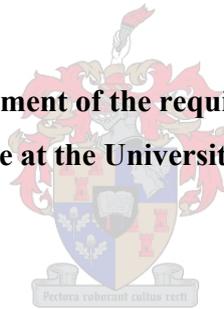

**ANALYSIS OF THE MARKET STRUCTURES AND
SYSTEMS FOR INDIGENOUS FRUIT TREES: THE CASE
FOR *UAPACA KIRKIANA* IN ZAMBIA**

by

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**Thesis submitted in partial fulfilment of the requirements for the degree of Master
of Forest Science at the University of Stellenbosch**



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March 2009

Declaration

By submitting this thesis electronically I, Kaala Bweembelo Moombe, declare that the entirety of the work contained in this thesis is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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ABSTRACT

This study is about marketing of *Uapaca kirkiana* fruit in Zambia, a fruit that has great economic value especially among the rural and urban poor. It contributes to general food security. In southern Africa, farmers and other stakeholders have identified *Uapaca* as a priority species for domestication. Current agroforestry initiatives are promoting integration of indigenous trees into farming systems to provide marketable products for income generation. Domestication of trees however, depends on expanding the market demand for tree products. There is considerable evidence that expanding market opportunities is critical for the success of domestication innovations but farmers have been introduced to domestication with little consideration for marketing. The existing market potential can be achieved through sound knowledge on markets and marketing. Information on the marketing of *Uapaca* fruit is inadequate. This study, therefore, aimed at generating information on the marketing of *Uapaca kirkiana* fruit, including the basic conditions of demand and supply of the fruit.

The main study was conducted in Chipata and Ndola districts in the Eastern and Copperbelt provinces respectively, while fruit pricing was conducted in Lusaka district in Lusaka Province. Questionnaires and participatory research methods were used to collect the data. A total of 37 markets involving 49 collectors, 59 retailers, 189 consumers and 20 government forest workers are included in the study.

The study reveals that there is demand for the fresh and secondary products of the fruit and hence substantial fruit trading exists in Zambia. However, the marketing system is characterised by underdevelopment. There is insufficient capacity to satisfy the demand for the fruit and institutional /policy support to *Uapaca* fruit market expansion. Currently, only basic technology for product development exists. The results suggest a need to address policy and capacity development for expansion of *Uapaca kirkiana* fruit industry. To improve the *Uapaca* trade industry, the study proposes developing and scaling up policy strategies, fruit processing sector, research-extension-trader-agribusiness linkages, infrastructure development and knowledge generation for improved understanding of the *Uapaca* fruit markets.

Keywords: *Uapaca kirkiana*, indigenous fruits, Chipata, Ndola, marketing, markets, policy, Zambia

OPSOMMING

Die studie handel oor die bemarking van *Uapaca kirkiana* vrugte in Zambia. Die vrugte het belangrike ekonomiese waarde veral onder landelike en stedelike armes. Dit dra by tot algemene voedselsekuriteit. In suider Afrika aanvaar boere en ander belanghebbendes *Uapaca* as a prioriteitsspesie vir domestikasie. Huidige agrobosbou inisiatiewe bevorder die integrasie van inheemse bome in boerdery stelsels vir die verbouing van bemarkbare produkte vir kontant. Domestikasie van bome is afhanklik van die mark vraag na boom produkte. Daar is baie bewyse dat ontwikkeling van markgeleenthede krities is vir die sukses van domestikasie innovasie, maar boere is blootgestel aan domestikasie met weinig inagnome van bemarking.

Die huidige mark potensiaal kan bereik word deur 'n deeglike kennis van markte en bemarking. Inligting oor die bemarking van *Uapaca* vrugte is onvoldoende. Hierdie studie het as doelwit die versameling van inligting oor mark strukture, uitvoering en verrigting van *Uapaca kirkiana* vrugte en ook 'n ondersoek na die basiese toestande van vraag en aanbod van die vrugte.

Die studie is onderneem meestal in die Chipata en Ndola distrikte in die Oos en Koperbelt provinsies. 'n Deel van die studie, wat handel oor vrugte pryse, is ook in die Lusaka distrik in Lusaka provinsie uitgevoer. Inligting is versamel aan die hand van 'n literatuur studie, ontleding van sekondered inligting en deur die gebruik van vraelyste en deelnemende navorsings metodes. Data is ontleed aan die hand van beskrywende statistieke en mark aandeel en mark marges modelle. In totaal is 37 markte met 49 versamelaars, 59 kleinhandelaars, 189 verbruikers en 20 regerings bosboubeamptes ingesluit in die studie.

Die studie het bewys dat daar aanvraag is na vars en sekondere vrugte produkte en dat daar 'n substansiele handel in vrugte in Zambia bestaan. Die mark stelsel is egter onder ontwikkel. Daar is nie voldoende kapasiteit om vraag na vrugte te bevredig nie en ook nie beleids ondersteuning om *Uapaca* mark ontwikkeling te ondersteun nie. Tans bestaan daar slegs basiese tegnologie vir produkontwikkeling. Die resultate wys op 'n behoefte om beleid en kapasiteit ontwikkeling vir die uitbreiding van die *Uapaca kirkiana* vrugtebedryf. Die *Uapaca* vrugtebedryf kan verbeter word deur die ontwikkeling en verbetering van beleid strategieë, verbetering van die vrugte vervaardigings sektor, navorsing oor agribesigheid, infrastruktuur ontwikkeling en kennis ontwikkeling vir 'n beter begrip van *Uapaca* vrugte markte.

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ACRONYMS/ABBREVIATIONS

FAO	Food and Agriculture Organization of the United Nations
ICRAF	International Centre for Research in Agroforestry / World Agroforestry Centre
IFT	Indigenous Fruit Trees
IK	Indigenous knowledge
NFP	National Forestry Policy
NTFP	Non-Timber Forest Products
ROZ	Republic of Zambia
SCP	Structure, Conduct and Performance
WFP	World Food Programme

Chapter One:

Introductory Concepts to the Study

This chapter presents the contextual platform for this study. The context is unfolded in three major parts. The first part provides a description of the ecosystem in which the study product is situated, justification for the research work and an outline of the issue at hand for the study. In the second part, outputs from the study are highlighted and include the key research questions. Lastly, in the third part, the organization of the entire thesis is presented. Succinctly, it describes the subsequent chapters and their principal contents.

1.1 Background, Study Rationale and the Problem Statement

1.1.1 Background

The current study on the marketing of *Uapaca kirkiana* was conducted in the Zambezian phytoregion. This phytoregion of relatively homogenous native vegetation types is found in central and southern Africa between latitudes 3° and 26° south and is about 377 million hectares in extent. The climate of the region consists of summer annual rainfall ranging from 500 to 1500 mm (Chidumayo, 1997).

The most widespread and characteristic vegetation is woodland, with Miombo woodland as the most extensive vegetation type constituting about 70% of the entire phytoregion, and covers 53% of Zambia's total land area. The leguminous trees of the genera *Brachystegia*, *Isoberlinia* and *Julbernardia* characterise the Miombo vegetation (Chidumayo, 1997).

The Miombo woodland has approximately 650 species of the woody plant flora, many of which are edible. Of the estimated 33 edible wild fruit species in Zambia, 82% are found in miombo. *Uapaca kirkiana* is among the most common edible wild fruits that have been exploited (Chidumayo, 1997) for both cash and consumption.

The fruits of *Uapaca kirkiana* have a long tradition of being traded. The marketing of indigenous fruit trees (IFT) provides established cash income with many actors involved. Many people in the miombo ecological region are fully engaged each season in harvesting and selling non-timber forest products (NTFP), including and particularly *Uapaca kirkiana* fruits (Chisimba, 1996;

Taylor *et al.*, 1996). Traders generate substantial amount of cash (Kwesiga & Mwanza, 1994; Mwanza & Kwesiga, 1994) that is used to purchase basic household goods, paying house rent, transport fares, school fees, farm inputs and meeting social obligations (Ramadhani & Schmidt, 2002).

1.1.2 The study rationale

Uapaca kirkiana fruit has a high socio-economic importance especially among the rural and urban poor. A number of attributes of the species justified its selection for the study. The species has popularity, good market expansion potential, priority status and multiple use characteristics (Hans, 1981; Maghembe *et al.*, 1998; Maliro & Kwapata, 2000; Mwamba, 1989; Sufi & Kaputo, 1977). Farmers and other stakeholders have recognised the socio-economic value of *Uapaca kirkiana* and identified it as a priority species for domestication in the southern Africa region. *Uapaca kirkiana* is the most commonly preferred indigenous fruit among farmers, consumers and experts alike (Akinnifesi *et al.*, 2004). One of the key resource values of the fruit is its valuable contribution to the quality of diet (Packham, 1993) and general food security. In Zambia, people in Mpongwe, Mkushi and in Samfya rely on the species as a food source (Chisimba, 1996).

Current agroforestry initiatives promote integration of indigenous tree resources into farming systems to provide marketable products for cash. The domestication of trees however, depends on the expansion of the market demand for NTFP (Leakey, 1999). In many developing countries, especially in Africa, farmers have been introduced to domestication with little consideration for marketing. Yet there is considerable evidence that expanding market opportunities is critical for the success of domestication innovations (Russell & Franzel, 2004).

1.1.3 The problem statement

The market potential that exists can only be achieved through a sound knowledge base on markets and marketing. However, information on marketing of native fruits is still scanty (Chilimampungu, 2001; Mumba *et al.*, 1996). Whilst the identity, distribution and utilisation of edible wild fruits indigenous to tropical and subtropical Africa have been thoroughly documented (Saka & Msonthi, 1994), information on market acceptance is limited. Commercialisation promoted by organizations such as the World Agroforestry Centre (ICRAF) is based on a narrow and imperfect knowledge of markets (Simons, 1998). Few marketing studies on indigenous fruits have been conducted in Zambia. Examples of such studies are by Gondo *et al.*, (2002)

(Marketing on non-wood forest products in Southern, Copperbelt, Central and Luapula provinces); Mkonda *et al.*, (2003) (Marketing of *Uapaca kirkiana* in Chipata District) and Mwanza & Kwesiga, (1994) (Indigenous fruit trees as under exploited wild genetic resources in Eastern Zambia). These marketing studies have neither been extensive nor sufficiently comprehensive. Therefore, the research problem identified for this study is the lack of information on the markets for and marketing of *Uapaca kirkiana* indigenous fruit in Zambia.

Increasing knowledge on marketing of fruits native to Zambia and the southern African region could be one of the principal pathways to effective commercialisation of *Uapaca kirkiana* and other IFT. Adequate information on marketing is required for effective design and management of domestication and commercialisation activities. Market information is valuable for product development. Among others, it is important for understanding the main factors influencing supply and demand of a product, developing relevant strategies for the commercialisation of IFT products to meet market demand, building capacity among farming communities, disseminating technology by creating market-based incentives for production, and improving the effectiveness and efficiency of production and marketing (Hyman, 1996; Kaaria, 1998; Mwanza & Kwesiga, 1994).

Limited knowledge, lack of appropriate technology and institutional barriers have critically constrained production and processing of NTFPs among rural and urban communities (Brigham *et al.*, 1996; Perez & Arnold, 1996). In addition, the barriers have had other effects on the development of the NTFPs industry such as (Mumba *et al.*, 1996) reduction in fruit trade volumes and pricing mechanisms, inadequately targeted and unsatisfied markets. Information is needed on the following key areas (Deweese, 1994; Ham, 2003; Neumann & Hirsch, 2000):

- Market structure: (a) characteristics of primary and secondary actors, (b) fruit quantities and level of exploitation and (c) market conditions.
- Conduct and Performance: (a) value addition, (b) market prices and (c) costs and benefits.
- Factors constraining marketing.

This study conducted was to generate such information based on the marketing of *Uapaca kirkiana* fruit.

1.2 Research Goal, Objectives and Questions

The ambit of the research was the marketing of *Uapaca kirkiana* and implications for livelihood security and forest conservation. The goal is to contribute to the knowledge pool related to the domestication and marketing of IFT in southern Africa. The research is conducted to gather and analyse information on the existing market and the marketing system of *Uapaca kirkiana* fruit in Zambia.

The research objectives are threefold. The first is to assess the basic conditions for the marketing of the *Uapaca kirkiana* fruit in terms of its supply and demand. The second is to analyse the marketing of *Uapaca kirkiana* fruit. The third is to examine the forest policy framework with reference to the IFT trade.

The research seeks to answer the following particular clusters of questions:

- 1) What is the current production and consumption of the *Uapaca kirkiana* fruit?
 - What are the existing collection and processing technologies?
 - What are the preferences, tastes and buying habits of the consumers?
 - In what form is the fruit consumed?

- 2) What are the structure, conduct and performance (SCP) of the *Uapaca kirkiana* market?
 - How organised is the marketing of the fruit?
 - What are the characteristics of various market actors?
 - What are the channels of fruit marketing?
 - In what form are fruits marketed?
 - What are the marketing costs?
 - What are the fruit differentiation activities?
 - What is the existing market information system?
 - What are the price determination and differentiation method?

- 3) What policy framework elements exist for the IFT trade?

- 4) What are the marketing challenges and opportunities for the *Uapaca kirkiana* fruit?
 - What key marketing constraints do the fruit traders experience?
 - Are there any marketing development opportunities and possible interventions?

1.3 Structural Outline of the Thesis

The first chapter introduces the study by giving the theoretical and conceptual framework of the study, the justification for the research work, presenting the study problem and stating the objectives with the key research questions. The second chapter, dealing with the sub-sector analysis of the *Uapaca kirkiana* fruit trade, is a literature review section that includes the description of the study species. It covers the characteristics and value of the fruit as well as the trade challenges. The study model adopted and the methodology used to collect and analyse the data are the subject of Chapter Three.

The research findings are presented in the three chapters, namely Chapters Four, Five and Six. The results on the basic demand and supply factors for the fruit are presented in the Chapter Four. In Chapter Five, the findings on the market conduct, structure and performance are presented focusing on three aspects namely (a) the trade entry and exit conditions, market shares, trade costs and fruit distribution and market pathways, (b) the fruit pricing, product differentiation and strategies and (c) the marketing costs and the socio-economic benefit from marketing *Uapaca kirkiana* fruit. Chapter Six presents the results on institutional and policy environment for the marketing of *Uapaca kirkiana* fruit.

The results are discussed in Chapter Seven, while Chapter Eight presents the overall conclusion of the study, including recommendations from the study for further research in marketing, policy and other relevant interventions.

Chapter Two:

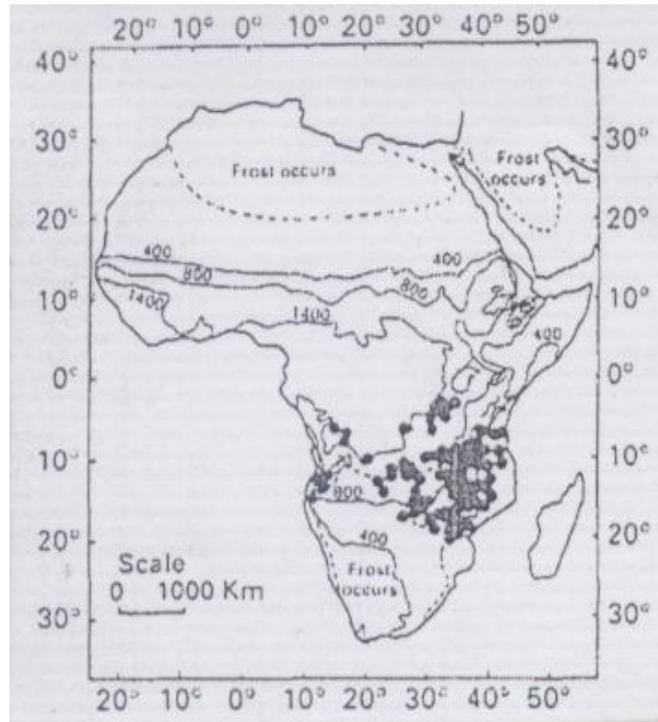
Literature Review of the Trade in *Uapaca kirkiana* Fruit

This chapter presents a sub sector analysis of the marketing of *Uapaca kirkiana* fruit covering the Zambian and international scene including relevant knowledge from studies on other indigenous fruits. It provides a description of *Uapaca* fruit in terms of its key characteristics, socio-economic value and market system in which it is traded. The review begins with the basic supply and demand factors. Under the structure, it reviews the market components and trade conditions, the trade strategies, channels and cost framework. The literature collation also covers pricing behaviour and the socio-economic benefits of the fruit. It finally considers trade constraints, opportunities and threats.

