

## **PRODUCTION AND MARKETING OF SAFOU (*DACRYODES EDULIS*) IN CAMEROON AND INTERNATIONALLY: MARKET DEVELOPMENT ISSUES**

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### **ABSTRACT**

This paper draws together information from three separate projects on the production of *Dacryodes edulis* (G.Don) H.J. Lam or 'safou' in Cameroon, and its domestic and international trade. The volume of safou fruit commercialised in Cameroon in 1997 was estimated at 11,000 tonnes, equivalent to US\$7.5 million. Exports from Central Africa and Nigeria to France, the United Kingdom and Belgium were worth over US\$2 million in 1999. A study of nine markets in the humid forest zone of Cameroon in 1999 revealed that women dominate the retail trade while men concentrate on wholesale. For both, safou trade is an important long-term livelihood option. Depending on the market and volume traded, weekly marketing margins can be double the minimum wage. Far from being exploited by traders, producers were found to receive 75% of the consumer price on average. The main constraint to both the domestic and international trade is the high perishability of safou.

*Key words:* *Dacryodes edulis*, safou, indigenous fruit, production, market, export, seasonality, Cameroon, marketing margin, gender.

### **RESUME**

Ce papier est basé sur des informations provenant de trois projets distincts sur la production de *Dacryodes edulis* ou safou au Cameroun et son commerce local et international. Le volume de fruits de safou commercialisé en 1997 au Cameroun est estimé à 11,000 tonnes pour une valeur de 7,5 millions de dollars américains. En 1999, les exportations de safou à partir de l'Afrique Centrale et du Nigéria vers la France, la Grande Bretagne et la Belgique sont estimées à 2 millions de dollars américains. Une étude menée en 1999 auprès de 9 marchés de la zone forestière humide du Cameroun montre que les femmes sont plus impliquées dans le commerce de détail alors que les hommes sont plus engagés dans le commerce de gros. La commercialisation du safou est une activité importante pour améliorer le niveau de vie des hommes et des femmes. Les marges de commercialisation hebdomadaires peuvent doubler le Salaire Minimum Interprofessionnel Garanti (SMIG) selon le volume de safou commercialisé dans certains marchés. Les paysans ont reçu en moyenne 75 pour cent du prix de vente au consommateur, ce qui montre qu'ils ne sont pas exploités par les commerçants. La contrainte majeure au commerce local et international du safou est son degré élevé de périssabilité.

*Mots clés:* *Dacryodes edulis*, safou, fruitier indigène, production, marché, exportation, saisonnalité, Cameroun, marge de commercialisation, genre.

## INTRODUCTION

The purpose of this paper is to explore the production, markets, marketing process and market prospects of the fruit of *Dacryodes edulis* (G. Don) H.J. Lam. Also known as safou, African plum or African pear, this tree species is in the process of domestication, but has yet to become a conventional<sup>1</sup> on-farm crop (such as mango or citrus).

Originating in Central Africa and the Gulf of Guinea region, the popularity of safou fruit (boiled or roasted for consumption) has led to its widespread cultivation, extending its area of distribution to Sierra Leone in the West, Uganda in the East and the Northern part of Angola in the South (Troupin 1950). As described by Leakey *et al.* (2002), farmers in Cameroon have already achieved some improvements in desired fruit characteristics. It is only very recently, however, that traditional propagation from seed is being supplemented with vegetative propagation methods (such as air-layering) to ensure that preferred traits are passed on from parent to offspring (Tchoundjeu *et al.* 2002).

Safou is therefore a former non-timber forest product (NTFP) that has, in many areas, made the transition from the forest to the farm. In Cameroon, it is present throughout the forest zone (Centre, South, East, Littoral and South-West provinces) and part of Adamawa province, or approximately 2/3 of the country (Isseri 1998). It is commonly cultivated in agroforestry systems as a shade provider and secondary crop in cocoa and coffee farms (Sonwa *et al.* 2002). In common with many NTFPs, safou plays an important role both in household consumption and as a source of income. Its nutritional value is significant, with a fat content of 50%, 27% fibre, 10% protein and 10% sugar (Silou 1994). Fruit yields per tree are well over 200kg (Omoti and Okiy 1987, Silou 1994). At producer level, incomes are particularly important for women and help families bridge shortfalls during the period when school fees are due (Schreckenber *et al.* 2002).

There is a lively trade in safou at national, regional and even international level. In Cameroon, it is the third most important fruit crop, after banana and kola, in terms of production value (Temple 1999). Domestic trade is growing steadily (Ndoye *et al.* 1997, Eyebe *et al.* 1999) with the growth of urban markets around Yaoundé (1.3 million people) and Douala (1.8 million people) a central factor in the rise of commercial production and the specialisation of production zones. At the international level, safou is a commercial success amongst the nationals of Central African countries and Nigeria living in France, the United Kingdom and Belgium.

In spite of its importance, little information is available about the potential production levels of safou in Cameroon (or elsewhere), as the tree is not included in agricultural censuses, nor is much known about the main centres of production (Isseri and Temple 2002). This lack of information prevents the appreciation of

<sup>1</sup>'Conventional' is used here to refer to crops which have, for example, been the object of formal improvement programmes, for which named cultivars exist and for which extension services can provide management and marketing information.

the real economic value of safou to the nation, and is a constraint to the design of useful research programmes and policy interventions.

In this paper, we synthesise data from surveys carried out in three separate projects to provide information about levels of production and commercialisation of safou and describe the kinds of people who are involved in its domestic and international trade. Based on the constraints they face, we make recommendations for interventions which might increase the opportunities for them to improve their livelihoods.

## METHODOLOGY

### Quantifying safou production in Cameroon

A survey to estimate potential production of safou in Cameroon was conducted in 1998 (Isseri 1998) in the context of an Institute of Agricultural Research for Development (IRAD) project investigating the production of a larger range of fruits and vegetables (Temple 1999). In the absence of national inventory data for safou, it was decided to extrapolate production from a combination of a phytogeographic map and market quantification surveys (Tchotsoua and Mapongmetsem 1998). This process involved several steps.

#### *Step 1—Preparation of a phytogeographic map for safou*

The preferred ecological characteristics of safou were determined from the literature as being: (i) average temperature of 23–25°C; (ii) average rainfall of 1400–2500mm; and (iii) deep ferrallitic or volcanic soils. The occurrence of these three conditions in southern Cameroon was mapped, leading to the identification of three different zones. All three preferred conditions are met in the first zone, which includes the main safou production centre of Makénééné. The second zone covers those areas which meet at least two of these conditions, such as Loum, and the third zone includes those areas, such as Ebolowa, where only one of the three conditions is met.

#### *Step 2—Quantifying production at Mfoundi market*

Mfoundi market in Yaoundé, the capital of Cameroon, was selected for this survey because of the large number of wholesalers operating there. A sample of retailers, wholesalers and producers were surveyed between June and August, 1997 (Isseri 1998). This produced an estimate of approximately 311 tonnes of safou sold at this market during this period. According to the wholesalers, 1997 was a fairly average year for safou production.

