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# THE VALUE OF INDIGENOUS FRUIT-BEARING TREES IN MIOMBO WOODLAND AREAS OF SOUTH-CENTRAL AFRICA

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## INTRODUCTION

The following discussion is based on a review of literature concerning the use and occurrence of wild fruits in south-central Africa, combined with the author's personal observations from Northern Zambia.

## WILD FRUITS AND LAND CLEARANCE

As has been recorded the world over, rural people selectively clear woodland when preparing land for cultivation (see Rackham, 1989 for a description of the historical emergence of the woodland mosaic in Britain).

A detailed study by Campbell (1987) of three areas in the Zimbabwean Communal Lands, shows considerable differences between these areas in terms of land tenure and human and tree population densities. However, from the small-scale commercial farming area of Ziyambe, where population pressure is least, to the more densely populated Chiweshe Communal area, the frequency of wild fruit consumption is the same. The most widely used species are: *Diospyros mespiliformis*, *Strychnos cocculoides* and *Azanza garckeana*. In the Mbozi area of south western Tanzania, Knight (1974:76) identifies a distinct land type which he calls *Parinari curatellifolia* woodland. In this area, *Uapaca kirkiana* and *P. curatellifolia* have been spared by farmers whilst converting woodland to farmland. Over time these have become, along with introduced mango, the only trees left in an otherwise intensively cultivated and populated area.

In Zimbabwe, wild fruit species do not achieve ecological dominance (as can be the case in regenerating woodlands in Zambia)—their canopy cover in *Julbernardia* Miombo is normally between 2 and 7%. Whereas the three species mentioned above achieve 0.5% cover in climax woodland, after land clearance they contribute up to 5%. Campbell asserts that this explains why frequency of fruit use is the same across the three areas. In Chiweshe, farmers have manipulated tree numbers to accord with the demands placed on them.

Wilson (1989) writing on the Runde communal areas of Zrshavana records a similar process where the most important fruiting species is *Parinari curatellifolia*. According to oral history, Wilson writes that the preservation of this species was an important act of farmer resistance to agricultural interventions by the colonial administration. Apart from the fruits provided by the trees, the persistence of the species ensured a supply of timber, firewood, fibre and shade to local people. The same species is also associated with land spirit guardianship. In the Communal areas forage for cattle tends to be in short supply: *Parinari curatellifolia* often formed part of contour ridges which tended to be prone to damage by cattle whilst foraging. The trees played a dual role - they provided valuable forage and also helped to protect the contour ridges from damage by cattle.

Pressure was also brought to bear by colonialists upon farmers who did not de-stump trees in

fields. For example, in an examination to qualify as a 'master-farmer' marks were deducted for having any trees in fields. However, despite the disincentives to retain tree cover on farms, a substantial proportion of valuable wild fruit trees were protected by the farmers.

Wilson (1989) also shows how farmers cultivating difficult sandveld soils developed a system of farming based on nutrient pumping and tree litter accumulation. Since the sandveld soils are of low nutrient status and have a low water retention capacity, trees are used which produce large quantities of slowly decomposing leaf litter. This accumulates around the trees and acts as a slow release nutrient supply for ground crops. Studies of soils under *Parinari curatellifolia* suggest that organic matter levels are doubled and phosphate levels are increased by almost five times (Wilson, 1989:376).

In some cases, fruit bearing trees because of their domestic and market value are retained even though they are known to reduce arable crop yields, for example, *Uapaca kirkiana*. In sparsely populated areas such as northern Zambia, the preservation of fruit trees such as *Parinari curatellifolia* is in evidence, *Uapaca kirkiana* is plentiful in surrounding Miombo and is gathered by local people. Under low population densities and relatively abundant woodland, there is little incentive to preserve or manage wild fruit tree populations.

## WILD SPECIES DOMESTICATION

There are various on-going processes of tree domestication, Chimbelu's study (1990) of the Lucazi and Tokaleya peoples in the Zambezi valley of Zambia reveals an extension of these processes. 70% of the Lucazi respondents said that they cultivate *Ricinodendron rautanenii* through using cuttings; the Tokaleya also use the same methods. Peters (1987) describes an area, extending from Livingstone through Botswana to north-western Namibia and south-eastern Angola, where *Ricinodendron rautanenii* is found in large groves. Studies by Lee (1973, 1979) on !Kung Sun people reveal that in the heartland area *Ricinodendron rautanenii* accounts for over 40% of food intake and is the key to these peoples' survival in the Northern Kalahari.

A more extreme example of domestication is revealed in Gumbo *et al* (1990) in Zimbabwe. A community tree planting project is being facilitated by ENDA, an NGO. In a pilot project in Mazvihwa ward, 3600 trees were planted voluntarily by the local community, of this number 41% were fruit bearing trees, either exotic or indigenous. In all 18 different wild species were used, half of which were fruiting species. In a pairwise ranking study carried out by McCracken, Pretty and Conway (1988, quoted in Gumbo 1990), exotic fruits were preferred to indigenous fruits. The degree of preference was subject to age and sex - older women showing the greatest interest in wild fruits. The most preferred wild fruits were *Sclerocarya caffra*, *Azanza garckeana* and *Parinari curatellifolia*. *Sclerocarya caffra* is the tree most in demand for planting by ENDA.

Table 1 charts the various scenarios where fruit species persist in the landscape. Even from this limited information the diversity of processes involved is evident. Planting a species would appear to be a 'step on' from preserving a species and would coincide with high population pressure and a highly preferred tree.