2.1 Description of *Uapaca kirkiana* Muell. Arg. (Euphorbiaceae)

2.1.1 Species distribution

Uapaca kirkiana is the most widespread species of the *Uapaca* genus. It is found in lowland forest, secondary miombo woodland such as clearings and gaps, open woodland, and amongst rocks at medium altitudes with good rainfall. The natural geographical distribution of the tree covers Malawi, Zambia, Zimbabwe, Burundi, Mozambique, Tanzania, Congo and Angola (Figure 2.1). In Zambia *Uapaca kirkiana* is found throughout the country except in Kalabo. It occurs between 800 and 1 900 m above sea level, in areas with annual precipitation ranging from 500 to 1 270 mm. The species will grow in poor, shallow soils, gravel and sandy loam soils (FAO, 1986; Maliro & Kwapata, 2000; Mwamba 1989; Storrs, 1995).



Source: Ngulube *et al.*, 1995.

The distribution (dots) of the species in relation to rainfall showing the 400, 800 and 1400 isohyets.

FIGURE 2.1 Distribution of *Uapaca kirkiana* species

2.1.2 Botanical characteristics

Uapaca kirkiana is a fast growing fruit tree indigenous to the miombo ecological zone of southern Africa and Madagascar (Maliro & Kwapata, 2000; Ramadhani, 2002). The tree is small to medium size of up to 5 – 12 m high but usually five to six metres tall (Storrs, 1995) and 5 – 25 cm in girth. The stem bears short, thick branches with simple alternating leaves arranged in clusters. The male and female flowers are yellow in colour and globose in shape, but born by different trees (Ramadhani, 2002). The species is frost tender, a characteristic that has resulted in poor fruit production in some cases (Parker, 1978).

The fruits are set between January and February and mature in August to November (Ramadhani, 2002). The *Uapaca kirkiana* fruit is fulvous (pale or brown/rusty-yellow and rufous (brown or brownish-red) in colour and 2.5 – 4cm in diameter containing three to five seeds (Mwamba, 1989; Ramadhani, 2002; Palgrave, 2002). The fruit proportions are about 45% pulp, 38% skin

and 17% seed (Hans, 1981; Maliro & Kwapata, 2000). In the Central Province, Mwamba (1989) found the fruit to have an average volume of 26.68 cm³ with 12.77 cm³ being pulp. The fruit weight ranges from 16.5 g (Ngulube *et al.*, 1995) to 18 g per fruit (Mkonda, 2003). The fruit is sweet with the pulp having a pear-like taste (Ramadhani, 2002).

2.1.3 Socio-economic contribution of *Uapaca kirkiana* and other indigenous fruit trees in southern Africa

The contribution of IFT to food security is both indirect through income generation and direct through consumption of products i.e. fruits. This is discussed below.

a) Contribution to household income

Edible wild fruits are an important income source in southern Africa especially for poor people (Mithöfer *et al.*, 2006). In Zimbabwe, for example, wild fruit trees represent about 20% of total woodland resource use by rural households (Akinnifesi *et al.*, 2006). Wild collection for fruits is an efficient labour allocation strategy and its returns to labour are considerably higher than that of crop production enterprises (Akinnifesi *et al.*, 2007). *Uapaca kirkiana* and other IFTs contribute substantially to socio-economic development through income generation especially in rural areas, where the collection of wild foods is a viable strategic risk-coping option (Akinnifesi *et al.*, 2006). Many people are fully employed seasonally in harvesting NTFP that include *Uapaca kirkiana* and other IFT fruits and selling to middlemen (Taylor *et al.*, 1996 in Leakey *et al.*, 1996). The major beneficiaries in the fruit trade, through value addition and processing, are women and children. The benefits from selling indigenous fruits come at a critical time annually, when income from other income sources such as agriculture is generally low (Akinnifesi *et al.*, 2006).

A study in Malawi, Mozambique and Zambia revealed that 26-50% of rural households relied on indigenous fruits as a coping strategy during critical seasonal hunger period which usually lasts for three to four months per year (Akinnifesi *et al.*, 2007). According to Mkonda *et al.* (2003), the marketing of IFT is an established source of income and enables many households to provide for families, alleviate poverty and improve living standards. Access to IFT enables households to survive above the poverty line throughout the year. In southern Africa, vulnerability of rural households to income poverty is lessened through income generation from IFT (Akinnifesi *et al.*, 2006).

There are potential market opportunities and extra growth potential for IFT in Africa that can boost rural incomes and employment opportunities substantially. A few IFT products have large market potential especially within the sub-Saharan Africa. The five most important ITF in southern Africa with high trade potential are *Uapaca kirkiana*, *Parinari curatellifolia*, *Strychnos cocculoides*, *Azanza garckeana* and *Flacourtia indica*, with *Uapaca kirkiana* being the most important source of income and widely traded local fresh fruit in the region (Akinnifesi *et al.*, 2007; Akinnifesi *et al.*, 2008). The fruits of *Uapaca kirkiana*, *Ziziphus mauritiana*, *Strychnos cocculoides* and *Parinari curatellifolia* provide substantial household incomes through trading at local markets (Akinnifesi *et al.*, 2006; Ham *et al.*, 2006). The income generated is used to purchase or pay for staple food and other basic household and agricultural goods or assets as well as to pay for services such as house rentals, transport fares, school requirements and social requirements (Akinnifesi *et al.*, 2006; Ramadhani & Schmidt, 2002).

Similar to other IFT that are traded, *Uapaca kirkiana* species is valued for its great commercial potential of its fruit (Mithöfer & Waibel, 2001). The fruit are sold and contribute significantly to local rural economies (Maliro & Kwapata, 2000; Ngulube *et al.*, 1997). The share of market margins for selling *Uapaca kirkiana* fruits was estimated in Zimbabwe at 32-45% for collectors, 53% for retailers, and 2% for wholesalers. Cultivation or collection of IFT from the wild is a profitable enterprise. The collection of *Sclerocarya birrea* generated \$US 78 in South Africa, and \$US 50 for *Uapaca kirkiana* in Zimbabwe (Akinnifesi *et al.*, 2007). Potential contribution to household income of *I. Gabonensis* is US\$93.00 – US\$28.00 revenue per annum (Ayuk *et al.*, 1999). Traders earn profits for example from Z\$0.47 to Z\$3.34 per kg of fruits depending on the market (Ramadhani, & Schmidt, 2002).

In Chipata, the revenue from fruit trade in *Uapaca kirkiana* on a monthly basis is more than the minimum wage. The average gross profit for sellers at peak fruiting season is K11 078.00 (≈\$4.43) and K47 736.00 (≈\$19.09) at low supply periods¹. The prices of fruit varied. At collector stage, the prices for small and larger size baskets were K382.34/kg and K422.78/kg respectively with a mean price per kilogram of K402.56, while at retail level the price is K1 341.00 per cup. Based on these prices the maximum profit margin is K966.12 (Mkonda *et al.*, 2003). Due to prolific sales, some traders have been in fruit trading for close to 37 years (Chisimba, 1996; Kwesiga & Mwanza, 1994).

¹ Exchange Rate in 2003: US1 ≈ ZK2, 500.00

b) Direct contribution to household food security

In Sub-Saharan Africa IFT play vital roles in food and nutritional security. The roles are especially important during periods of famine and food scarcity although IFT are becoming increasingly important as a main source of food to supplement diets in better times (Mithöfer *et al.*, 2006; Akinnifesi *et al.*, 2007). According to Akinnifesi *et al.* (2008) all five most important IFT species are harvested just before or during the hunger period in the southern Africa region. During the period of famine and food scarcity, the harvesting, utilization and marketing of indigenous fruit and nuts have been central to the livelihoods of the majority of rural communities throughout Africa (Akinnifesi *et al.*, 2007). The role of indigenous fruits of the miombo woodlands is particularly important in the Southern Africa Development Community, especially for the marginalized groups in society.

Indigenous fruits reduce vulnerability. Mithöfer *et al.* (2006) stated that the probability of falling below the poverty threshold is 70% during the critical food insecure season. If indigenous fruit are available, they reduce vulnerability by about one third during the critical period.

IFTs provide nutrition and food when agricultural labour demands are high. Several IFT crops are excellent sources of vitamin C that can reduce widespread malnutrition in many southern African countries. For this, the local population extensively uses IFT. For example, the Baobab (*Adansonia digitata*) pulp produces 5.13 g vitamin C that is more than 10 times as much as the same weight of oranges. The *Azanza garckeana* species is also an important source of essential minerals particularly Potassium (P), Calcium (Ca), Magnesium (Mg) and Sodium (Na) (Mojeremane & Tshwenyane, 2004).

Table 2.1 presents the nutritional composition of the *Uapaca kirkiana* fruit (Packham, 1993; Sufi & Kaputo, 1977). In a study in Malawi, Leakey (1999) found that the fruit dry matter content of 27.4% had 86.5% total carbohydrates, 8.4% fibre, 1.1% fat and 1.8% crude protein. The total free sugar content of the fruit from Zambia was 8.5% (Sufi & Kaputo, 1977). The fruit contains 9.8% sugars and oil content of the seed is 22%, which is typical of the *Euphorbiaceae* family (Hans, 1981).

TABLE 2.1 Chemical composition of *Uapaca kirkiana* fruit

Parameter	Composition
Dry Matter, %	24.4
Ash, %	2.2
Crude Protein, %	1.8
Fat, %	1.1
Fibre, %	8.4
Total Carbohydrate, %	86.5
Energy Value, kJ 100 g ⁻¹	1 456
Minerals, µgg ⁻¹	
	P 555
	Ca 33
	Mg 1 106
	Fe 431
	K 13 682
	Na 365

Source: Saka & Msonti, 1994 (modified)

Uapaca kirkiana fruit is popular with the local population (Mwamba, 1989; Ngulube *et al.*, 1995; Sufi & Kaputo, 1977). In food security, the *Uapaca kirkiana* fruit plays an important dietary role as native food because of its high nutritive value from the pulp (Hans, 1981).

Several IFT are processed into finished products. For example, among the five most important species in southern Africa four are made into jams, two used to prepare porridge, three are used to make alcoholic drinks or juices or ground into powder for mixing with other foods, two are dried and one has oil extracted from its nut. Indigenous fruit pulp and nuts are pounded and mixed with small amounts of cereal flour to make *Nshima*, a regional food staple (Akinnifesi *et al.* 2008).

In the case of *Uapaca kirkiana*, a number of products can also be made from the fruit including refreshing drinks, jam, wine, squashes, sweet beer, porridge and cakes and can also be eaten raw (Leakey, 1999; Mithöfer & Waibel, 2001; Mwamba, 1989; Ngulube *et al.*, 1995; Storrs, 1995). *Uapaca kirkiana* jam ranked fifth among fruit products in Malawi, but first among IFT products while *Uapaca kirkiana* wine ranked seventh (Akinnifesi *et al.*, 2008).

2.2 Resource Supply and Demand

The *Uapaca kirkiana* fruit is among the most available, popularly harvested and traded of all indigenous fruits in the Zambian miombo. The fruit ranked second in Chipata District in order of cumulative quantities harvested. An estimated quantity of 1 026 kg of the fruit was collected in one season, compared to a mean quantity of 386 kg each for eight other fruit species (Mwanza & Kwesiga, 1994). According to Gondo *et al.* (2002), a collector in Zambia usually harvested 100 kg of the fruit in a week.

The fruit is harvested from October to February from forests nearest to and within homesteads. All household members especially women and children are involved in fruit harvesting, using methods such as gathering from the ground, picking from trees, dislodging fruits either by throwing objects or shaking them off trees, lopping and cutting trees. Tree cutting has increased with the emergence of wild fruit markets (Chidumayo, 1997; Gondo *et al.*, 2002; Ham, 2003) with the potential of adversely affecting the trade in the fruits through deforestation.

The degree to which indigenous fruits are marketed for cash depends on product demand drivers and marketing factors including: their availability, species distribution and stocking patterns, shelf life, abundance, ownership, access to markets, sale price and existence and effectiveness of social factors such as tradition that regulate and control the sale of fruit products (Chidumayo, 1997). Others include income generation and customer preferences. Preference may be based on flavour, taste and appearance (Chidumayo, 1997; Gondo *et al.*, 2002; Mwanza & Kwesiga, 1994). In some cases preference is also based on colour and size, and is subject to age and sex, with older women showing the greatest interest in wild fruits (Packham, 1993).

2.3 Market Structure

2.3.1 Market constituents and entry conditions

The majority of the marketers of the fruit are adult females subsisting on agriculture and without formal employment. Mkonda *et al.* (2003), found that 92% of traders are females, 50% of whom are married and with large families. Mwanza and Kwesiga (1994) found that 81% of indigenous fruit marketers are married. In Chipata District markets, subsistence farmers, engage in the sale of fruits as part of off-farm income generation, constitute 67% of the fruit traders. The majority (80%) of these farmers, who are mostly women (81.8%), are also marketers without formal employment (Mwanza & Kwesiga, 1994). Nearly all (97.7%) of the fruit vendors are 21-41 years

of age. There are fewer children involved in wholesaling than in retail (Mkonda *et al.*, 2003, Mwanza & Kwesiga, 1994).

Due to the informal nature of the fruit trade, there seems to be no deliberate conditions for participation in the marketing. There are no restrictions in the purchase and consumption of fruits that exists either by sex or age (Mwanza & Kwesiga, 1994).

2.3.2 Fruit marketing strategies

The fruit promotional marketing strategies comprise product differentiation and product development activities. Product differentiation comprises basic cleaning to remove broken and rotting fruits and sorting/grading based on size and degree of ripeness. This is not a common practice, however, only about 2% of those interviewed by Mkonda were found to sort their fruit (Mkonda *et al.*, 2003). Sorting/grading is done mostly for regular on-the-doorstep customers. In some instances, the fruits are deliberately not sorted as a selling strategy to ensure that fruits of different sizes are sold (Gondo *et al.*, 2002; Mkonda *et al.*, 2003).

Some of the following practices are conducted to increase competitiveness and hence improve the marketing of the fruit such as (Mkonda *et al.*, 2003):

- meeting suppliers to transact before they reach the market places to reduce competition and increase bargaining power,
- maintaining regular customers,
- credit sale to attract premium or sale at a higher price than when a cash payment is made,
- hiring labour; but for a short time only and mainly hired few and usually relatives,
- carrying out market intelligence, for example establishing the fruit prices before setting own price,
- storing fruits temporarily to allow full ripening, and
- allowing customers to sample fruits and eat few before purchasing.

Product development involves minimal fruit processing that is limited to subsistence scale. Most IFT products marketed are sold in their natural state. However, as presented in section 2.1.3 (b), wine and other products are made from *Uapaca kirkiana* (Packham, 1993).

2.3.4 Fruit market channels and cost structure

Forests are the sources for the fruits that are collected for both marketing and household consumption. Collectors sell the gathered fruit to consumers within the local community and retailers trading at roadside and/or urban markets (Gondo *et al.*, 2002; Ham, 2003). The collectors transport the fruits to the nearest trading centers for quick sale. The rapid flow of fruit to the markets is necessary because the fruit is highly perishable and there are no appropriate storage facilities. According to Mkonda *et al.*, (2003), 5% of retailers collected the fruit themselves and the rest of the fruit was purchased from middlemen and collectors in Chipata District.

In Chipata markets, the longest distance to the marketplaces from the fruit sources is 15 km (Mkonda *et al.*, 2003). Some fruits from Chipata are also transported to and sold in Lusaka. Within Chipata District, the major points of sale include local (35.6%) and roadside (31.1%) markets. For most of the sellers in eastern Zambia, public and hired private vehicles are the commonest and easiest form of transport. The other transport mode comprises bicycles, ox-carts and carrying as head loads (Chisimba, 1996; Ham, 2003; Mwanza & Kwesiga, 1994).

There is no clear differentiation of the cost structure. Costs related to fruit trading include expenditure on fruit differentiation, distribution, processing, and promotion or pricing, with the biggest cost share allocated to transportation (Mwanza & Kwesiga, 1994). According to Mkonda *et al.* (2003), the market fees and presale costs vary to a high degree depending on the market places and marketing levels.