#### *Step 3—Estimation of yields in the supply zone of Mfoundi market*

The supply zone was mapped on the basis of discussions with traders. It was

estimated at just over 1 million ha. Dividing this area by the total commercialised volume gave a commercialised volume of 0.0003t per hectare.

#### *Step 4—Extrapolation of production volume*

Within each of the three phytogeographic zones for safou, the main production zone (representing areas of very high concentration of production and the principal distribution centres) was mapped. The average per hectare production for the Mfoundi supply zone was multiplied up by the area of each of the three production zones to give a value for total commercialised production (7,877 tonnes) for the 3-month period.

#### *Step 5—Extrapolation of an annual production volume*

The three months surveyed represent the period of highest production in a season of approximately 7.5 months (April to October). It was estimated, therefore, that the production volume in the other 4.5 months would only be approximately half that during the peak months. Total national commercialised production is thus estimated at approximately 11,000 tonnes<sup>2</sup>.

This method served to provide a *rough estimate* of the amount of safou commercialised in 1997, but is subject to several limitations. Perhaps the most important of these is the variability of safou production from year to year and from area to area. An estimate for one year based on one market can therefore only provide an indication of the order of magnitude and should be followed up by further work. The figure arrived at may be an underestimate for the year concerned as it was not possible to quantify the volumes traded outside of the markets. In order to extrapolate the figure further to get actual production values, it would also be necessary to quantify the volumes of fruit lost through poor storage, consumed locally or not harvested at all. Existing estimates for these factors are very variable with van Dijk (1999) suggesting that only 10% of the production in Southern Cameroon is marketed, while Ayuk *et al.* (1999) find that just over 40% of annual production is sold.

### **Domestic market and trader characteristics**

The second study was carried out by CIFOR in 1999 in three provinces (Centre, South and South-West) of the humid forest zone of Cameroon (HFZC) as part of a project investigating the domestication of indigenous fruit trees, particularly *Dacryodes edulis* and *Irvingia* spp. (Schreckenberg *et al.* 2001). The marketing component of this project was intended to identify the links between the market and the project's case-study communities. Nine markets (Table 1) of importance for the case-study communities were selected. In this way it was possible to cover all the main production areas of safou except West Province (Fig 1).

<sup>2</sup>Based on the calculation:  $7,877/2 + 7877 = 11,815$  tonnes, rounded down.

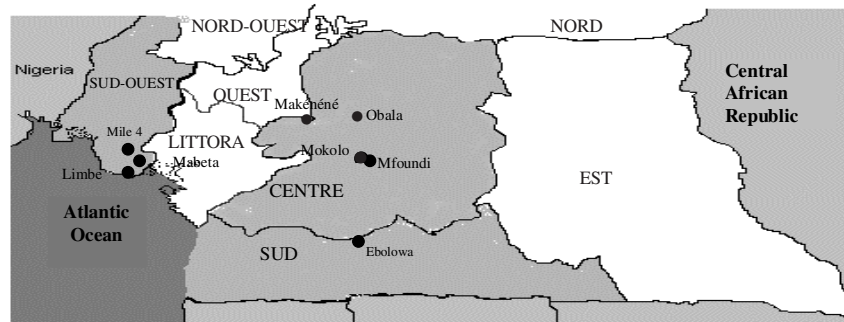


Figure 1. Location of CIFOR study markets

TABLE 1

Distribution and type of markets in the CIFOR study

Province	Market	Market	Number of traders interviewed
South-West	Limbe	II	18
	Mile 4	I	4
	Mabetta	I	5
Centre	Mokolo	II	15
	Mfoundi	III	11
	Obala	II	12
	Makéné Est	I	18
	Makéné Centre	II	14
South	Ebolowa	II	8

<sup>a</sup>Market types are as defined by Ruiz Pérez *et al.* (2000):

Type I = small local markets;

Type II = medium-sized markets of regional importance;

Type III = large urban market with national projection.

At each market, traders were selected on the basis of their consistent presence in the market, their having been in business for at least a year, and their willingness to work with us. Our original intention was to select 20 traders per market, but the final number (Table 1) depended on the size of the market. Traders were selected randomly and were only included in the sample if they met the above criteria. Those who fulfilled the criteria but did not want to be interviewed were replaced using a random approach. 105 traders were interviewed in all, representing 22% of all the traders operating in the nine markets. The total number of traders (of all products) at each market was determined on the basis of traders' own estimates. We then assumed that if 10% of our sample marketed safou, 10% of all traders also did so, and multiplied up

our data accordingly. Information was obtained using three types of questionnaire. The first asked about the characteristics of the trader: age, level of education, number of children, marital status, and number of years' experience in marketing NTFPs. Both this and the second questionnaire, dealing with the preferred characteristics of safou, were only applied once to each person. The third was applied monthly during the safou season and concerned transactions involving safou, asking about price, source of the product, point of marketing and the various costs<sup>3</sup>.

### **International trade**

The international safou trade was investigated by Tabuna (2000) in Brussels, London and Paris. The aim of this exploratory work was to collect information to help explain the opinions and behaviour of safou consumers. In 1999 50 people in Paris and 40 in Brussels were questioned as they left main points of sale for African foods at the Château Rouge market in Paris, and the Matongué or Porte de Namur and Gare du Midi markets in Brussels. The choice of shop was made on the basis of two criteria: a shop front conducive to interviews and the agreement of the shopkeeper. In Brussels, one of the two importers and three of the main retailers were interviewed in September 1999: two retailers from Matongué (a Belgian and a Pakistani), and a Belgian retailer from the Gare du Midi. In Paris, six importers were interviewed (four from Cameroon and two from Congo-Kinshasa) and nine retailers in Château Rouge (two Asians, one Tunisian, two from Congo-Brazzaville, and four from Congo-Kinshasa). In addition, semi-structured interviews were conducted in London with four importers and four retailers, all African. These took place in March 2000 at Tottenham Market, Forest Gate Market and Peckham. The interviews were preceded by a long period during which a relationship of trust was established with those concerned, of particular importance in this branch for which very few statistics exist. It was possible, therefore, to obtain information on the quantities imported. These figures were multiplied by the total number of safou importers in the different towns. An estimate of the value generated was obtained by multiplying the average retail price by the quantity of safou imported.

## **RESULTS AND DISCUSSION**

### **Quantifying safou production in Cameroon**

#### *Main production zones*

The market for safou in Cameroon is structured around the two principal poles of the main cities of Douala (New Bell market) on the coast, and Yaoundé

<sup>3</sup>A more detailed description of the methods, including the questionnaires used, is provided in an unpublished technical guide by Awono (2000).

