants do not get their food either.
- When ash is added to the soil, nutrients pass quickly to the water and become readily available to the plant bringing quick results.
- Nutrients can also come from compost. They are like the salt already in the plant. Burning is not necessary. In compost, nutrients pass slowly into the water. The effects of compost are not as immediate as those of ash, but the same amount of nutrient is present.
- When kumbo gets wet the salt is washed out. In the same way salt is washed from wood ash. So ash must be put on the garden while still dry.
- In the same way that ash is washed to give salt, the soil can also be washed by floods or heavy rain. When this happens salt is lost (leaching).

Kumbo provides a useful tool for learning about nutrients. Unless farm families understand the basic processes taking place in the soil they will not take an interest in soil husbandry. This is a specific example of how indigenous traditional knowledge can sometimes be used in unusual or unexpected ways. It is one example - others need to be investigated. The farm family's understanding of the ecological setting of marginal areas is an essential element in its survival for the only resources readily available are those in the soil and the bush. As we have seen the Moru have a detailed and rational understanding of their environments and this in itself provides a sound basis for grafting new learning.

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* Chayamarit K. 1993. *Cleome gynandra* L. In: Simonsma, J.S. & Kasem Pilak (Editors): Plant Resources of South-East Asia: No. 8. Vegetables. Pudoc Scientific Publishers, Wageningen, The Netherlands. pp. 148-150, Figure p. 149.