2.4 Market Conduct

There have been no definite and strategic mechanisms for IFT pricing. Informal market information drives the system. Generally and in order of importance, the determination of the fruit prices is based on information about prevailing market prices, total marketing costs, prices in previous season, supply and other miscellaneous means including harvesting costs (Mkonda *et al.*, 2003). However, the greater the distance the fruits are transported, the higher the differential sale price between source and sale points (Brigham *et al.*, 1996; Mwanza & Kwesiga, 1994). The other aspects that have some bearing on the fruit pricing are:

- *Presale activities.* Eight percent of traders (i.e. collectors and retailers) do presale activities, such as cleaning and removing damaged fruits to increase fruit prices (Ham, 2003; Ramadhani & Schmidt, 2002).

- *Competition among suppliers.* However, this is minimal and does not constitute an important determinant of price levels.
- *High perishability* of the fruit resulting in low prices, as sellers want some return before the product gets spoiled (Brigham *et al.*, 1996; Mwanza & Kwesiga, 1994).
- *The market segment.* IFT often have a low price unit in rural areas. Generally, low prices are caused by low rural demand (Brigham *et al.*, 1996; Mwanza & Kwesiga, 1994).
- *The leader-follower theory.* In Chipata, marketing appears to follow the leader- follower theory, whereby few (28%) traders (also known as *price leaders*) determine the fruit prices and the rest (also called *price followers*) just accept the set price by the leaders. Fruit collectors also seem to accept the prices from the markets as set by wholesalers (Ramadhani & Schmidt, 2002).
- *Availability and prices of substitutes.* If more preferred fruits are available at low prices then demand and prices of *Upaca* will decline.

2.5 Trade Constraints and Opportunities

2.5.1 Constraints

A number of problems have restrained the exploration and the full utilisation of the IFT markets. The trade constraints may be broadly categorised into economic, social, technological and legal constraints.

There are three economic constraints. The first is the seasonal availability of the fruit. The periodic accessibility of IFT discourages some of the would-be investors partly because income generation takes place during a short time period. The other reason that does not motivate investors in the trade of ITF is that seasonal availability also causes supply-demand imbalances and drop in the product prices. The downward change in prices happens at peak production times in November/December when there is an abundance of the fruit on the market (Gondo *et al.*, 2002; Ham, 2003; Mkonda *et al.*, 2003). The second economic problem is the unpredictable productivity of wild fruits. Similar to seasonal availability of the fruit, the unpredictability of fruit production makes the flow of income generated from the trade in fruits inconsistent and at times even non-existent as it fluctuates with the supply from the resource base (Gondo *et al.*, 2002). The third constraint is fruit sampling/tasting, whereby the prospective buyers pick and eat few fruits to assess the taste (quality) of the fruits. The buyers do this as part of the decision-making process for the purchase (Mkonda *et al.*, 2003).

The second category of problems that also influence the degree of marketing of *Uapaca kirkiana* concerns social issues. The first of the two issues is the belief and perception in the ownership of fruits. Some communities believe that ancestral spirits own fruits, and therefore establish taboos that are against and restrict the trade in fruits. In communities with such perceptions, it is an offense to engage in the commercial utility of fruits (including *Uapaca kirkiana*) because spirits disapprove of such use of IFT (Kwesiga & Mwanza, 1994; Mwanza & Kwesiga, 1994). The presence of stigma attached to the consumption of some gathered products, especially in rural areas as compared to urban areas is the second social problem. Such stigma affects the marketing of IFT (Brigham *et al.*, 1996).

Technology constitutes the third group of constraints to IFT marketing and development. There are four technological hindrances to fruit trade and include lack and/or limited marketing and economic infrastructure, lack of processing and preservation equipment and capacity, limited information system and short shelf life of the fresh fruits.

Lack of and/or limited marketing and economic infrastructure such as fruit stalls, storage and transport facilities cause major problems for fruit traders. A study done by Kwesiga and Mwanza (1994) indicates that 6.1% of fruit marketers said that lack of storage facilities are a disincentive to trade of IFT. The problem with transportation is threefold: the distance, the state of roads and frequency of transport. According to Kwesiga and Mwanza (1994) 63.6% of IFT marketers in Chipata acknowledge distance involved in moving fruits to the marketplaces as a problem. This is worsened by roads that are in deplorable state, which also constrains transportation of fruits from collection points to marketplaces. Closely related to the aforementioned problem of poor roads, transport is infrequent, not reliable and normally far away from the markets (Brigham *et al.*, 1996; Gondo *et al.*, 2002; Ham, 2003; Kwesiga & Mwanza, 1994; Mkonda *et al.*, 2003; Ramadhani & Schmidt, 2002; ICRAF, 2003).

Lack of processing and preservation equipment and capacity is the second problem within the technological framework. The equipment and processing techniques for edible wild harvested foods that are available on the market may not yet be advanced enough to promote the hygiene or quality standards to required levels (Brigham *et al.*, 1996; Chisimba, 1996; Kwesiga & Mwanza, 1994).

The third constraint is limited information system regarding the marketing of IFT such as *Uapaca kirkiana*. There is an overall lack of information, networking opportunities and no transparency in the marketing of fruits, which may be strongly linked to the limited growth and underdevelopment of the sub-sector on the marketing of tree products especially at the producer/collector stage (Ramadhani, & Schmidt, 2002; Russell & Franzel, 2004). This scenario of information scarcity results into unfair trade with the benefits skewed away from producers/local communities (Gondo *et al.*, 2002). The fourth and last constraint is the short shelf life of the fresh fruits that at times results into loss of trade business due to fruits that perish quickly (Ham, 2003; Gondo *et al.*, 2002; Mkonda *et al.*, 2003).

The last group of problems includes institutional and legislative issues. There is no strong policy and legislation to guide resource tenure and pricing. The weak and unclear national and traditional regulatory instruments that are biased in wealth distribution isolate the utilisation and marketing possibilities of the IFT and sadly, to their detriment. Currently, national policies seem to favour urban over rural interests (Mwanza & Kwesiga, 1994). The effects of neglect at policy and legislation level in agricultural and forestry has resulted into limited domestication of IFT (Kwesiga & Mwanza, 1994; Mwanza & Kwesiga, 1994; Russell & Franzel, 2004). Within the institutional framework, there is missing and/or unclear definition of property rights of IFT which limits the improvement of the marketing system (Ramadhani & Schmidt, 2002). Another problem is that of uncoordinated research and development on NTFPs in Zambia (Chisimba, 1996). The various research institutions in Zambia do not seem to coordinate or adequately share the research programmes and results.

2.5.2 Opportunities

Uapaca kirkiana fruit trade is an easy and motivating income generating activity for subsistence farmers (Chisimba, 1996; Kwesiga & Mwanza, 1994) because of three reasons (Gondo *et al.*, (2002). Firstly, it does not require huge start up resources, and can be initiated without capital costs. Secondly, the only requirement before delivery to the market is time to harvest, grading and cleaning of the fruit. Thirdly, although not very advanced, technology exists within the sub-region to process some of the fruit to secondary products. For example the *Uapaca kirkiana* fruit can be processed into jam and porridge. If processing and marketing services can support the IFT domestication and improvement, indigenous fruits can be a major business opportunity and a source of employment to the most vulnerable in society.

Nothing on threats here

2.6 Conclusion

This literature overview shows that the trade in IFT is a thriving business in Zambia. Except for information from the the study by Mkonda *et al* (2003) and general studies on NTFP by Gondo *et al.*, (2002) limited knowledge exists however on the interactions between role players in the *Uapaca* value chain. This study will focus on these interactions and the knowledge gained can be used in market development and commercialization efforts.

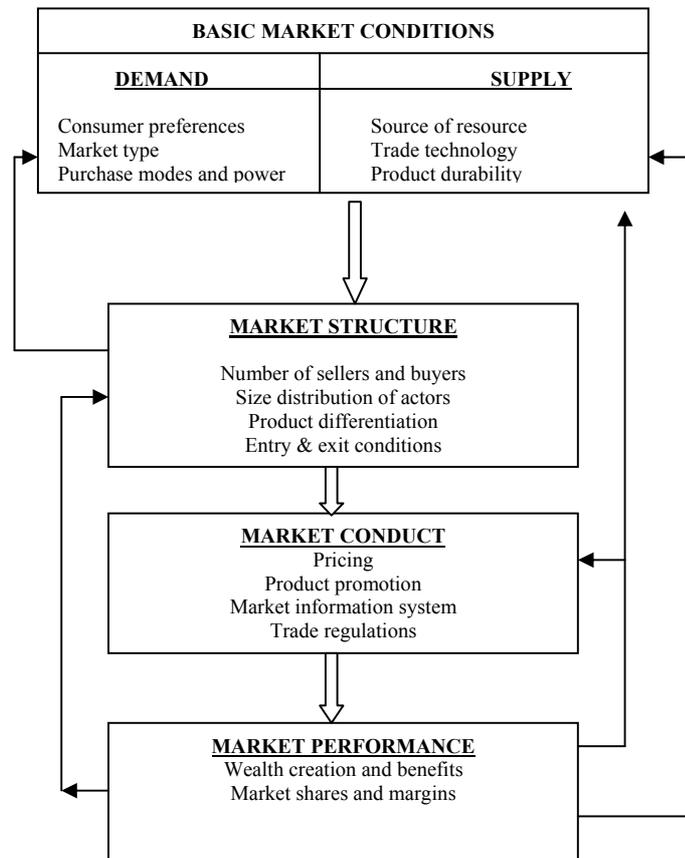
Chapter Three:

Empirical Research Model and Methodology

This chapter deals with the study model and the methodology. The study adopted the Market Structure, Conduct and Performance (SCP) model. The concept of the SCP model is described in this chapter to establish the discussion framework for the entire study. The key aspects guiding the study and hence highlighted in the current chapter comprise the basic market condition of demand and supply, the SCP of the market and consumer behaviour. The chapter also presents a discussion of the empirical research methods used to collect and analyse the study data. The methodology covers methods, structure, sampling, field data gathering practice, validity and data analysis.

3.1 Research Model

The SCP model is adopted because it is a concise and applicable methodology of market assessment as depicted in Figure 3.1. Economic performance is engineered by sets of attributes that are interlinked to each other. As suggested by the model, there is causal flow from basic conditions to performance through market structure and conduct. The central assertion of the model is that performance may be evaluated or predicted based on the observation of structure, conduct and basic conditions. Performance in a particular market may be dependent upon the conduct of sellers and buyers in that market, for example in pricing policies and practices, research and development. Conduct depends in turn upon the structure of the relevant market. The market structure and conduct are also influenced by various rudimentary market conditions. Within this relationship, there are also feedback effects. For example, research and development strategies may influence change in product differentiation and costs (Scherer, 1970).



Source: Scherer, 1970

FIGURE 3.1 The industrial organisation analysis model adopted for the study

Because of its clear presentation of the linkages and elements in a market chain, the model is extremely attractive to and has been adopted for the analysis of the marketing of *Uapaca kirkiana* fruit under the current study in Zambia. In addition, both Kaaria (1998) and Ramadhani (2002) used it to study the socio-economics of IFTs in Malawi and Zimbabwe respectively. The salient features of the SCP model subsequently provide a guiding framework for the study methodology, structure and procedures as they are designed to generate knowledge based on the selected components of the model. The conceptual framework of the five key elements of the model is discussed next, starting with the basic conditions of supply and demand.

3.1.1 Basic market conditions

Basic market conditions are determined by the basic market elements regarding the supply and the demand of products. Supply is the schedule of quantities the producers would be willing to offer for sale at various levels of expected prices for the product. Kohls and Uhl (1998), define demand as *a schedule of different quantities of a commodity that buyers will purchase at different prices at a given time and place*. Demand is a series of quantity-price relationships and not the quantity demanded, which is a point on the demand schedule or the actual quantity purchased for use (Kohls & Uhl, 1998). An analysis of the key factors influencing supply and demand is critical for understanding how a market works and assessing marketing constraints and opportunities. For the current study, only the quantities of the *Uapaca kirkiana* fruit demanded by the consumers and supplied by traders were estimated.

3.1.2 Market structure, conduct and performance

a) Market Structure

Structure means organisational characteristics of a market that influence the nature of competition and pricing behaviour within that market. It defines the characteristics and composition of sellers and buyers as the socio-economic environment in which the firm operates (Pomeroy & Trinidad, 1995). The characteristics of businesses included in the concept of market structure are (Caves, 1977; Ellenbroek, 1988; Scherer, 1970; Tomek & Robinson, 1990):

- the number and size distribution of the market participants i.e. sellers and buyers,
- actors' market shares,
- product and service differentiation,
- the conditions of entry into and exit from the market for participants, and
- availability of market information.

These structural components of a market influence the conduct of market actors. For example, price behaviour varies with market structure (Tomek & Robinson, 1990).

b) Market Conduct

Market conduct refers to the patterns of commercial behaviour induced by the market structure. The patterns are followed in adjusting to the markets in which the various actors transact (Pomeroy & Trinidad, 1995). The competitive actions and practices of the players in a market; the decisions the players make and also the way in which these decisions are made constitute the

conduct of business. Conduct is the behaviour in changing prices, outputs, product characteristics, selling expenses and research expenditures (Caves, 1977; Scherer, 1970) under differing market structures (Ferris, 1964).

3.1.3 Market performance

The eventual outcome of all market conduct practices is termed market performance (Ellenbroek, 1988; Kohls & Uhl, 1998). Precisely, however, market performance is the outcome of the market operations in terms of economic, social, or environmental criteria. Economic outcomes refer to the impact of structure and conduct as measured in terms of variables such as prices, costs and volume of output. An important social outcome is often the distribution of benefits among various groups in society. An example of an environmental outcome is the effects of markets on natural resources. Thus, how well the marketing system provides society and the market players with the expected benefits from it (Ellenbroek, 1988; Ferris, 1964; Kohls & Uhl, 1998; Pomeroy & Trinidad, 1995). Market performance is about whether the businesses: enhance welfare, avoid wastage of available resources, produce efficiently the right goods in market quantities and effectively enhance employment and economic growth (Ferris *et al.*, 2006).

The current study is limited to the general income benefits, actual or potential, accruable to the actors i.e. traders and consumers of a product. The evaluation was mainly on the general qualitative aspects in terms of perceived contribution to employment, investment, economic expansion, living standards and food security. The other aspects considered are conservation and the overall rural economic development potential. The marketing of fruit is addressed through the identification and analysis of opportunities.

3.1.4 Consumer behaviour

Consumer behaviour is another important aspect for the analysis of marketing of products such as *Uapaca kirkiana* fruit. Consumer behaviour relates to all acts of individuals directly involved in obtaining and using economic goods and services including the decision processes that determine these acts. These decision processes include perception constructs to reach purchasing decisions. Consumer behaviour stresses the interaction between the marketer and the consumer. The core of the consumer behaviour concept is the process of perceiving and evaluating product information, considering how product alternatives meet the consumer's needs and deciding on a commodity, which is essentially a consumer's decision making process (Baker, 1971; Harell, 1986). Three key groups of factors influence consumer decision making processes:

- The first set of factors comprises the individual consumer's needs, perceptions of the product and its characteristics and attitudes toward alternatives. Other factors in this group comprise the consumer's demographic, occupation and psychographic characteristics,
- The second group is about environmental influences, which include cultural, social and situational determinants,
- The third factor is the marketing strategy. This factor represents the variables within the control of the marketer that attempt to inform and influence the consumer. These variables may be regarded as stimuli perceived and evaluated by the consumer in the process of decision-making (Assael, 1986; Kotler, 1994; Marcus & Tauber, 1979).