(Mfoundi market) in Centre province. Overall production is highest between June and September but sources vary. Production begins in the Littoral and West provinces in April. The main centre of production is the Centre province, with particular concentrations around Makénééné (starting at the end of May) and around Yaoundé (coming on line in early June to mid-July). Production in South Province is the last to come on line in late June or early July. A study of the flows of safou between provinces (Temple 1999) indicates that there is considerable movement, with the Littoral province being the only one that is more or less self-sufficient. Centre province is almost self-sufficient (88%), importing some safou from the Littoral and West provinces (early in the season). South province has the highest level of importation, drawing 70% of its safou supplies from the Centre province and 25% from the West.

#### *Traded volume and value of safou*

The IRAD study of Mfoundi market (Isseri 1998, Isseri and Temple 2002) estimated the total commercialised volume of safou to be 467t during the 1997 season. This is somewhat higher than data obtained by CIFOR, using very different methods, for the same market in 1997 (Eyebe *et al.* 1999), which suggests a total volume of only 285t. The difference in these figures illustrates just how difficult it is to obtain accurate data when fruit are being sold by a great variety of traders.

Extrapolating from the IRAD figure, the total commercialised volume nationally was estimated at around 11,000 tonnes. Given an average price per kilo of 491CFA<sup>4</sup>, this would have been worth roughly \$7.5 million.

The data obtained by the 1999 CIFOR study (Schreckenber *et al.* 2001) are somewhat lower but still impressive. Table 2 shows the projected volumes and values of safou sold at the nine markets surveyed in this study. It should be noted that although the large markets of Mfoundi, Mokolo, Makénééné Centre and Makénééné Est were included, the study did not cover the key market of New Bell (Douala). The total estimated volume of safou marketed in these nine markets in 1999 was 2,324 tonnes, for a value of CFA 1 billion (approximately \$1.5 million<sup>5</sup>). The projected volume marketed at Mfoundi was 758t, a large increase over the 1997 volume (whether the IRAD or CIFOR figure is used). Part of it may be explained by the difficulties of obtaining accurate data and part by the variable production of safou from year to year.

In spite of these caveats, however, there does seem to be evidence for an increase in the marketed volume of safou between 1997 and 1999. This supports earlier work by CIFOR which demonstrated a 55% increase in the market value of safou traded at a selection of markets between 1995 (Ndoye *et al.* 1997) and 1996 (Eyebe *et al.* 1999).

<sup>4</sup>1997 exchange rate was US\$=685CFA

<sup>5</sup>1999 exchange rate was US\$=630CFA.



## The domestic market

### Market characteristics

On the basis of their size and degree of self-sufficiency (as a percentage of supply from the same area), Ruiz Pérez *et al.* (2000) identified four types of NTFP markets in Southern Cameroon, three of which are represented in the present study (Table 2). The first category (called Type I here) consists of “small, local markets with a high level of self-sufficiency that act as local exchange places as well as suppliers of the regional and national markets”. This category includes Mabeta, Makénéne Est and Mile 4 in which most sellers are producers and most buyers are consumers. These share the characteristics defined by Poulton and Poole (2001) for local markets for tree fruits, being informal with:

- most players operating on a small scale
- short marketing chains (sometimes just direct producer-consumer interaction)
- generally low margins
- little emphasis on quality
- high seasonality
- reasonable information flows
- significant other inefficiencies (e.g. peri-harvest losses, glutting).

The second category of markets (Type II) consists of a “group of medium-sized markets of regional importance, with a medium level of self-sufficiency, acting as secondary nodes for the small local markets and as intermediate assembly points for the large urban markets” (Ruiz Pérez *et al.* 2000). This category includes Limbe, Makénéne Centre (wholesale), Ebolowa, Mokolo and Obala (though, if classified only on the importance of safou, Obala would be a Type I market).

The third category (Type III) of “large urban markets...whose size and spread

TABLE 2

Volume and value of safou on the markets surveyed, 1999 season

Markets	Mfoundi	Mokolo	Ebolowa	Obala	Limbe	Mile 4	Mabeta	Makénéne Est	Makénéne Centre	Total
Projected volume (in tonnes/year)	758	492	118	96	196	41	4	253	366	2324
Projected value (in million CFA/year)	428	213	63	24	153	7	2	81	78	1049

Source: CIFOR data



of linkages give them a national projection...[and which] are characterised by a weak degree of self-sufficiency” (Ruiz Pérez *et al.* 2000) includes Mfoundi market in the capital, Yaoundé. If the classification were based only on safou, rather than on all NTFPs, the wholesale market at Makénéne Centre would also deserve to be in this third category. The Type II and III markets fit the description provided by Poulton and Poole (2001) for the national fruit marketing systems in most poor countries, being still largely informal with:

- most players operating on a modest scale
- longer marketing chains than in local markets, but little (if any) development of cool chains
- significant price volatility due to limited information flows and high perishability
- high seasonality
- limited added value through small-scale processing
- profit margins generally low (particularly once risk factors are taken into account) but marketing costs often high due to poor transport, roads and communication infrastructure
- price premia for good quality and supplies out of main season, but still relatively little emphasis on quality overall (many consumers are poor).

None of the markets in this study fall into the fourth ‘frontier market’ category identified by Ruiz Pérez *et al.* (2000).

#### *Trader characteristics and gender analysis*

In general, it is women who are most involved in the management of NTFPs in Cameroon (Ndoye *et al.* 1997). In the case of safou, young people and women do most of the collecting, with young boys climbing the trees and the women and young girls gathering the fallen fruit. Adult men may be involved in the heavy task of transporting the fruit back to the village. Based on a study of four communities in Southern Cameroon, Schreckenber *et al.* (2002) found that traditional patterns of safou harvesting and trade are subject to change in some villages, particularly those close to border markets, where the increase in demand has led to traders buying up the production of whole trees and bringing their own labour with them to carry out the harvest. Most commonly, however, it was the women who took the fruit to market. In another study covering different areas of Cameroon, however, the composition of household members selling safou was found to vary considerably according to location, with children playing an important role (E. Betser, pers. comm.)

Depending on distance to the market and the state of the roads, getting the fruit to the market may be quite problematic, particularly as the harvest coincides with the rains when vehicle access is especially difficult. Many producers, therefore, have to headload their fruit to market. If the market is a local one, the fruit may be sold direct to consumers. In the case of wholesale markets such as Makénéne Centre, producers sell their fruit to wholesalers, who wait for them at the market.

Although safou is marketed by both men and women, the CIFOR study provides clear evidence of a division of labour (Fig 2). The retail trade is

dominated by women (to 95%), while men concentrate on wholesale trade (71%). Retail trade requires a certain level of patience, as it may take one or more days to sell one's stock. Selling fruit wholesale requires less market time but often has the disadvantage of involving a large amount of travel, with its inherent risks (attack, sleeping in the open, road accidents, etc.). Household constraints mean that women have very little chance of engaging in wholesale trade unless they can avoid the travel element (see case of Maman Emilienne in Box 1).