**Table 1: WILD FRUIT SPECIES IN THE LANDSCAPE**

Author	Area	Country	Main Species	Notes
Rocheleau (1987)	North Province	Zambia	<i>Uk, Pc</i>	Abundant Miombo reserves. Collection of forest products by women. Exotic fruit trees being incorporated into more intensive systems - including grass mound systems.
Wilson (1989) Knight (1974)	Communal lands Mbozi Plateau	Zimbabwe Tanzania	<i>Pc</i> <i>Pc, Uk</i>	As population pressure increases on land fruit trees are preferentially spared on new arable lands. Initially as nutrient pumps in 'traditional' (pre-European contact) systems - more latterly preserved on contour ridges and field boundaries, and for shade.
Chimbelu (1990)	Zambezi Valley	Zambia	<i>Rr</i>	Species retained and actively propagated. Valued for making fishing tackle or as food, depending on cultural tradition.
Gumbo <i>et al</i> (1990)	Communal Lands	Zimbabwe	<i>Sc</i>	Domestication of wild-fruited species. Planting of <i>Sc</i> in compounds and on private land. Locally valued as multi-purpose species.

Key: *Uk* - *Uapaca kirkiana*  
*Pc* - *Parinari curatellifolia*  
*Rr* - *Ricinodendron rautanenii*,  
*Sc* - *Sclerocarya caffra*

## COLLECTION AND MARKETING WILD FRUITS

From a questionnaire carried out by Campbell (1989) recording collection responsibilities, it is apparent that primary school children are the major collectors of wild fruits, with adult women as the second major collection grouping. Local tenurial arrangements and access rights are other factors affecting gathering activities. In Zimbabwe communal land fruit trees are individually owned if they are inside the home compound. In fields, trees and their products are held privately only when crops are present. On communal grazing land, trees can be cropped by anyone, subject to restrictions on collection of unripe fruit. Indigenous fruit trees occur on these different land types and are also subject to local land rights (Gumbo, 1990). Access is also constrained by centralized legislation: for instance, in 1985, 55% of Zambia was under forest, of which 9% was protected as National or Local Forests (Hans, 1985). Centralized restrictions, however, tend to be less effective than locally instituted rights and restrictions (ODA, 1990).

As with fruit collection, marketing of wild fruits is also the domain of women and children. In the Communal Lands, despite the fact that women are often responsible for the sale of exotic fruits, they do not control the money this activity generates. They do, however, control money they receive from selling wild fruits (Gumbo, 1990).

Access to markets and availability of transport are key factors in determining the commercialisation of produce. Most rural areas are served by some form of transport including donkeys, ox-carts, bicycles, and occasionally buses. However, in more remote areas, such as parts of rural Zambia, walking is still the predominant form of transport, leading to wastage in fruit because of lack of easier forms of transport.

However, change comes rapidly to areas with the advent of roads and markets. This is well illustrated by the example of the National Breweries of Zambia who are brewing 'musuku wine' from *Uapaca kirkiana*. Local people in Southern Province are informed by the brewery when the collection trucks will arrive. Systematic collection fruit is organised by local people and brought to the roadside. However, although the collection is well organised, there is evidence to suggest that this sudden increased demand is outstripping the capacity of the area to supply the fruit.

## FOOD AND NUTRITIONAL PROPERTIES

As has been evidenced by studies in other parts of Africa, wild fruits provide an important component of the diet, particularly for children (Falconer, 1990). Wild fruits contribute greatly to diet quality rather than quantity. Another important characteristic of some wild fruits is their storage capacity. This is particularly the case with *Ricinodendron rautanenii* kernels which are available for 4-5 months during the dry season (Peters, 1987). In northern Zambia a 'hungry season' precedes the first rains in November when the busiest time of field preparation and planting normally begins. The fresh fruits of *Uapaca kirkiana* contribute significantly to diet during this period, whilst the sale of fruit generates much needed cash for farm inputs and other household requirements.

It is well-established that wild fruits contain higher concentrations of vitamin C than exotic fruits (Wehmeyer, 1966). Protein content of fruit kernels is also high in indigenous species: *Ricinodendron rautanenii* contains 60% protein as compared with 48-56% for groundnut (Xabregas, 1957). Wild fruits are also good sources of carbohydrate, calcium, magnesium and potassium. In Campbell's study (1987), 15% of respondents, when asked their reasons for eating wild fruits, specifically mentioned their high vitamin C content as an overriding factor.

Chimbelu (1990) found that there were significant differences between priority uses of *Ricinodendron rautanenii* between the Luchazi and Tokaleya peoples of Zambia. The Luchazi respondents valued the tree most highly for its medicinal purposes, and then in descending order of importance for furniture, food and fishing equipment. However, amongst the Tokaleya, the majority of respondents indicated that fruit was the most important product from the tree.

Although there is little information on the yields obtainable from wild fruit trees, it is probable that because they are highly adapted to variable climatic conditions and in particular drought, their fruits have an extremely important function in times of drought-induced nutritional stress. And therefore, although yields may be relatively low compared to exotic fruits, the ability of indigenous trees to withstand harsh conditions is of over-riding importance, and a major factor in their protection by farmers.

## CONCLUSIONS

Although there is growing understanding of the importance of wild fruits and other non-timber forest products, still little is known about their importance in sustaining households through periods of climatic, nutritional and financial stress. It appears from this brief review of the literature from the Miombo woodland areas, that higher economic and social values should be ascribed to the highly diverse environment supported by these woodlands. The association between agriculture and trees needs to be understood and supported, rather than ignoring the extensive local knowledge and technology development that has occurred across these areas.



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