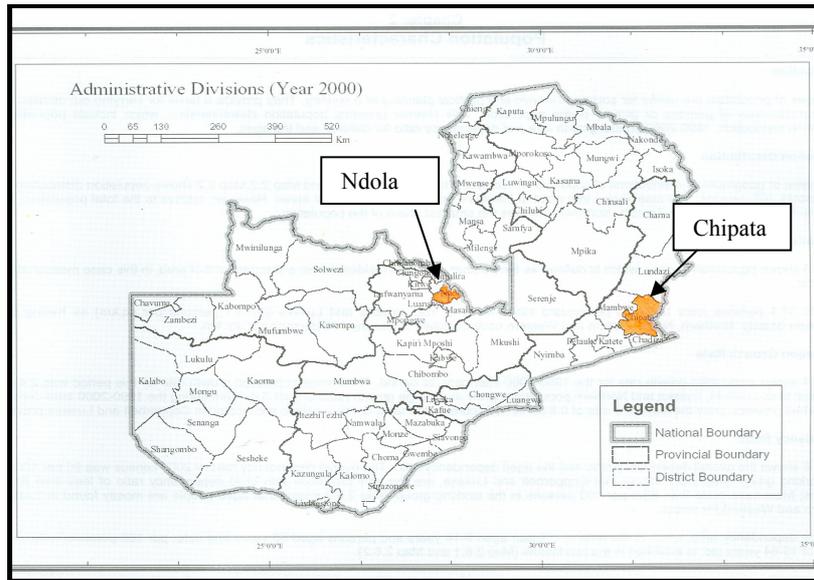
Consumers' actions are important to know, as they will play a big role in the strategic programmes to develop fruit markets. Kohls and Uhl (1998) noted further, that demand is synonymous with consumers as they shape the food industry through the decisions they make over products on the market. Therefore, this study focused on market strategy and consumer behaviour regarding *Uapaca kirkiana* fruit.

The SCP model has components that can provide valuable data and good understanding of the marketing of *Uapaca kirkiana* fruit. This study has therefore adopted it to generate information using the following methodology framework.

3.2 Study Areas and Methodology

3.2.1 Overview of the study areas

The present study about *Uapaca kirkiana* marketing was conducted in Zambia, which is situated between 8° & 18° south of the Equator and 20° & 35° east of the Greenwich Meridian (ROZ, 2003a), and with a tropical type of climate. The shaded areas in Figure 3.2 are the principal study districts namely Chipata in Eastern Province and Ndola in the Copperbelt Province. The study districts are located approximately 888 km apart by road. The other study area is Lusaka where only the fruit pricing marketing component was conducted. The Eastern Province is located between 10° & 15°S and 30° & 34°E (Kabwe, 2001) with about 900 mm of rainfall per annum. The province is approximately 69 106 km², which equates to about 9% of Zambia's land size (ROZ, 2003b). The Copperbelt Province is approximately 31 328 km². It is about 4% of the total land size of Zambia and lies between 12° & 14°S and 27° & 30°E with a mean rainfall of 1 200 mm per annum (CFAP, 1998).



Source: Republic of Zambia (ROZ), 2003c

FIGURE 3.2 Map of Zambia indicating study districts

The provinces and study districts provide contrasting cases in terms of their socio-economic and other characteristics. The Copperbelt Province has higher population at 16% of the national figure and the Eastern Province constitutes 13.2% of the national figure. The Copperbelt Province has a lower population growth rate of 0.8% than the Eastern Province with a growth rate of 2.7% and higher than the national average at 2.5%. With a smaller size than Eastern Province, the Copperbelt Province has a high population density with 50.5 versus 18.9 persons/km² for Eastern Province. The household size is also higher for the Copperbelt than the Eastern Province with 5.4 and 4.9 people, respectively. The Eastern Province has a high poverty rate at 80% of the population while in the the Copperbelt Province 65% of the population is rated as poor. The national poverty averages are 83% for the rural and 56% for the urban areas (ROZ, 2003b).

Relatively, Ndola has slightly higher population (9374 757 people i.e. 3.8% of the national figure) than Chipata (367, 539 people i.e. 3.7% of the national figure) but the same density as Chipata at 47.6 persons/km². The population growth rate is lower for Ndola (1.1%) than Chipata (1.4 – 2.5) in the period 1990 to 2000. The economic dependency ratio, which is the ratio of the economically inactive population to the economically active population, for the study districts is 100-123 for Ndola and 60-78 for Chipata. The key economic sectors differ slightly for Ndola, which comprises mining and agriculture, and Chipata that is mainly agriculture (ROZ, 2003b). For both districts, there are crop and livestock agriculture with similar commodities.

In addition to the contrasting socio-economic, and therefore poverty situations as outlined above, there were other justifications for selecting the study sites. The Eastern Province was chosen because there is a market for *Uapaca kirkiana* (Kwesiga & Mwanza, 1994; Mkonda *et al.*, 2003) and it is ICRAF's domestication project site. The rationale is that generation of knowledge on the marketing of *Uapaca kirkiana* has great relevance and potential to feed the IFT domestication programme in Zambia and the southern African region. *Uapaca kirkiana* was selected as one of the priority species in the southern African region (Maghembe *et al.*, 1998). The Copperbelt and Lusaka Provinces were chosen for comparison with Chipata. The specific study localities (i.e. markets and villages) in Ndola and Chipata districts were purposely selected. Further, Ndola and Lusaka districts have cities and are therefore taken as urban markets.

3.2.2 Methodology of the empirical study

The study comprised principally two methodologies, namely, participatory rural appraisal (PRA) and questionnaire survey as discussed below.

a) Participatory Rural Appraisal

Rapid appraisal methods (that include PRA) are quick, low-cost ways to gather the views and feedback of stakeholders. They are used for providing qualitative understanding of complex socioeconomic changes or people's values, motivations, and reactions and providing context and interpretation for quantitative data collected (in some cases) by more formal methods (World Bank, 2004). One of the key values of PRA is its use in understanding opinion, behaviour and attitude of rural people (Molnar, 1989).

PRA is an intensive, systematic but semi-structure learning experience carried out in a community with the community members. It is a cross-disciplinary and sector approach to engaging stakeholders such as rural communities in development through interactive and participatory processes (DFID, 2002). It is a research and/or planning approach focused on sharing learning between local people and outsiders i.e. researchers or development agents. PRA enables development practitioners and local people to assess interventions collaboratively (Molnar, 1989; FAO/WFP, 2005). The purpose of the approach is start up discussion with stakeholders on points of interest (Slocum *et al.*, 1995). PRA is one of the approaches among the participatory methodologies that are often seen as a set of principles for generating insights about people and the communities in which they live. Participatory methodologies enable people to do

their own investigations, analyses, presentations, planning and action, and to own the outcome (DFID, 2002). It uses a wide range of tools, often within a focus group discussion format, to elicit spatial, time related and social or institutional data (DFID, 2002). It uses a number of techniques including visual ones.

According to Franzel (1996), PRA tools may be more efficient and effective for collecting certain types of information than formal surveys. In the present study, the PRA approach chiefly comprised the use, in various combinations, of the following tools:

- Group Interviews

These were used to obtain community level information as recommended Barton *et al.*, (1997). The information captured during the current study using this research tool included status of the forest resources and IFT consumption and trade.

- Focus Group Discussions

Focus groups can be used in preliminary research and/or for the purpose of triangulation (Welman & Kruger, 2001). This in-depth research technique was used to generate information on the fruit marketing business, which included the status of management and ownership of forests where the fruits were collected from, the fruit collection and trading and the problems experienced as well as the proposed interventions. Focus group size ranged from seven to ten persons. The participants were purposively selected based on their superior experience/knowledge about the IFT. According to Barton *et al.*, (1997), focus groups (consisting of six to twelve people) have been increasingly used in participatory research to identify and describe perceptions, attitudes and felt needs and as such it is a very important technique in participatory research. According to Morgan (1998), focus group research has been prominent in marketing studies because market researchers seek to obtain motivations not amenable to structured conventional survey research. Different perspectives, insights and understanding are also obtained through focus group participants.

- Historical profiles

Historical mapping can be helpful in introducing the time dimension in participatory assessment thereby providing evidence of developmental and other changes that have occurred in an area (Barton *et al.*, 1997). During the study, the profiling aided in understanding the forest resource status in terms of management and use over time including fruit consumption and trade patterns.

- Transect/Observation walk

According to Barton *et al.* (1997), an observational walk is one of the tools for gaining hands-on knowledge/experience in a community. A transect walk was conducted that focused on the land-use with special attention to environmental and agricultural features such as cultivated land and forests. The walk also observed social aspects such as housing types and other infrastructure. Some village members and research assistants participated in the walk that noted features of interest in relation to the study purpose.

- Ranking

Based on Barton *et al.* (1997), ranking exercises are a means to enable participants to indicate their preferences and priorities about a given issue. For the study, the people's opinions about the social classes in the communities and the most commonly collected and possibly traded fruits were sought through ranking.

- Resource and Mobility maps

Participatory mapping is useful for providing an overview of the local situation. It can also provide a good starting point for environmental and social assessment (Barton *et al.*, 1997). Maps are good tools for knowing the different aspects of the village such as land-use patterns (Mukherjee, 1993). During the meeting for the group interviews, the communities were requested to draw resource and mobility maps to indicate the availability of the IFT and the collection and trading routes or channels they used. The maps helped in visualising the sources of fruits and provided some additional basis for further discussion. This was done after explaining the purpose of the exercise. These maps were useful in knowing the sources of the fruits and the market places.

- Flow Diagrams

A diagram is any simple model, which presents information in an easily understandable visual form. One of the key values of diagrams is that they greatly simplify complex information (Barton *et al.*, 1997). The present study investigated the flow of the fruit commodity including trade pathways using flow diagrams. The communities were requested to draw their own fruit flow diagrams after explaining the process of constructing such diagrams.

The participatory rural appraisal meetings involved a total of 96 people comprising 57.3% females. The meetings were held in Chidakwa (20 participants) community in Chipata District and in Mutapa (25 participants) and Chikumbi/Maria Chimona (51 participants) communities in Ndola District. These communities were selected on the basis of their active involvement in *Uapaca kirkiana* marketing. The data collected through the PRA meetings have been incorporated in the results and their discussion.

b) Questionnaire Surveys Research

Surveys can be used for describing conditions in a particular community or group (World Bank, 2004). For the (primary) data generated by the current study, the principal collection methods and instruments were semi-structured questionnaires (Appendices 1 - 4). According to Chamber (1983), semi-structured questionnaires as data collection methods are the most commonly used in rural research. These research tools allow free flow of information and data capture (Phillips, 1973; Babbie, 1978a), and one of the best methods especially for a population that is too large to be observed directly (Babbie, 1995).

Different questionnaire sets were designed and used to capture data from each of the four units of analysis, namely collectors, retailers, end consumers and government forestry workers. The questionnaire schedules were divided into thematic sections to improve clarity and facilitate their administration.

Using the PRA and questionnaires methodology explained above, the following data on the major thematic areas were gathered:

❖ Collectors and Retailers

- Purpose of trade
- Monetary investment in trade
- Fruit sources, modes of acquisition and participants
- Fruit quantity traded and consumers/customers
- Fruit prices and pricing across the season
- Product promotion activities and strategies
- Trade contribution to household income (qualitative only)
- Trade problems and actor opinions
- Resource management (opinions)

❖ **Consumers**

- Fruits consumed including priorities
- Quantity and purpose of consuming the fruit
- Mode of acquisition of fruit
- Prices: general opinion
- Preferences: fruit attributes, consumption forms and desired products
- Attitude to the consumption of the fruit
- Problems experienced
- Resource management (opinion)

❖ **Government Forestry Workers**

- Improvement of IFT management and marketing
- Constraints in NTFP development and policy implementation

Although the actual questions varied slightly for the collectors and retailers, the type of data gathered had similar themes and the data sets were therefore not separated between collectors and retailers.

3.3 Study Structure

The study was conducted between December 2003 and February 2004 in both the villages and markets. Table 3.1 shows the number of markets included in the study. In total, thirty-seven markets and seven villages were involved in the study. The markets were 10 in Chipata, 17 in Ndola and 10 in Lusaka. The villages were six in Ndola, one in Chipata and none in Lusaka.

Of the total number of study markets sampled, 37% were in Chipata and 67% were in Ndola. For Ndola and Chipata districts, the study involved the entire market supply chain from collectors through retailers to consumers. In Lusaka only the fruit prices were assessed in markets that were purposefully chosen and only for comparisons with Chipata and Ndola.

TABLE 3.1 List of markets and villages included in the marketing of *Uapaca kirkiana* study

District	Names of Markets	Names of Villages
Chipata	Kapata, Mchini, Nabvutika, Saturday, Kaumbwe, Dyakanani, Jere, Magazine, Muchenga and Rdavies.	Chidakwa
Ndola	Chifubu, Chimwemwe, Chipukusu, Chisokone, Fisenge, Kapalala, Kawama, Lubuto, Pamodzi, Masala, Ndeke, Hillcrest, New Mushili, Northrise, Njanji and Twapia.	Mutapa and Maria Chimona/Chikumbi (comprising Chiwala, Chikumbi, Nkonde, Kang'umba and Shamasembe)
Lusaka	Lusaka City, Lusaka Town Centre, Soweto, Chaisa, Chipata, Lilanda, Mandevu, Marapodi and Ng'ombe.	

Members or elements (i.e. individuals or subpopulation) of a population are referred to as units of analysis (Welman & Kruger, 2001). There were four units of analysis for the study on *Uapaca kirkiana* markets, again, identified on the basis of the SCP model of market analysis. For the market chain, the units are the collectors, retailers and consumers. During data collection and subsequently analysis, these three main participants in the marketing chain have been treated as separate groups for purposes of data analysis. Government forestry officers form the unit for the policy component.

The distribution of the units of analysis is 63.9% consumers, 19.6% retailers and 16.6% collectors. Forty-nine (49) collectors were included in the study. Of these, 79.6% were from Ndola and 20.4% from Chipata. The sample population for the retailers was 59 respondents with Chipata District accounting for 36.2% of retailers while 53.8% of retailers were from Ndola District. The 189 consumers interviewed consist of 63% from Ndola and 37% from Chipata.

The reason for more study cases and focus in Ndola than in Chipata is that there had been no similar studies in the former area unlike in the latter where several research events had been undertaken. Similarly, there was more inclination towards the consumers than the other two units of analysis because findings at the consumer level were expected to have stronger influence on the design of interventions on the trading business than perceptions at either the retailer or

collector levels. Consumers are the primary architects of an industry through the decisions they make about products on the market (Kohls & Uhl, 1998).

The collectors, retailers and consumers were selected for the study because they are the main actor groups in the market chain for the *Uapaca kirkiana* (the study) fruit in the two districts. The identification of these groups is consistent with the SCP model adopted for the study. In this model, the basic conditions involve demand and supply. Demand elements comprise consumer preferences, purchase modes and power, among others. The considerations for supply are about the source of resources to be supplied to consumers.

For the management of and trade in forest resources such as *Uapaca kirkiana* fruit, the main formal institution involved in resource regulation is the government through its Forestry Department and the traditional authority i.e. chieftaincies including the village/community heads. The department was identified as relevant for the study because it administers the forestry policy. The department has some influence on the management and control systems of the resource base from which the *Uapaca kirkiana* fruit is sourced. Thus, the forestry workers were identified as key informants on forestry policy aspects.

3.4 Sampling Strategy and Techniques

3.4.1 Markets

The study involved both probability (random) and non-probability (purposive) sampling strategies in a multistage process. The cluster or primary sampling unit was the market. Firstly, all the legal markets as designated by the local authorities (councils) in the respective study district localities were identified, and subsequently constituted the sampling frame for the research. At the time of the study there were 26 and 14 markets officially recognised by the Chipata and Ndola councils respectively. Secondly, samples of 65% and 71% from lists of the legal markets within Ndola and Chipata were randomly selected for the present research.

For Lusaka, all the markets in the central business district as well as the neighbouring townships were selected purposively. For the townships, the selection considered the relative location of the markets to fruit sources and the availability of fruits in addition to the legal status of the markets.

3.4.2 Market actors

The secondary sampling unit was the market actors (the fruit traders and the consumers). For the market actors, the main approach was the purposive incidental sampling whereby only fruit traders and consumers were considered and included in the study sample as a representative of the relevant population. The market actors were intercepted and selected for interviews as they brought fruit to the markets for selling or when they bought fruit from the markets. Data were gathered only from those actors who agreed willingly to be interviewed.

Purposive sampling is the most important type of the non-probability sampling. It involves relying on previous research findings to get a representative sample of the relevant population (Welman & Kruger, 2001). According to GOA (1992), sometimes the study objective is to generalize, but when this is not possible because a sampling frame cannot be obtained, that is, either a listing of the population or a rule for determining the population, then incidental or purposive sampling can be used instead of statistical (probability) sampling.