A comparison of the marketing margin per sack shows that women receive less than men (4290 CFA for women against 4970 CFA for men), but the difference is not statistically significant. However, the quantity of safou sold was higher for men. This result confirmed that obtained by Ruiz Pérez *et al.* (forthcoming) who found that men tend to run larger businesses than women. The average age of traders is 34 years. Women are generally older than men, but also include some of the youngest traders in the sample (starting at 17 years). Most traders have family responsibilities with 62% of the sample having at least one child to support. In terms of education, most traders have at least primary level education, but there is a clear gender split when it comes to secondary education, with 69% of men having reached this level, against only 43% of women.

The relationship between marketing margins and level of education shows that the more highly educated traders are more successful: non-educated traders have an average net margin per bag of 2250 CFA, those with primary education receive 3930 CFA while those with secondary education achieve 4920 CFA. Given their lower education levels, women are therefore relatively disadvantaged.

There is a great deal of evidence that certain NTFP commercialisation activities, typically characterised by low thresholds of entry with respect to capital and skills, are particularly important for poor people (Falconer 1990, Schreckenber 1996). The question now being asked in the literature (reviewed by Neumann and Hirsch 2000) is whether reliance on NTFPs serves to perpetuate

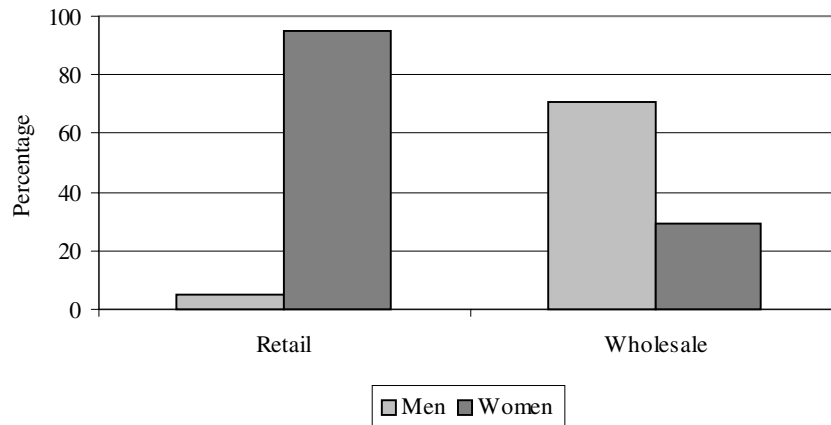


Figure 2. Involvement of men and women in marketing safou in Southern Cameroon

**Box 1. The personal story of Maman Emilienne**

Maman Emilienne is a 43-year old trader at Makénéne Est market. Responsible for feeding 10 children, she began trading in 1991 when her marriage broke up. At the time she had a small amount of capital (CFA 20,000 or approximately US\$32) and was advised by a cousin to invest this in the sale of agricultural products. After a year's experience at the market, she decided to begin selling safou during the safou season.

Her situation is not easy. Too little capital means that she cannot buy sufficient stocks to ensure a good turnover and profit. This is exacerbated by the poor storage qualities of safou fruit, which need to be sold within a few days of harvest. She states that an increase in the period of storage to just 4–5 days would greatly increase her ability to make a profit. On a personal level, her main constraint is the need to go home from time to time to look after her younger children. While she does not like to leave them alone, she says there is no point being at home with them if they have empty stomachs so it is better to spend her time at the market and let them fend for themselves, learning life's lessons the hard way. Typically she spends half a day at the market and spends the rest on cultivating her food crop fields.

Maman Emilienne sells an average of 3.6 sacks (246kg) of safou per week during the season, usually in lots of half a sack per transaction. She is unable to go to the rural areas to buy the fruit but has good relationships with farmers who supply her at the market. She has no transport costs but pays a sales tax of CFA 200 per sack. On average, her profit per sack is around CFA 3400, giving a total weekly profit of about CFA 12,000 (US\$19). According to Maman Emilienne, it is this income that enables her children to go to school.

poverty or whether it can provide a basis for developing more sustainable livelihood options. Semi-structured interviews carried out with the market traders in this study suggest that the safou trade is not always a last resort activity, but can indeed provide people with a sustainable livelihood. The main reason given for becoming a trader was the lack of money available to continue schooling, and the need instead to look for a source of income. The sale of a combination of forest and agricultural products was considered one of the better income-earning opportunities available but required a small amount of capital to start with. Some traders had also entered the trade following in the footsteps of one or other parent. On average, traders in the sample had been trading safou for seven years, usually in combination with a variety of other products depending on the season, and considered this to be a long-term activity. The main reasons for giving up trading were lack of capital, usually due to some crisis in the family (e.g. ill health or death), which obliged people to revert to farming. In the case of one newly-

married woman, the decision that she should give up trading was made by her husband.

*Weekly marketing margins and equity in safou trade*

Marketing margins are an indicator of the profitability of NTFP marketing<sup>6</sup>. In general, the level of margins is closely linked to the type of product marketed. Of four forest products (*Dacryodes edulis*, *Cola acuminata*, *Ricinodendron heudelotii* and *Irvingia* spp.) studied in Cameroon in 1995, safou was the most important both in terms of quantity and value (Ndoye *et al.* 1997). In 1999, marketing margins for safou were found to be very high. In Mfoundi market, for example, they represented more than double the guaranteed minimum wage (SMIG) of 26,000 CFA Francs per month.

The weekly margin per trader at Mfoundi was CFA 84,000 in 1999 (Table 3), up from CFA 26,000 in 1996 (Ndoye *et al.* 1997). This rise was probably because the poor level of safou production in South province in the 1999 season caused an upturn in prices at Mfoundi. The markets normally relying on southern production (Ebolowa, Kye-Ossi and Abang Minko), as well as the trade with Equatorial Guinea and Gabon, had no other source of supply. The large difference between weekly margins at Mokolo and Mfoundi markets, both in the capital Yaoundé, is accounted for by the fact that Mfoundi is a very specialised market selling high quality fruit on to other areas, and to customers with a high standard of living who are willing to pay for better quality.

There are significant variations in the weekly marketing margins from one market to another. Although the marketing margins per kilo vary quite widely

TABLE 3

Weekly marketing margins and volume sold per trader at different markets in 1999

Market	Type of market	Mean weekly marketing margins per trader (CFA)	Mean weekly volume sold per trader (kg)	Mean margin per kg sold (CFA)
Mabeta	I	1000	9	110
Makénéné Est	I	7000	128	55
Mile 4	I	7000	126	56
Obala	II	4000	73	55
Limbe	II	13000	211	62
Ebolowa	II	27000	185	146
Makénéné Centre	II	15000	222	68
Mokolo	II	17000	211	81
Mfoundi	III	84000	639	131

Source: CIFOR data

<sup>6</sup>Marketing margins are the added incomes achieved as a commodity is exchanged along the marketing channel and are not the same as total profits.

between markets (Table 3), a trader's weekly marketing margin is more closely linked to the total volume he or she sells. Traders therefore do particularly well at major markets, such as Mfoundi, where the local population has both the capacity for consumption and a high purchasing power. Here traders can move large quantities, at prices kept high by demand. At the other end of the scale, the lowest weekly marketing margins are to be found in the smallest markets, such as Mabeta and Obala.