An incidental sample is the most convenient collection of units of analysis that are near and readily available for research purposes (Welman & Kruger, 2001). In addition, Welman and Kruger (2001) state that the merit of non-probability samples is that they are less complicated and more economical especially in terms of time and financial expenses than probability samples. They are cost effective, too (GOA, 1992). For the current study, this was deemed best under the limited time and financial resources.

3.4.3 Forestry officers

The sample of twenty forestry officers comprised 90% males and 10% females working for the government of Zambia and in strategically relevant positions were identified and selected for the study. These included personnel in charge of forest administration, research and management at both district (50%), provincial (15%) and national (35%) levels. For this category of respondents, the questionnaires were distributed and the officers filled them in. After completion, the questionnaires were collected and then immediately checked for clarity to facilitate data analysis. Any unclear responses were crosschecked and verified with the respective respondents.

According to GOA (1992), when the sampling is non-random the results of the study may not be generalized to a population but still has valid use. This is the case with the present study. Since the selection of the units of analysis was purposive the findings may not be generalized to the

entire population of the *Uapaca kirkiana* market actors in Zambia or the provinces where the study districts are situated. Nonetheless, the study provides information on the marketing of *Uapaca kirkiana*, which may be used as an indicator for similar investigations and/or areas.

3.5 Field Practice of Data Collection

The questionnaires were pre-tested and redesigned before use, following Babbie (1978b), Babbie and Mouton (2001), and Welman and Kruger (2001). Pre-testing involved nine collectors, ten retailers, five consumers and two government forestry officers selected on a convenience basis but from among the target group. To ensure effective communication and improve reliability of results, the relevant vernacular (i.e. mainly Chewa/Nyanja for Chipata and Lusaka, and Bemba/Lamba for Ndola) was used to interview all collectors, all retailers and some consumers. It is important to consider the literacy levels of the respondents and command of the selected language so that accurate information is collected (Welman & Kruger, 2001). English was used for interviewing all respondents that understood the language. These included all government officers and the majority of consumers. The forestry officers administered the questionnaires themselves and completed questionnaires were collected afterwards. At collection, the questionnaires were checked for clarity and amends made if necessary.

Research assistants with a minimum of secondary education certificate and fluent in the local languages helped during the study to capture data from the *Uapaca kirkiana* fruit collectors, retailers and end consumers in Ndola District. The research assistants were trained/guided for two days in administering field research questionnaires. The training received was on the purpose, importance and content of the study, understanding the design, administering/protocol and practical pre-testing of the questionnaires. For data collection in Chipata District, two experienced research assistants from ICRAF were involved.

3.6 Validity and Reliability of Results

Neuman (2000) states that validity refers to whether an indicator used is measuring what it is meant to measure or, according to Babbie and Mouton (2001), the extent to which a specific measurement provides data that relates to commonly accepted meanings of a particular concept under consideration. The validity of result depends on, among other factors, the methods used to capture the data and how the respondents perceive the situation and the purpose of the study. Many authors such as Aaker *et al.*, (2001), Babbie (1978a), Babbie (1978b), Kotler (1994) and

Philips (1973) state that questionnaires, just like PRA techniques (Colfer & Byron, 2001) have been used to capture valid data in marketing and similar studies.

Correct data capture can be constrained by a number of factors including the fact that respondents may choose to impress the interviewer or misinterpret the study purpose and in the process not tell the truth. The perception of interviewers can also misrepresent facts. Therefore, reliability is paramount in obtaining correctly represented data. According to Babbie and Mouton (2001), reliability is the likelihood that a given measurement procedure will yield the same description of the given phenomenon if the measurement is repeated. For this study, ensuring the reliability of research results included: the selection of two study sites, use of local research assistants and vernacular, pre-testing and redesigning of the questionnaires before the main study.

In addition, PRA was also used to triangulate or cross check data. According to Molnar (1989), triangulation is the gathering of information about a particular topic from a variety of different sources and using a variety of methods. According Bryman (n.d), it refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings. Bryman (n.d) further argues that the use of a single research method especially in social research has limitations, and triangulation offers the prospect of enhanced confidence (Bryman, n.d).

Aside from this, the PRA events are essential in gaining support among the target respondents considering that most of the information collected is opinion and perspectives/perceptions. This ensured collection of credible and genuine data. A combination of both random and stratified methods and use of standard data analysis tools such as the Statistical Package for Social Sciences (SPSS), Microsoft Excel and Statistica helped ensure the reliability of the results as well.

3.7 Data Analysis and Models Used

3.7.1 Data analysis process and software packages

Analysis involved the process of arranging raw data into computer readable form for statistical analysis (coding), checking for mistakes and entering data into the computer. Data was coded to obtain a limited set of attributes for a variable composition (Babbie & Mouton, 2001). As a coding process, a list of responses was made, groups identified, and numbers assigned to these groups to facilitate statistical interpretation of data. However, some data were not coded but used

descriptively only. The data was analysed using SPSS 11.0 for Windows², Microsoft Excel and Statistica 7.0³.

3.7.2 Data analysis models

In the cases requiring specific results, models were used to analyse data. The two models outlined below are market shares model and marketing margins model. According to Scott (1995), these models have been used successfully in market studies.

a) Market shares model

MODEL 3.1: Market shares of collector traders

$$MS_i = \frac{V_i}{\Sigma V_i}$$

Where:

MS_i = market share of actor i ; MS_i is estimated using Scott's model, Step 6 below,

V_i = quantity (kg) of *Uapaca kirkiana* handled by actor i ; V_i is calculated based on Steps 1 to 4 below,

ΣV_i = total quantity (kg) *Uapaca kirkiana* handled; ΣV_i is calculated as in Step 5 below.

(Source: Scott, 1995)

Model 3.1 above is used to estimate the retailers' market shares during the entire season of approximately two months. The six steps used in Model 3.1 to estimate the share quantities are:

1. The daily trade quantity is estimated based on the number of unit measures sold by each collector per day, as data captured during the interviews,
2. The weekly trade quantity is calculated. From the daily estimates, the weekly trade volume is estimated by multiplying the daily quantities by the number of days in a week, thus seven.
3. The monthly estimates are calculated following on the weekly estimated quantities.
4. The total mass of the fruits traded by each collector is calculated based on the estimated weights of each unit measure.
5. The total mass for all the collectors sampled is calculated by summing the individual traders' values.
6. Compute the market shares using Model 3.1

² www.spss.com

³ www.statsoft.com

b) Marketing margins model

Model 3.2 below is used to calculate marketing margins for trade in *Uapaca kirkiana*.

MODEL 3.2: Calculating marketing margins for trade in *Uapaca kirkiana*

- $GMM = \text{Consumer price} - \text{collector price}$
Where: $GMM = \text{Gross marketing margin};$
- $TGMM_{cdc} = ((\text{Consumer price} - \text{Collector price}) / \text{Consumer price}) * 100,$
Where:
 $TGMM = \text{Total gross marketing margin}$
 $cdc = \text{complete distribution channel}$
- $GMM_p = 100\% - TGMM\%,$ $p = \text{producer or collector}$

(Source: Scott, 1995)

3.8 Conclusion

The research and data analysis models used guided the current research work. Data collection was done based on the outline of the SCP model of market analysis which comprises basic market conditions of supply and demand, the market structure, conduct and performance. Further, the data was collected with the elements of the analysis models selected. These methods enabled the researcher to gather qualitative and quantitative data about the *Uapaca* value chain. Results from the study are presented in the next three chapters.

Chapter Four:

Results on Demand and Supply

Chapter Four is the first of three chapters dealing with the results of the study. The others are Chapter Five: Market Conduct, Structure and Performance and Chapter Six: Institutional Arrangements. This chapter presents data on the demand and supply of *Uapaca* as captured during the PRA and market surveys. Data presentation is according to major themes starting with demand followed by supply. Data on the demand for the *Uapaca kirkiana* fruit is preceded by the household size, gender, age and education demographics of the respondents involved in the study. The key data includes the marketing factors that influenced both the consumer behaviour and the general demand especially the preferences and purpose for consuming the fruits. Data on the fruit sources and procurement environment, post harvest issues that comprise storage, transportation and trade constraints are covered in the presentation of the supply of the fruit.

4.1 Respondent Demographics

4.1.1 Sex and gender

About fifty five percent (55.1%) of the collectors (n=49) are females. The majority (72.1%) of these collectors (n=43) are married. At retail level, females constituted 91.4% and 57% of them of these retailers are married. The majority (52%) of consumers are also female (n=189). The average consumer household consists of five persons. The majority (66.7%) of the consumer respondents are married.

4.1.2 Age and education

a) Collectors: The mean age for all collectors was 34 years (Figure 4.1). The majority (60%) of collectors have attained primary education only. No collector has tertiary education (See Figure 4.2). However, even though children are not reflected in the data figures below, they were observed carrying fruits to the selling or market places/points.

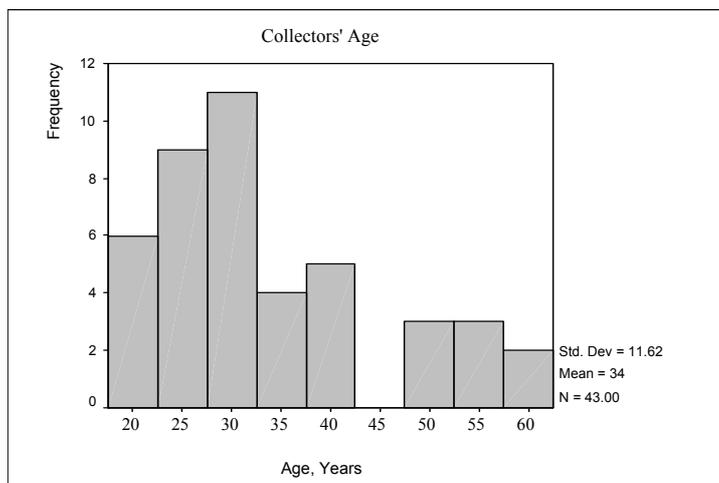


FIGURE 4.1 Age of collectors

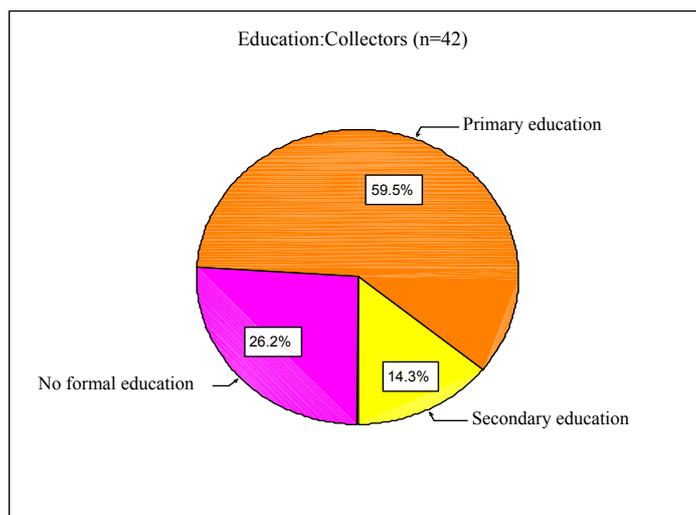


FIGURE 4.2 Education level of collectors

b) **Retailers:** The mean age for the retailers is 40 years (Figure 4.3). The majority of the retailers have attained primary education, while only 2% have reached tertiary education standard (Figure 4.4). Children as young as seven to ten years were observed selling fruits especially at vending points.

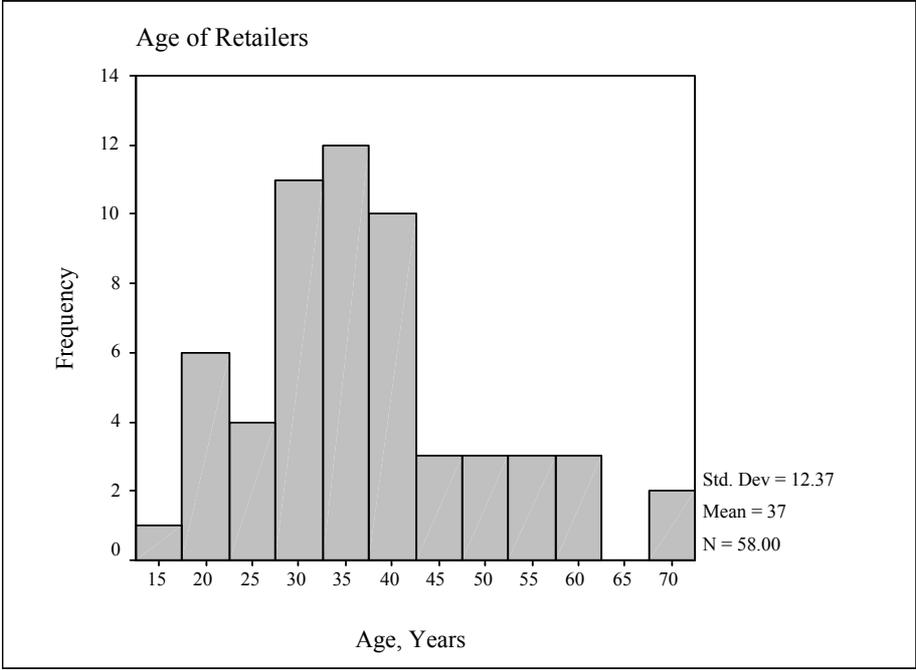


FIGURE 4.3 Age of retailers

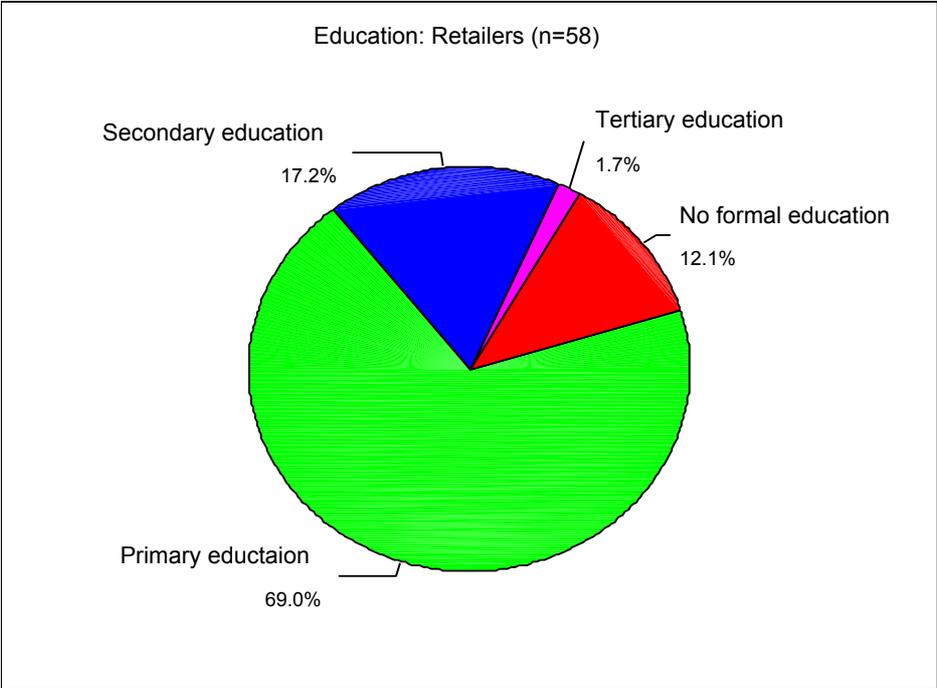


FIGURE 4.4 Education level of Retailers

c) Consumers

The mean age for the consumers of *Uapaca kirkiana* fruit is 33 years. Age distribution range between 15 and 71 years (Figure 4.5). The educational level ranges from no formal (2.7%) through primary (32.4%) and secondary (48.9%) school to tertiary education (16.0%).

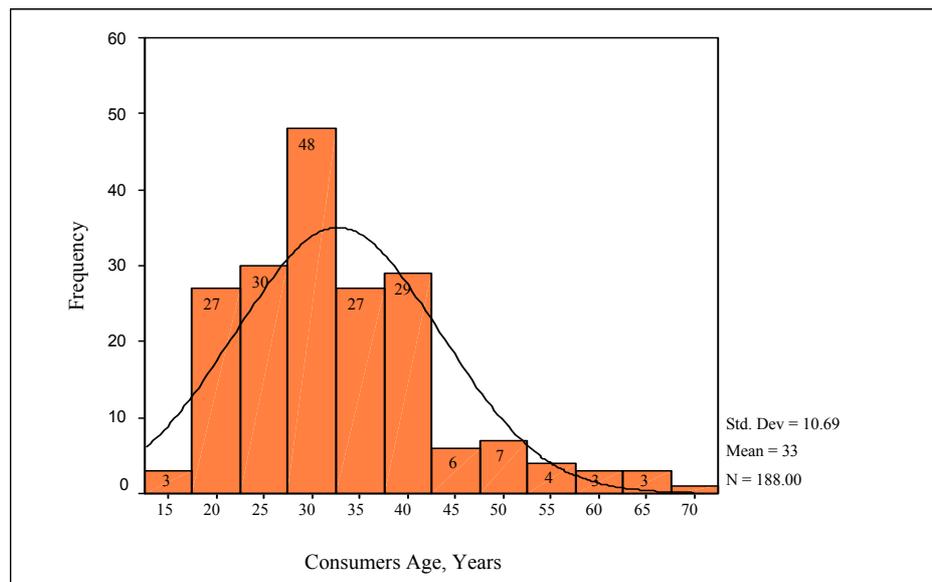


FIGURE 4.5 Age of consumers

d) Government forestry officers

The sample of government forestry officers comprised of 90% males and 10% females (n=20). Their work experience ranges from two to 24 years with a mean of 14 years. The work specialisation of the officers is extension (70%), research (5%) and management (25%). These officers work from the district (50%) and provincial (15%) offices as well as Forestry Department headquarters (35%). The educational levels are college certificate (40%), diploma (30%) and university graduates (30%).

4.1.3 Household size and time of trading

The average household size for collectors is 5 persons (Figure 4.6), while the household membership among retailers is 6 persons (Figure 4.7).

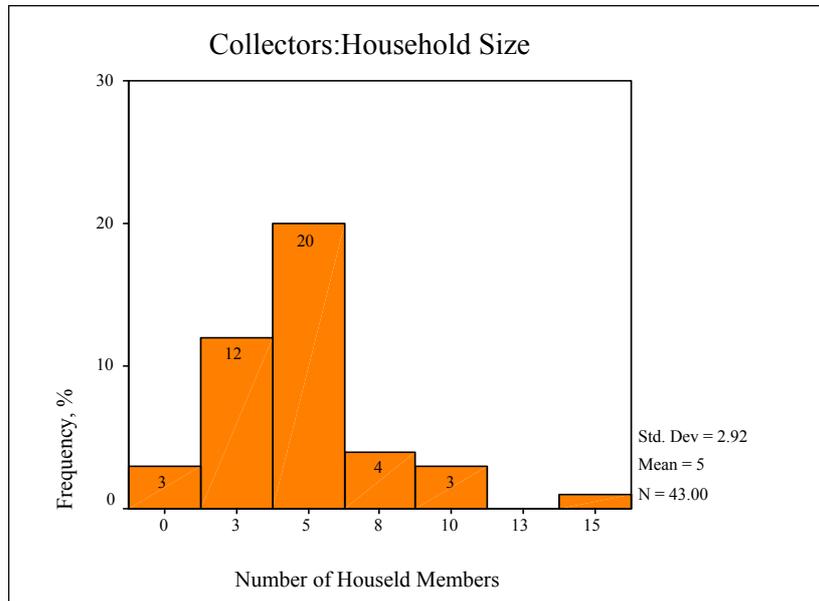


FIGURE 4.6 Household size for retailers

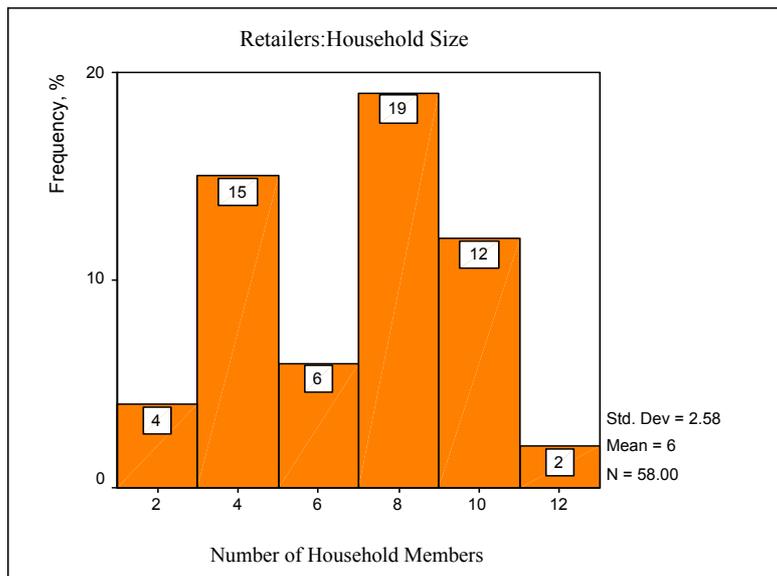


FIGURE 4.7 Household size for collectors

The average time period that retailers have been in trading *Uapaca kirkiana* fruit is 10 years, with a maximum of 55 years (Figure 4.8). The average period that collectors have been in business is seven years with a maximum of 32 years (Figure 4.9).

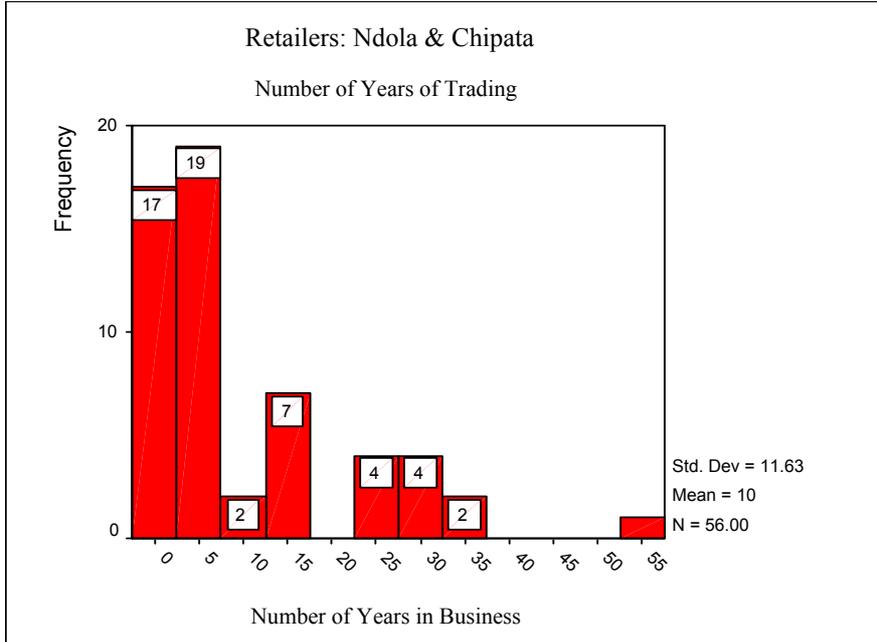


FIGURE 4.8 Number of years in trading (Retailers)

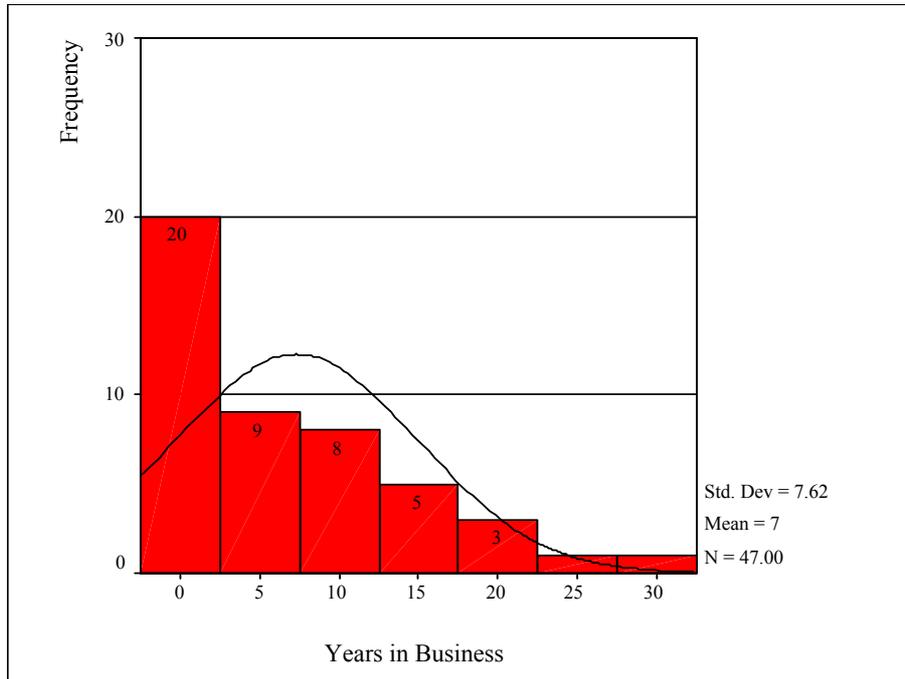


FIGURE 4.9 Number of years in trading (Collectors)

4.2 Demand for *Uapaca kirkiana* Fruit

4.2.1 Consumer behaviour and attitude

a) Preferences of fruit consumers

A number of different types of IFTs are traded and consumed in both Chipata and Ndola districts. At least 11 wild IFTs are consumed in the districts. Table 4.1 shows the consumers' ranking of the IFT species they consume. Of all the IFT types mentioned by the respondents in the two districts, *Uapaca kirkiana* is the most commonly consumed.

TABLE 4.1 Ranking of preferred indigenous fruit trees for consumption

Name of Fruit		Rank			
		Mean Score ⁴		Position based on Mean Score/Rank	
Scientific	Local	Chipata	Ndola	Chipata	Ndola
<i>Uapaca kirkiana</i>	Masuku	3.26	2.71	1	1
<i>Anisophyllea boehmii</i>	Nfungo	3.75	3.38	2	2
<i>Strychnos pungens</i>	Tugome	-	3.60		3
<i>Parinari curatellifolia</i>	Mpundu	4.50	3.62	7	4
<i>Syzygium guineense</i>	Masafwa	3.00	4.12	3	6
<i>Strychnos cocculoides</i>	Tusongole	4.00	4.06	4	5
<i>Azanza garkiana</i>	Makole	4.33	4.17	6	7
<i>Landolphia kirki</i>	Mabungo	-	4.30		8
<i>Flacourtia indica</i>	Ntuza	4.32	-	5	
<i>Garcinia huillensis</i>	Nsogwa	-	4.50		9
<i>Ziziphus mauritiana</i>	Masau	5.00	5.0	8	10

⁴ Mean score calculation was by adding the individual rankings by respondents and dividing by the total number of respondents. This means therefore, that the lower the mean the more popular the fruit is, and hence a fruit positioned as 1 is more popular than one positioned 2 or three in ranking.

The consumers ranked *Uapaca kirkiana* first among the IFTs with an overall mean ranking/score of 2.71 and 3.26 for Ndola and Chipata districts respectively. It is followed by *Anisophyllea boehmii*, *Strychnos pungens* and *Parinari curatellifolia* (in the case of Ndola) or *Syzygium guineense* (in Chipata). In both districts *Uapaca* ranks higher than *Anisophyllea*.

During a PRA session in Chipata, the following fruits were identified as being consumed in order of ranking: *Uapaca kirkiana*, *Parinari curatellifolia* (Mpundu), *Flacourtia indica* (Nthuzza) *Strychnos spinosa* (Kasokolowe) *Strychnos cocculoides* (Zimbili) *Syzygium* spp. (Masafwa), *Diospyros mespiliformis* (Chenja) and *Azanza garckeana* (Mkuyandola). The participants said they liked eating *Uapaca* because it was sweet and had plenty of pulp. It is also easy to collect. When ripe the fruits drop easily. *Parinari* is liked for giving energy (*Kukuta*) and easy processing into other forms. Similarly *Flacourtia* is consumed for energy provision and sweetness. In addition it has market demand and generates income.

Mango (*Mangifera indica*, a naturalised exotic fruit) is more popular than *Uapaca kirkiana*. It is ranked first with a mean rank of 2.11. Based on these rankings, it seems that consumers buy Mango and *Uapaca kirkiana* fruits for similar purposes. Therefore, Mango might be considered a competing fruit to *Uapaca*. For example, the retailers observed that they can sell exotic and IFT and still be able to satisfy the market. They mentioned the following fruits as the other potential close substitutes for *Uapaca kirkiana*: *Anisophyllea boehmii*, *Strychnos cocculoides* and *Landolphia kirkii*.

b) Reasons for consuming the fruit

The reason for consuming fruit is generally the same for the two study sites as revealed during the market survey. In both sites, sweetness and nutritional value (vitamins) are the most popular reasons. Figure 4.10 presents the reasons why respondents like to consume *Uapaca kirkiana* fruit. Overall, the fruit is eaten because of sweetness (38%), vitamins (23%), snack value (18%), hunger satisfaction (16%), leisure/habit (3%) and thirst quenching (2%)⁵. In Ndola reasons for consumption include sweetness (44%), vitamins (22%), satisfying hunger (20%), snack (6%), leisure (5%) and quenching thirst (3%) is the order by percentage of responses. For Chipata, the chief purposes for consuming the fruit are snack value (40%), sweetness (27%), vitamins (24%) and satisfying hunger (9%). The consumers in Chipata did not mention leisure and quenching thirst as reasons for consuming the fruit.

⁵ *Kusiliza njota* in Njanja (a vernacular in Eastern Province)

Whereas sweetness is most important for consumers in Ndola, eating the fruit as a snack is more important than sweetness among the consumers in Chipata. However, sweetness is more important than vitamins for both districts.

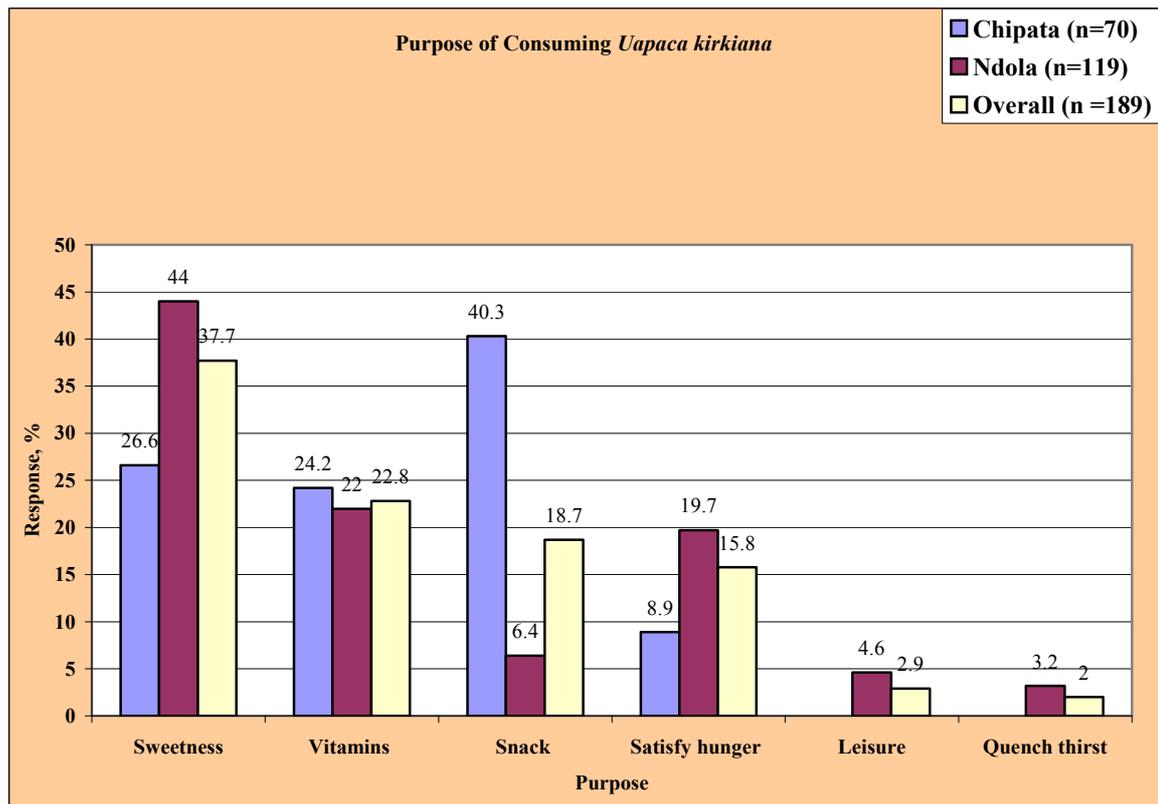


FIGURE 4.10 Purpose of consuming *Uapaca kirkiana* fruits

c) Fresh versus processed fruit

Based on PRA discussions, there is generally no processing of the *Uapaca kirkiana* fruit in both Ndola and Chipata. The fruit is consumed both in raw and processed form. Nearly all the consumers (97.4%) consume the fruit fresh, while only 2% indicated that they also process the fruit. When consumers are asked in which of the two forms they would want to consume the fruit, the majority (56%) prefer raw to processed fruit (Figure 4.11).