The data for Makénééné Est (retail market) and Makénééné Centre (wholesale) clearly show that, as expected, marketing margins per kilo are higher for retail, but the greater volumes moved by wholesalers provides them with better margins overall.

There is a common assumption in much of the NTFP literature that traders exploit producers (Neumann and Hirsch 2000). The results of this study show (Table 4) that the farmers receive an average of 75% of the price paid by the consumer. However, this figure is not the same in all zones. In Makénééné Est, the farmer receives 78% of the selling price, but in the Ebolowa area, the farmer receives only around 51%. It should be noted that these data derive from short supply chain transactions (in which safou is sold by a producer to a middleman who then sells it on to a consumer) and different levels of returns to farmers might be expected with more complex marketing chains.

*Monthly developments in prices, variation between markets and qualities of safou*

Fig 3 shows that safou commands higher prices at the beginning (May) and the

TABLE 4

Percentage of price paid by the consumer received by the farmer at various markets in 1999

Markets	Mfoundi	Mokolo	Ebolowa	Obala	Limbe	Mile 4	Makénééné Est	Makénééné Centre	Total
Percentage (%)	71	73	51	72	72	75	78	56	75
Number of cases (Transactions)	3	75	6	56	6	41	117	1	305

Source: CIFOR data

Note: Each transaction consists of a trader purchasing safou from a farmer and then selling it on to a consumer.

end (December) of the season, with prices dipping to their lowest during the peak production month of August.

In addition to this seasonal variation, prices also vary between markets (Table 5). In general, prices are higher at Mfoundi and Ebolowa markets. Mfoundi is the market for distribution within Yaoundé, the administrative capital of Cameroon, and this explains the high demand for and price of safou. Ebolowa is the gateway to both the Cameroon-Gabon and the Cameroon-Equatorial Guinea borders where demand for safou is very high. (In 1999 this was compounded by the fact that safou production in the southern region was very poor). Prices were lowest at Makénéne Centre wholesale market, where village women typically sell fruit (purchased from farmers or their own husbands and brothers) to wholesalers from Yaoundé. Prices are low on the markets of South-West province (Limbe, Mile 4, Mabeta), since the safou produced there is of lower quality than in Centre province, for example; the fruits found in this area are mainly small or medium-sized.

The size of safou fruit is a determining factor in the price fixing mechanism. Other characteristics such as colour, taste and the thickness of the mesocarp, may also affect market value (Atangana *et al.* 2002, E. Betser pers. comm.). These characteristics are, however, difficult to measure visually, so the principal distinction is made on the basis of size. The same bowl may contain a mixture of large, medium and small fruits. Our results show that the price of safou varies according to size category (as also confirmed by Leakey *et al.* 2002). The largest fruit have a mean selling price of CFA 22,000 per bag, followed by mixed fruit at around CFA 21,000, medium-sized fruit at CFA 18,000 per sack, and finally small fruit at CFA 15,000 per sack. Lots of mixed size tended to be more expensive than medium-sized fruit simply because there were more large than small fruits in the package. The price premium for large fruit is obtained both by producers and retailers (purchase and sale prices, respectively, in Fig 4),

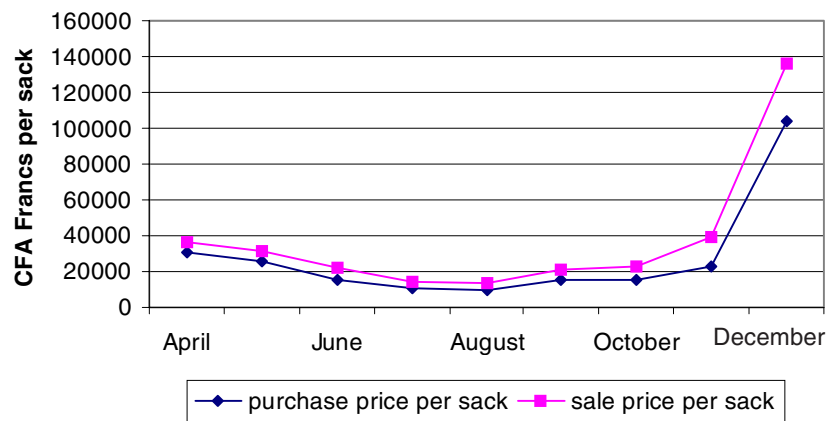


Figure 3. Monthly developments in safou prices (1999)

TABLE 5

Purchase and sale prices and gross margins per sack on the different markets surveyed in 1999

Market	Purchase price (CFA)	Sale price (CFA)	Gross margin per sack <sup>a</sup> (CFA)
Mfoundi	22520	30190	7670
Mokolo	17750	22150	4400
Ebolowa	20540	29750	9210
Obala	10290	14215	3925
Limbe	10000	14620	4620
Mile 4	10350	13430	3080
Mabeta	10405	16770	6365
Makénééné Est	13460	17870	4410
Makénééné Centre	7455	11025	3570
Mean <sup>b</sup>	14260	19390	5130

Source: CIFOR data

<sup>a</sup> A sack has a volume of 80 litres and weighs 68kg.

<sup>b</sup> The figures given are calculated on the basis of the original transactions from all the markets taken together.

suggesting that improved size should be a key consideration in domestication activities.

### Constraints to the domestic safou trade

Safou producers could improve their sales strategies if they had better market information and, particularly, if they were better organised. Transport is the highest cost involved in marketing (Ndoye and Ruiz-Pérez 1999). Despite the poor state of the roads, farmers could increase their income if, rather than selling their safou to wholesalers on an individual basis, they grouped together and delegated one or two trustworthy people to sell their production at the most remunerative markets. This approach would require a significant amount of safou to be collected at once, and hence the need to hire transport to take it directly to the appropriate market. Not only would the cost of transport be far lower than when the producers operate separately, but the product would also be much more likely to reach the market in good condition. Reasons why farmers are not already doing this include lack of leadership and trust in many areas, a lack of experience in working as groups, and the perishability of safou. The latter makes trade very risky and is a disincentive to farmers' groups even where they are already organised for the marketing of cocoa and coffee.