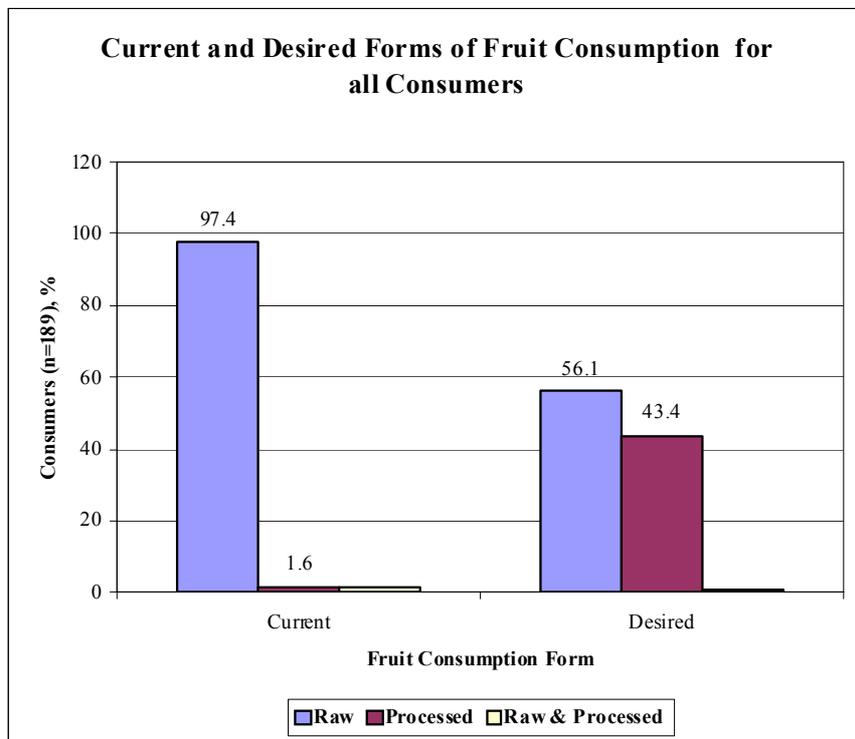


FIGURE 4.11 Consumers' current and desired forms of eating *Uapaca kirkiana*

At study site level, the current scenario shows that there is more consumption of fresh fruit than processed for both districts, with Chipata exhibiting a very clear preference for fresh fruit.

The data show different consumer consumption desires for the sites (Table 4.2). The Ndola consumers would like to have more processed products than fresh fruits (66.4% versus 32.8%). It is vice versa for the Chipata consumers who prefer fresh to processed (i.e. 95.7% for raw versus 4.3% for processed fruit).

TABLE 4.2 Current and desired consumption forms by district

District (n=189)	Consumption				
	Scenario	Form			
		Raw	Processed	Raw & Processed	Total, %
Ndola	Current	97.5	0.8	1.7	100
	Desired	32.8	66.4	0.8	100
Chipata	Current	97.1	2.9	-	100
	Desired	95.7	4.3	-	100

Some respondents want processed fruit for reasons of health, food security, value addition and having better products than the raw fruit on the market. The desired processed products for consumers are presented in Table 4.3. A segment of the consumer market is knowledgeable about the benefits of processing the *Uapaca kirkiana* fruit into other products such as jam, alcoholic and non-alcoholic products. Jam is the most preferred with 53% of respondents indicating it as such. Non-alcoholic drinks (30%), wine (11%) and porridge (6%) are the other preferences.

TABLE 4.3 Consumers' desired processed Products from *Uapaca kirkiana*

Desired products	Responses, % (n=37)
Jam/Butter/Syrup	53.2
Drink: soft/juice	29.8
Wine	10.6
Porridge	6.4
Total	100

4.2.2 Factors that influence *Uapaca kirkiana* consumer behaviour

Table 4.4 shows the eleven attributes of fruit and marketing environment the consumers consider when making decisions to purchase fruit. Of the three attributes that consumers value most i.e. taste, appearance and cleanliness, the most strongly considered is taste. About 90% of consumers in Chipata and 62% in Ndola mentioned taste as the strongest factor considered. Appearance is

considered strongly by 66% of consumers in Ndola and 42% of the consumers in Chipata. The third factor is cleanliness that is strongly considered by 62% of consumers in Chipata and 42% of the consumers in Ndola.

TABLE 4.4 Comparison of the factors considered by consumers when buying *Uapaca kirkiana* fruits

Factor	Respondents, %							
	SCd [♠]		Cd		NCd		NA	
	Chipata	Ndola	Chipata	Ndola	Chipata	Ndola	Chipata	Ndola
Taste of fruit	89.6	61.7	9.0	35.5	1.5	2.8		
Appearance of fruit	42.0	66.1	55.1	31.3	2.9	0.9		1.8
Cleanliness of fruit	41.5	61.7	56.9	33.0	1.5	4.3		0.9
Selling site	28.4	44.4	47.8	39.4	23.9	16.2		
Maturity of fruit	21.7	42.0	53.3	40.0	25.0	12.0		6.0
Price of fruit	14.1	15.8	34.4	38.6	51.6	43.6		
Packing of fruit	9.5	17.7	22.2	33.3	68.3	46.9		2.1
Source of fruit	3.2	4.4	4.8	10.0	91.9	82.2		3.3
Size of fruit	100	66.7		33.3				
No Pests	100	100						
Cleanliness of seller		100						

Code: 1.SCd: Strongly considered; 2. Cd: Considered; 3. NCd: Not Considered; 4. NA: No Answer.

(♠ The columns indicate the % of respondents that considered the concerned factor in the given district).

The other factors strongly considered by the buyers of the fruits are:

- Selling site with 28% in Chipata and 44% in Ndola,
- No pest with 100% in both Chipata and Ndola,
- Maturity of fruits with 42% in Ndola and 23% in Chipata,
- Price of fruits with 16% in Ndola and 14% in Chipata,
- Size of fruit with 100% in Chipata and 67% in Ndola,
- Packaging of fruits with 18% in Ndola and 10% in Chipata,
- Source of fruits with 4% in Ndola and 3% in Chipata.

Figure 4.12 illustrates the factors observed by retailers that promote the sale of fruit to consumers. Among the 14 factors mentioned, the commonest three are appearance of the fruits (26%), fruit cleanliness (16%) and selling site cleanliness (14%). The least common promotional factors with the same percentage number of respondents of about 2% are freshness, giving extras, customer care, grading and ease of communication with consumers. The rest of the promotional factors are taste (7%), maturity (7%), packaging (7%), size (5%) and quantity (3%) of fruits. About 5% of retailers had no clear indication of promotional factors.

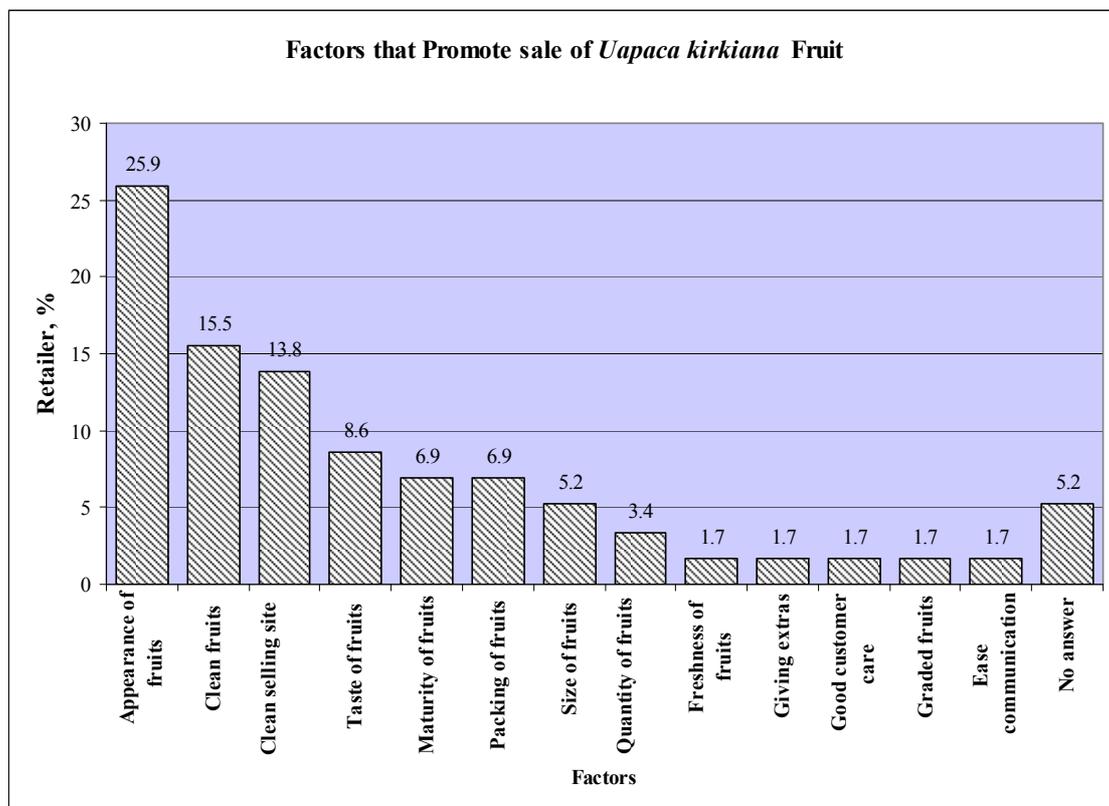


FIGURE 4.12 Factors promoting sale of *Uapaca kirkiana* fruit in Chipata and Ndola

4.2.3 Factors affecting the demand for *Uapaca kirkiana* fruit

The consumers of *Uapaca kirkiana* fruit in the two study districts experience a number of problems (see Figure 4.13) such as seed causing sores (36%), the fruit having different tastes (12%), spoilage of fruits (11%), stomach pains after eating the fruit (8%), non-availability of the fruits (5%), short shelf life of the fruits (4%), unhygienic trading environment (3%), difficult to eat the fruit (3%), the fruit not satisfying hunger (2%) and high fruit prices (1%). Less common

problems were fruit causing appetite loss (0.8%), no fruit grading (0.8%), bad fruit smells (0.4%) inconsistent supply of fruits (0.5%), raw fruit being the only consumption form available on market (0.4%) and fruit contains too many seeds (0.5%). Only about 12% of respondents said they did not face any constraints as consumers of the fruits.

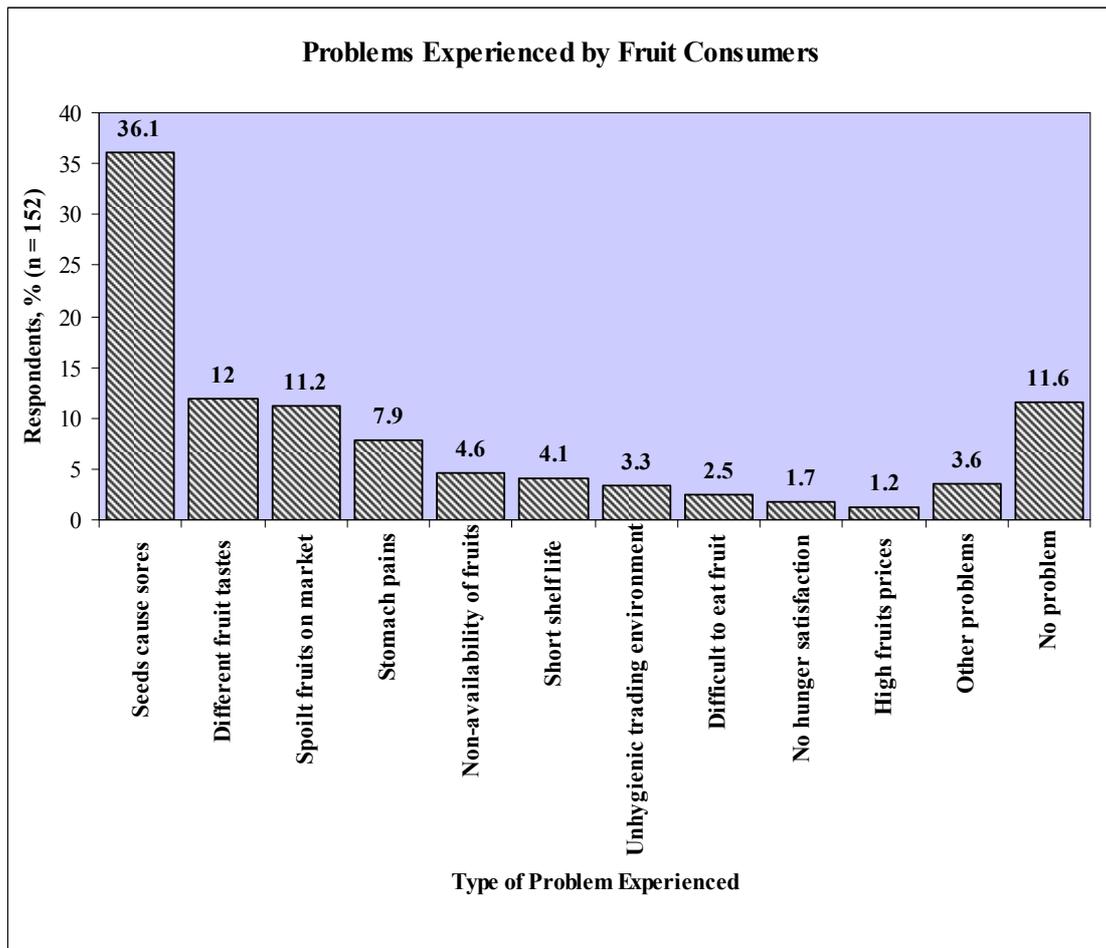


FIGURE 4.13 Problems experienced by the consumers of *Uapaca kirkiana* fruits

Table 4.5 shows the aforementioned problems but as they are experienced at district level. In Chipata, 38% of consumers indicated that they had not experienced problems while in Ndola only 4% said the same. In Ndola the three commonest problems mentioned are sores in mouth (43%), fruit spoilage (12%) and different fruit taste (11%). The other constraints are stomach pains (8%),

short shelf life (5%), unhygienic trading environment (4%) and the fruit being difficult to eat (3%). In Chipata fruit taste (16%), sores in mouth (13%), pains (9%) and non-availability of fruits (9%) were the four most commonly mentioned problems. The other problems experienced in Ndola are fruit spoilage (7%), lack of hunger satisfaction (4%), short shelf life (2%) loss of appetite (2%) and unhygienic trading environment (2%). There are fewer problems mentioned in Chipata than in Ndola. However, the general order of importance by percentage is the same for the two sites.