The short shelf-life of the fruit is undoubtedly the single greatest constraint faced by domestic safou traders. Silou (1994) notes that shrinkage of the pulp once it has softened is the primary reason for post-harvest losses, which can be up to 50% in Congo. Tchotsoua and Mapongmetsem (1998) estimate that 40% of



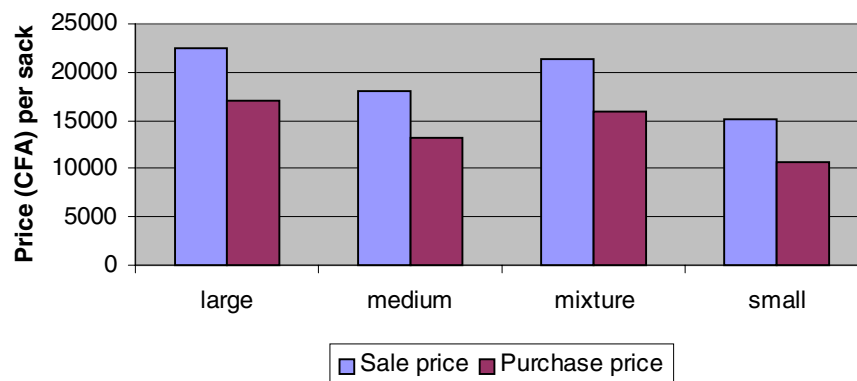


Figure 4. Sale and purchase prices for different size categories of safou (1999)

commercialised production in Cameroon is spoiled because of poor storage and transport. This high perishability is compounded by the poor transport infrastructure within Cameroon. This makes it almost impossible to get fruit to the potential markets in Adamawa, North and Extreme North provinces, where residents originally from southern Cameroon are potentially a large consumer base.

The circulation of goods is very problematic in Central Africa as a whole. Although CEMAC (Economic and Monetary Community of Central Africa) texts underline the need for the free circulation of goods to ensure real regional integration, the implementation of these decisions is difficult. Many people are not aware of the levels of taxes they need to pay when transporting products within and between countries, leading to widespread bribery and corruption both in the interior of the country and at the borders.

### International marketing of safou

#### *The organisation of the existing foreign market for safou*

As with all NTFPs in sub-Saharan Africa, safou imported into Europe is generally intended for nationals of the exporting countries (Tabuna 1999, 2000). Starting in the 1960s, volumes increased from 1982 as growing numbers of political exiles from central Africa (particularly the former Zaire) arrived in Europe. Unlike the students who had preceded them, these new immigrants brought their families and soon found work, providing them with an income to satisfy their demand for traditional foods from home. Table 6 lists the main producer countries together with the number of their nationals in the principal importing countries, Belgium, France and the United Kingdom, in 1994. These data do not include people who may have taken the nationality of their host country or people with refugee status. Taking into account increases in numbers since 1994, it is likely, therefore, that

TABLE 6

Distribution of potential safou consumers in the main European importing countries

Exporting country	Importing countries		
	Belgium	France	United Kingdom
Cameroon	—	18,037	—
Congo Brazzaville	—	12,755	—
Congo Kinshasa	15,868	22,740	8,000
Gabon	—	3,013	—
Nigeria	—	873	34,000
Central African Republic	—	4,059	—
Total	15,868	61,477	42,000

Source: Eurostat 1994

the potential market in these countries is well over 120,000 people.

Fruit are imported fresh, and are generally packed in boxes, previously used for other purposes, or wicker baskets. Most exports are from three Gulf of Guinea countries: Cameroon, Congo-Kinshasa and Nigeria. Congo-Brazzaville also exported until the successive civil wars in 1993, 1997 and 1998. Fruit exported from Nigeria goes primarily to the UK market, and the other two countries export to Belgium, France and the UK. Because of the seasonality of safou production in Africa (Silou 1996, Ndoye and Ruiz-Perez 1999), exports to the three countries do not occur simultaneously (Table 7). Safou from Cameroon and Nigeria reach the European market between May and November, whereas those from Congo-Kinshasa reach Europe between December and March.

#### *Estimate of safou imports to Europe*

As noted in the methodology, the quantities imported were determined by extrapolation from interviews. They were then used to calculate the values generated through sales of safou in each country by multiplying by the average retail price, estimated from the maximum and minimum prices used by retailers. In Paris, safou prices vary from US\$ 3–10 per kg. Maximum prices are charged at the beginning and end of the season; minimum prices in the middle of the season and for fruits which are beginning to soften. Interviews with importers indicated average prices of US\$ 7.5 per kg in and Paris and US\$ 9 per kg in Brussels. Total imports to Europe in 1999 are estimated at over 326 tonnes, with a value of over US\$2 million (Table 8).

Of the three countries with nationals from the main safou-producing countries of Africa, France is the biggest safou importer, followed by the United Kingdom and Belgium. Import volumes are therefore closely linked to the size of the importing country's immigrant population from the producer countries. According to retailers interviewed in France and Belgium, nationals of Cameroon, Congo-

TABLE 7

Source and seasonality of safou exports

Exporting countries	Export period	Importing countries
Cameroon	May to November	Belgium, France and United Kingdom
Congo-Kinshasa	December to February	Ditto
Congo-Brazzaville	No exports since 1993	—
Nigeria	June to November	United Kingdom

Source: Tabuna 2000

TABLE 8

Quantities and value of safou imported to Europe in 1999

Importing countries	Quantities imported (tonnes)	Values generated (US\$)
France	200	1,500,000
United Kingdom	120	900,000
Belgium	6	56,000

Source: Tabuna (2000)

Kinshasa and Congo-Brazzaville are the main consumers of the fruit in those countries. This is also because they are more numerous than nationals of Gabon and the Central African Republic.

### Strategies for the development of the European market for safou

#### *Constraints*

According to most of those interviewed in Château Rouge and Matongué, safou is a foodstuff they purchase regularly, whenever it is available on the market. However, they buy less than they did in Africa because of the high price, particularly at the beginning and end of the season. Most interviewees stated they would buy more if the prices came down. In addition to price, they also noted the absence of the fruit on the market between the end of March and the beginning of May. As regards quality, most consumers were satisfied with the quality of the fruit sold, although they said that this could be irregular. They would like to see lower prices and availability throughout the year.

Lower prices will only be achieved if supply can be increased sufficiently. Yet, even more than in the domestic market, transport and storage are a major headache for international importers and retailers. Fruit storage problems lead to significant losses. In addition to this, the fruit are not always sorted properly before export. This raises the matter of training for the exporters and their

suppliers. A final constraint for traders is the fact that the market is restricted to Paris and Brussels, and to nationals of the central African countries.

#### *Increasing sales to African consumers*

A strategy for developing the existing market would involve overcoming storage and transport constraints mentioned by consumers and traders (importers and retailers). This would make it possible to take the fruit to consumers in other smaller towns in France (Bordeaux, Marseilles and Montpellier), and other European countries, such as Lisbon, where there is a community of nearly 14,000 Angolan potential consumers. It would also help to increase the volume imported and per capita consumption by the immigrant communities. Consumption is currently estimated at 3 kg per immigrant in France, which is far below annual per capita consumption in Central Africa.

As is the case on the domestic market, perishability of the fruit is a key constraint. We believe that exporters can begin to satisfy consumer and trader expectations in Europe by developing products with a longer storage life. Frozen products would be one possible solution. The fruits could be de-stoned prior to freezing, which would also reduce the weight for export. This method is already being used by the consumers interviewed and deserves further investigation. Exporters would have to organise themselves and acquire the appropriate cold-chain equipment. The correct temperature would have to be found to ensure that the characteristics of the fruit (taste, texture, etc.) were not altered.

#### *Selling safou to the European consumer*

Safou is an exotic fruit with a taste unfamiliar to the European palate. A second avenue for increasing the international safou trade would be to sell it in European ethnic food outlets to both Europeans and others who may not be familiar with the product. Indeed, a trade show held in Paris in 1997, the 'Ethnic and Speciality Food Show' highlighted the improved status of safou in terms of both potential consumer attitude and the European market.

Given the similar physico-chemical properties of safou and avocado, lessons could be learned from the commercial success of fresh avocados in Europe. In France, the current market for avocado is estimated at 90,000 tonnes, corresponding to a per capita annual consumption of 1.5 kg (Guilbert 1997). Guacamole, an avocado dip, also has a growing market, coming second in the league of ethnic products sold to Europeans (CDI 1999).

The acid taste of some safou varieties might be a marketing point. Acid-tasting safou paste could be used as an accompaniment to grilled fish, seasoned with African spices and condiments. The non-acid safou paste could be seasoned and sold as a dip, like guacamole. A company in Douala is already producing a safou-based paste. Another possible niche is for the use of the whole fruit in appetisers. Restaurants in Cameroon serve halved safou fruit stuffed with meat or fish as appetisers. These are particularly appreciated by the expatriate community who are less fond of safou boiled or roasted in the traditional way. This suggests that

the appetiser niche may be one to develop.

Finally, as also mentioned by Kalenda *et al.* (2002), various safou oil products (pulp oil, seed oil and oil cake) have a future in both the food and cosmetic industries.

## CONCLUSIONS AND RECOMMENDATIONS

De Jong *et al.* (2000) argue that the income from NTFP commercialisation can only be sustained if, amongst other factors, the resource base is maintained, be it through controlled harvesting or some kind of on-farm or plantation production. In the case of safou in Cameroon, the move to on-farm production has been made, sidestepping the alternatives of plantation production or product substitution, both of which are likely to have a negative impact on local incomes.

This study confirms and builds on previous studies (Ndoye *et al.* 1997, Eyebe *et al.* 1999, Tabuna 2000), providing evidence of a thriving domestic market for safou in Cameroon as well as a small but valuable European import market. What is still missing is an indication of the income elasticity of demand, i.e. the responsiveness of the demand of safou to changes in income. At the same time there is an urgent need to know how producers and consumers will respond to increases or decreases in the price of safou. With respect to producers, this may need to be investigated in the context of changing cocoa and coffee prices, given that safou is predominantly planted alongside these two cash crops. To identify appropriate policy interventions, such information about trends in demand must be combined with a more accurate quantification of the supply base. This could be achieved if public authorities include safou in future agricultural censuses.

There are a number of areas in which producers can be helped to improve the profits they currently make. As we have shown, prices of safou vary according to fruit size and season. Tchoundjeu *et al.* (2002) discuss the kinds of domestication activities that can be promoted to help farmers produce fruit with the characteristics desired by the market. The development of named cultivars with recognised characteristics (of size, taste, oil content, etc.) could help farmers command better prices for their fruit (Leakey *et al.* 2002).

The second area that requires investment is transport. Poor transport infrastructure is a constraint for the marketing of all products in the region and will not be resolved overnight. Improvements could be achieved, however, by clarification and better implementation of the regulations concerning the movement of produce, particularly NTFPs in this case, in order to reduce the load of taxes and bribes paid by traders. At the domestic level, individual transport costs could be reduced by better organisation of producers. A question remains as to how greater organisation of producers might affect small traders, lacking the possibility to accumulate enough capital to operate on a larger scale.

Organisation and training is also needed for exporters and their suppliers, most of whom do not distinguish between the needs of local and international markets. This lack of professionalism is a problem common to many exporters of traditional African foods. Governments have a role to play in training producers and exporters in how to meet the requirements of the international market.

Cameroon has already dealt with similar problems arising in the sale of bananas to Europe. In the context of a global economy in which non-tariff barriers are becoming increasingly important, exporters need to be trained and organised to access international markets.

Poulton and Poole (2001) argue that market development efforts for smallholder fruit growers should focus primarily on national markets as this is where the overwhelming majority of tropical fruit sales currently take place. In the case of safou, however, the key constraint is the same for both markets—namely the perishability of safou—and overcoming it would help to increase both the domestic and international market. Perishability makes marketing inherently more uncertain and places a premium on good infrastructure (including cold storage chains for high value markets), market information and good links with buyers (Poulton and Poole 2001). Priority should therefore be given to research into storage and processing methods for safou.

Although no formal marketing policy has been adopted by either importers or retailers, the international market for safou has increased consistently since the 1980s. The mean retail price of approximately US\$7 per kg makes safou one of the most expensive tropical fruits in Europe. If storage problems can be overcome, supplies to members of the Gulf of Guinea communities in smaller towns, and to Europeans, could be increased. The resulting increase in export volumes would have positive socio-economic consequences for both the producers and the exporters. The fruit would, however, have to meet the expectations of current consumers, and the requirements of new outlets, such as guaranteed large-scale supplies. Frozen fruit and safou paste may be possible innovations.

A combination of innovative processing and storage methods, production of safou fruit with specific characteristics desired by the market, better training and organisation of producers and exporters, and improved transport systems, are the key to giving safou producers and traders the chance of achieving higher and more secure incomes.

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#### BIBLIOGRAPHY

- Atangana A.R., Asaah E., Tchoundjeu Z., Schreckenber K. and Leakey R.R.B. 2002. Biophysical characterisation of *Dacryodes edulis* fruits in three markets in Cameroon. Pp 106–118 in Kengue J., Kapseu C. and Kayem G.J. (eds.) *3ème séminaire international sur la valorisation*

- du Safoutier et autres oléagineux non-conventionnels Yaoundé, Cameroun, 3–5 octobre 2000.* Presses Universitaires d'Afrique, Yaounde.
- Awono A. 2000. Guide technique. La domestication des arbres fruitiers locaux; le cas du *Dacryodes* et de l'*Irvingia*. Volet commercialisation. Unpublished project methodology guide. CIFOR, Yaoundé.
- Ayuk E.T., Duguma B., Franzel S., Kengue J., Mollet M., Tiki-Manga T. and Zekeng P. 1999. Uses, management and economic potential of *Dacryodes edulis* (Burseraceae) in the humid lowlands of Cameroon. *Economic Botany* **53**(3): 292–301.
- CDI. 1999. Les produits ethniques: un créneau à développer. *Partenariat* **42**: 1–4.
- De Jong W., Campbell B.M. and Schröder J.-M. 2000. Sustaining incomes from non timber forest products: introduction and synthesis. *International Tree Crops Journal* **10**, 267–275.
- Eyebe A., Ndoye O. and Ruiz Pérez M. 1999. L'importance des produits forestiers non ligneux pour les communautés rurales et urbaines du Cameroun. Paper presented at the third meeting of the Community Forestry Network, 4–5 May, Yaoundé, Cameroon.
- Falconer J. 1990. The major significance of 'minor' forest products. *The local use and value of forests in the West African humid forest zone*. Community Forestry Note No.6, FAO, Rome, Italy, 232 p.
- Guilbert P. 1997. La France, noyau dur pour l'avocat. *Linéaires* **120**, November 1997: 87.
- Isseri F.G. 1998. Etude phytogéographique du safoutier (*Dacryodes edulis*) et quantification de la production de safou au Cameroun. Unpublished thesis, Yaoundé University, Cameroon.
- Isseri F. and Temple L. 2002. Quantification de la production et analyse du marché du safou au Cameroun. Pp 418–429 in Kengue J., Kapseu C. and Kayem G.J. (eds.) *3ème séminaire international sur la valorisation du Safoutier et autres oléagineux non-conventionnels Yaoundé, Cameroun, 3–5 octobre 2000*. Presses Universitaires d'Afrique, Yaounde.
- Kalenda D.T., Ella Missang C., Kinkela T., Krebs H.C. and Renard C.M.G.C. 2002. New developments in the chemical characterisation of the fruit of *Dacryodes edulis* (G. Don) H.J. Lam. *Forests, Trees and Livelihoods* **12**(1/2): 119–123.
- Leakey R.R.B., Atangana A.R., Kengni E., Waruhiu A. N. Usuro C., Anegebe P.O. and Tchoundjeu Z. 2002. Domestication of *Dacryodes edulis* in West and Central Africa: Characterisation of genetic variation. *Forests, Trees and Livelihoods* **12**(1/2): 57–71.
- Ndoye O., Ruiz-Pérez M. and Eyebe A. 1997. The markets of Non-Timber Forest Products in the Humid Forest Zone of Cameroon. *Rural Development Forestry Network Paper 22c*, ODI, London.
- Ndoye O. and Ruiz-Perez M. 1999. Commerce transfrontalier et intégration régionale en Afrique Centrale: Cas des produits forestiers non-ligneux. *Bulletin Arbres, Forêts et Communautés Rurales* **17**: 4–12.
- Neumann R.P. and Hirsch E. 2000. *Commercialisation of non-timber forest products: review and analysis of research*. CIFOR, Bogor, Indonesia.
- Omoti U. and Okiy P.A. 1987. Characteristics and composition of the pulp oil and cake of the African pear, *Dacryodes edulis* (G. Don) H.J. Lam. *Journal on the Science of Food and Agriculture* **38**: 67–72.
- Poulton C. and Poole N. 2001. Poverty and fruit tree research: Issues and options paper. DFID Forestry Research Programme, UK.
- Ruiz Pérez M., Ndoye O., Eyebe A. and Puntodewo A. 2000. Spatial characteristics of non-timber forest product markets in the humid forest zone of Cameroon. *International Forestry Review* **2**(2): 71–83.
- Ruiz Pérez M., Ndoye O., Eyebe A. and Ngono D.L. Forthcoming. A gender analysis of forest products markets in Cameroon. *Submitted to Africa Today*.
- Schreckenber K. 1996. Forests, fields and markets: a study of indigenous tree products in the woody savannas of the Bassila region, Benin. Ph.D. thesis, London Univ. 326pp.
- Schreckenber K., Leakey R.R.B and Tchoundjeu Z. 2001. Opportunities and constraints faced by resource-poor farmers in investing in the planting and improvement of indigenous trees for income generation. *European Tropical Forestry Research Network Newsletter* **32**: 53–55.
- Schreckenber K., Degrande A., Mbosso C., Boli Baboulé Z., Boyd C., Enyong L., Kanmegne J. and Ngong C. 2002. The social and economic importance of *Dacryodes edulis* (G. Don) H.J.



- Lam in Southern Cameroon. *Forests, Trees and Livelihoods* **12**(1/2): 15–40.
- Silou T. 1994. Le safou (*Dacryodes edulis* H.J. Lam) oléagineux à vocation régionale dans le Golfe de Guinée. Synthèse des données physico-chimiques et technologiques. Pp 123–142 in Kengue J. and Nya Ngatchou J. (eds.) *Le safoutier—the African Pear, Proceedings of the regional seminar on the valorisation of the African Pear*. Yaoundé, Cameroon.
- Silou T. 1996. Le safoutier (*Dacryodes edulis*): un arbre mal connu. *Fruits* **51**: 47–60.
- Sonwa D.J., Okafor J.C., Mpungi Buyungu P., Weise S.F., Tchatat M., Adesina A.A., Nkongmeneck A.B., Ndoye O. and Endamana D. 2002. *Dacryodes edulis*, a neglected non-timber forest species for the agroforestry systems of West and Central Africa. *Forests, Trees and Livelihoods* **12**(1/2): 41–55.
- Tabuna H. 1999. Le marché des produits forestiers non ligneux de l’Afrique Centrale en France et en Belgique. Produits, acteurs, circuits de distribution et débouchés actuels. *CIFOR Occasional Paper* no. 19. CIFOR, Bogor (Indonesia).
- Tabuna H. 2000. Les produits forestiers non ligneux alimentaires de l’Afrique Centrale sur les marchés français et belge. Situation actuelle et perspectives. Unpublished PhD thesis, Muséum National d’Histoire Naturelle de Paris.
- Tchotsoua M. and Mapongmetsem P.M. 1998. Le safoutier (*Dacryodes edulis*): Zones écologiques et commercialisation des fruits au Cameroun. Pp 261–272 in Kapseu C. and Kayem G.J. (eds.) 1998. *Proceedings of the 2nd International workshop on African pear improvement and other new sources of vegetable oils*. ENSAI, Presses Universitaires de Yaoundé.
- Tchoundjeu Z., Kengue J. and Leakey R.R.B. 2002. Domestication of *Dacryodes edulis*: state-of-the-art. *Forests, Trees and Livelihoods* **XX**: 000–000.
- Temple L. 1999. Le marché des fruits et légumes au Cameroun; quantification des flux-analyse des prix. Internal project report, Projet Fruits et Légumes, IRAD, Yaoundé, Cameroon.
- Troupin G. 1950. Les Burseracées du Congo Belges et du Ruanda-Urundi. *Bull. Soc. Bot. Royale de Belgique* **83**: 111–126.
- van Dijk J.F.W. 1999. An assessment of non-wood forest product resources for the development of sustainable commercial extraction. Pp 37–49 in Sunderland T.C.H., Clark L.E. and Vantomme P. (eds.) 1999. *Non-wood forest products of Central Africa. Current research issues and prospects for conservation and development*. FAO, Rome.