TABLE 4.5 Problems experienced by consumers by district

Problem	Response, % (n=152)	
	Chipata (n=35)	Ndola (n=118)
Seeds cause sores	12.5	43.2
Different fruit taste	16.1	10.8
Fruit spoilage	7.1	12.4
Stomach pains	8.9	7.6
Non-availability of fruits	8.9	3.2
Short shelf life	1.8	4.9
Unhygienic trading environment	1.8	3.8
No hunger satisfaction	3.6	1.1
Difficult to eat fruit	-	3.2
Loss of appetite	1.8	0.5
High fruit prices	-	1.6
Inconsistent fruit supply	-	0.5
No grading of fruits	-	1.1
Only consumption form known	-	1.1
Fruit smells	-	0.5
Many seeds in fruit	-	0.5
No problem	37.5	3.8
Total	100	100

Related to the general problems consumers face with the fruit is the preferred form in which the fruit should be marketed. Table 4.6 shows the desired marketing forms for the overall study. The commonest preference is having fruits packed (36%) and the least important is the use of unit measures (1%) such as cups and plates. The other forms desired are unpacked (23%), selling in heaps/loose (17%), sorted fruits (13%), and graded fruits (10%).

TABLE 4.6 Form in which the consumers prefer the fruits sold to them

Sell form Preferred by buyers	Responses, % (n = 162)
Packed	35.9
Unpacked	23.1
Heaps/ Loose	16.9
Sorted in Sizes	13.3
Graded	10.0
Use Unit Measures: Cups / Plates	0.8
Total	100

At the individual study site level, a higher percentage of consumers in Chipata than in Ndola prefer packed (52.7%), unpacked (50.6%), sorted (53.3%) and heaps/loose (62.6%). There is more concern for grading (54.5%) and use of unit measures (66.4%) among consumers in Ndola than in Chipata.

4.3 Supply of *Uapaca kirkiana* Fruit

4.3.1 Sources and regularity of fruit supply

Collectors. According to the PRA sessions and the market surveys, the fruits were collected from Malawi and Congo in addition to Zambia. The collectors indicated that the fruit was adequate and obtained from government forests (44.8%), communal areas (12.1%) and private woodlands (43.1%) (Table 4.7). The private sources of the fruit comprise company and individual farm areas, while open woodlands and agricultural farmlands characterise communal sources.

TABLE 4.7 Geographical fruit collection areas in the study districts

Source of Fruits	Response, %		
	Overall (n=58)	Ndola	Chipata
Communal areas	12.1	8.3	30.0
Private woodlands	43.1	52.1	-
Government forest estate	44.8	39.6	70.0
Total	100	100	100

Generally, the fruit sources are the same for both Chipata and Ndola districts. In Ndola the collection sources are more from private woodlands (52%) and least from communal areas (8%), whereas for Chipata the only sources are communal (30%) and (70%).

The transect/observational walks and mobility maps/flow diagrams constructed during group discussions revealed a great deal about the trade flows for the fruit. The diagrams made it clear that the fruits are acquired from within the community areas, from other districts, provinces and countries. The study districts share international boundaries with Malawi and Congo. In Chipata the fruits are sourced from Chief Mpezeni area and Kapezi area in Malawi. For Ndola the fruit are collected from Chief Mushili's and Chief Chiwala's area, Luanshya, Mufulira and Kitwe districts as well as the Democratic Republic of Congo. In Ndola District, the state forests where the fruits are collected from by Mutapa community members are Lumina, Ngala and Kasaria. The community members interviewed stated that although they did not own the forest estates, they were allowed to collect *Uapaca kirkiana* fruits and other NTFP without any legal restraint.

The provinces that supply Lusaka District are Lusaka (Chongwe District), Central (Kabwe and Kapiri Mposhi districts), Copperbelt (Ndola District) and Southern (Choma, Batoka and Pemba districts). The Ndola district is the farthest of these districts, at more than 324 kilometres away from Lusaka City.

The PRA group discussions revealed that fruit collection for trading is done from October to early February with a peak in November/December (Figure 4.14). The children start collection earlier in the season than adults. During the market survey the majority (81.3%) of collectors said they

have enough fruit from the various sources throughout the trading season. According to the survey, most collectors are active in fruit trade for an average of 3 months in a season.

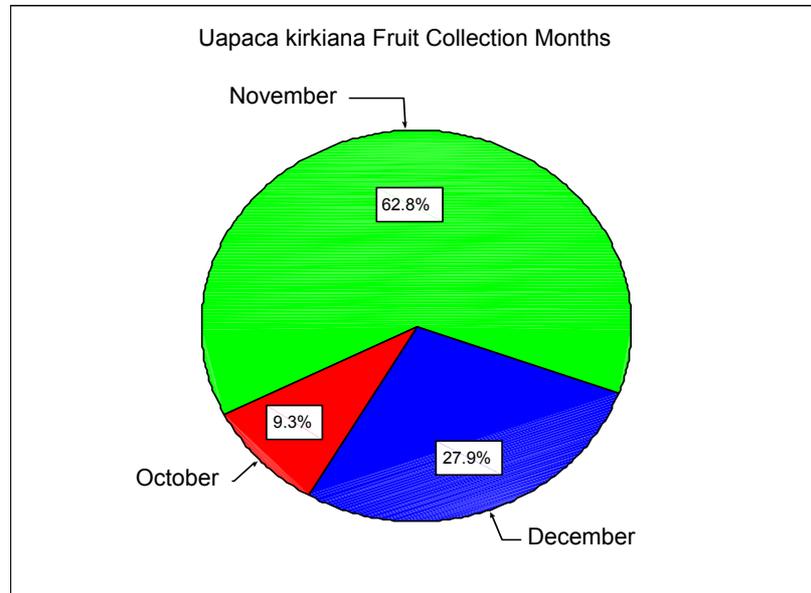


FIGURE 4.14 Collection/trading months for the *Uapaca kirkiana* fruit

However, some collectors do not collect throughout the season (Table 4.8). The reasons for not doing so are that the collectors are involved in other businesses (60.0%), trading in the *Uapaca kirkiana* fruit is a part-time business only (13.3%), the hard labour involved (13.3%) and participation only during the peak period (13.3%). Traders also lack or have limited means of transportation. Agricultural activities and selling other merchandise are the most commonly mentioned businesses that constrain the involvement of collectors in the fruit trade.

TABLE 4.8 Reasons for not trading in *Uapaca kirkiana* in the season

Reason	Response (n=34), %
Doing other businesses	60.1
Trade as part-time business only	13.3
Labour intensive business	13.3
Participate in peak period only	13.3
Total	100

Retailers. The survey results in Table 4.9 show that at retail level, the fruit are acquired mostly from collectors (95%) through purchase and barter system (2%), direct collection from communal (2%) and private (2%) areas including farmlands (see Table 4.7). There is internal trading within some communities. Some collector-retailers in the villages also obtained fruit by buying from fellow community members.

TABLE 4.9 Source of fruits for retailers

Source of Fruits	Response (n=56), %
Collectors: purchase	94.8
Collectors: barter	1.7
Communal areas	1.7
Private areas	1.7
Total	100

The supply linkages between collectors and retailers involve both regular and non-regular supply. For retailers in Ndola (n=19), 78.9% said they did not have regular supplies of fruit while 21.1% said they had regular suppliers of fruits. The retailers make arrangements with regular suppliers to obtain good (e.g. clean and undamaged) fruit. In Chipata, retailers use regular suppliers to obtain good fruit at lower prices than the usual ones. Nevertheless, the study showed that the regular-supplier arrangement is not always favoured. In Ndola this is not done because of price differences, fruit availability and irregular supply of fruits. In Chipata, wanting to have an independent purchasing choice was the reason for not supporting regular suppliers.

The PRA meetings revealed that the majority of the retailers are active in fruit trade throughout the season from October to early February with concentration in November/December. The survey further revealed that 68% of the retailers start trading in November, 29% in October and 4% in December (Figure 4.15). On average, the retailers are active for 2.4 months in the season.

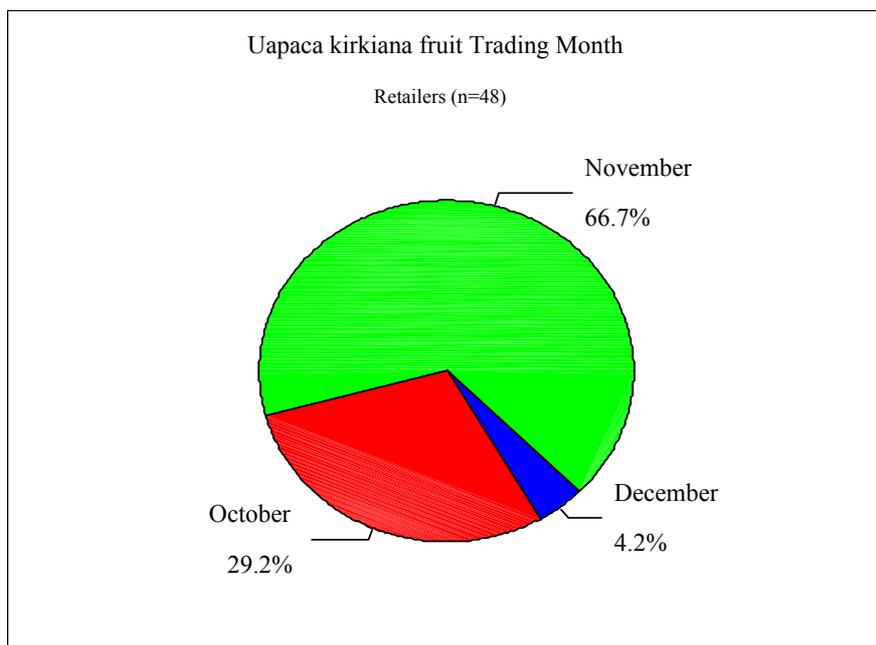


FIGURE 4.15 Trading/Collection months for the *Uapaca kirkiana* fruit

A large number of retailers have been involved in the seasonal fruit trade for many years. The average number of years in *Uapaca kirkiana* fruit trading is 10 for the two study districts. The involvement in business ranges from one to 55 years with a median of 5 years. The number of years in business is almost the same for the two districts. Traders in Ndola have a mean of 10.4 years while their counterparts in Chipata have a mean of 9.5 years in the *Uapaca kirkiana* fruit marketing business.

4.3.2 Fruit storage and loss

Collectors. The survey revealed that 50% of the collectors store their fruits after procurement. Table 4.10 shows that the fruits are stored in houses (82%), in open places (9.1%) and underground (9%). The storage methods are in sacks (20%), loose on the ground (16%) and in other containers (64%), which include baskets and tubs.

TABLE 4.10 Fruit storage places and methods at collector stage

Responses, %					
Storage Place			Storage Method		
Houses	Market buildings	Underground	Loose on ground	Sacks	Other Containers
81.8	9.1	9.1	16	20	64

During storage, some of the fruits are lost. Figure 4.16 shows the causes of loss of the fruit during storage. Fruits are lost through rotting (41%), breaking (29%) loss of sweet taste (change to sour taste) (12%), hardening of pulp (6%), failure to ripe (6%) and change of colour (6%) especially during keeping the fruit for ripening (known as *Kufumbika* in Bemba/Lamba vernacular). According to the participants in the PRA group discussions in both Ndola and Chipata, some traders harvest the fruits just before they ripen fully. They do this so that the fruits ripen within three to four days after *kufumbika*. However, this would depend on the state of maturity at the time of collection for storage.

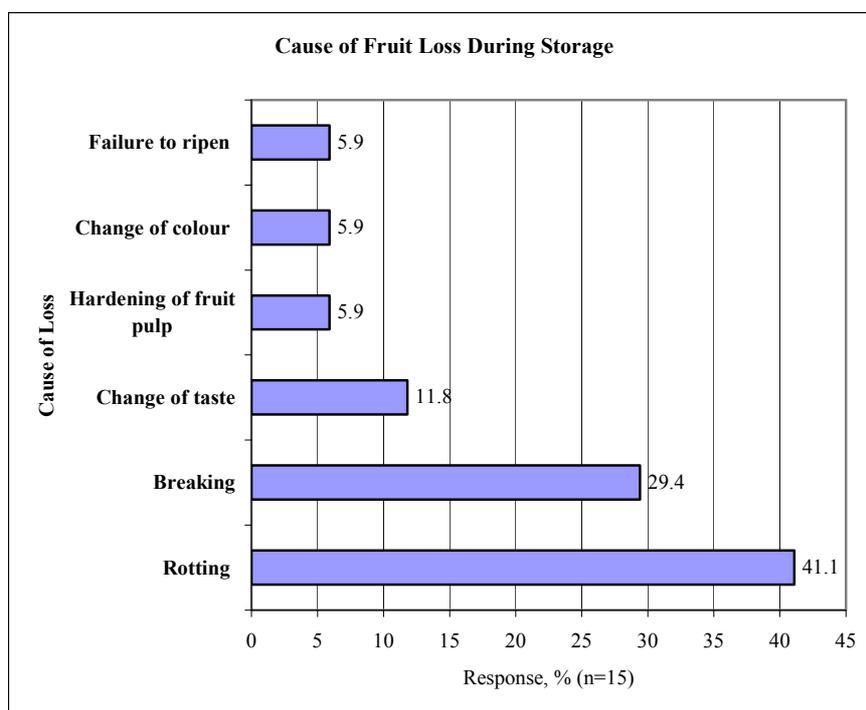


FIGURE 4.16 Causes of fruit loss during storage at collection stage

The fruit is also lost through other ways. From the survey (see Table 4.11) it was learnt that about 80.0% of collectors experience loss of fruits through damage from handling (82.9%), rotting (11.4%), heat (2.9%), and type of containers used (2.8%). For example, the use of sacks causes more loss of fruit than using baskets. In the group discussions, the participants said that there were more fruits lost through breaking when using public transport/vehicles than other means such as carrying on their heads.

TABLE 4.11 Cause of loss of fruit other than during storage at collection

Cause of Loss of	Respondents, % (n =35)
Breaking through handling	82.9
Rotting	11.4
Heat	2.9
Type of container used	2.8
Total	100

Retailers. Analysis of the survey results shows that 32% of retailers store their fruit at purchase or collection. Table 4.12 shows the storage places and methods. The storage is in houses (26.3%) and market buildings (73.7%). Storage methods comprise putting in containers (94.4%) and loose (5.6%) on the ground, floor or mat.

TABLE 4.12 Fruit storage places and methods by retailers

Responses, %			
Storage Place (n=19)		Storage Method (n=18)	
Houses	Market buildings	Containers	Loose on ground
26.3	73.7	94.4	5.6

The survey results show that on average the fruit took about 1.5 days before they are completely sold. Based on retailers' responses during the survey, it took 3.3 days for the fruit to be spoilt during trading.

The survey indicated that rotting (60%), breaking (33.3%) and being stolen (6.7%) especially when stored in market areas caused loss of the fruit during storage at the retail stage (see Figure 4.17). The survey also revealed that other important causes of fruit loss that retailers incur are damage (24%) and rotting (29%).

In Chipata, the PRA sessions highlighted that the *Uapaca kirkiana* fruit gets stolen from the trees in the agricultural fields before they are fully ripe. The collectors that steal the fruits keep them until full ripe before selling them.

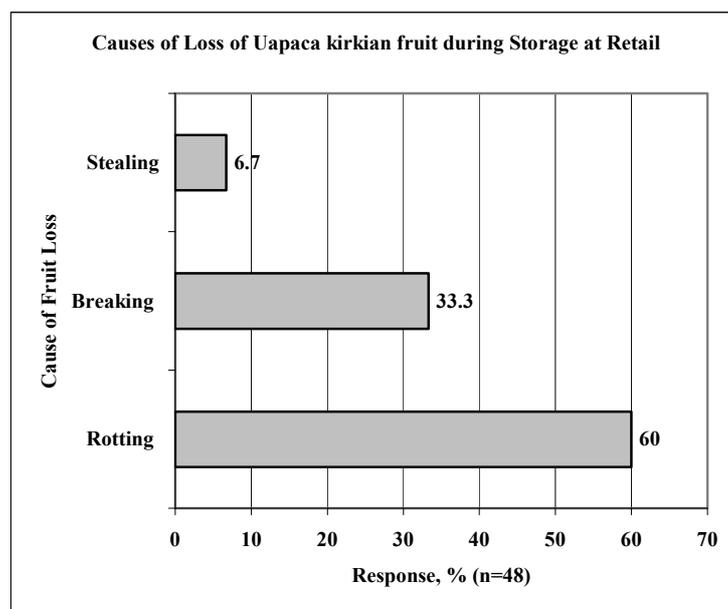


FIGURE 4.17 Causes of fruit loss during storage at retailing stage

4.3.3 Fruit procurement factors

Collectors. Table 4.13 illustrates that collectors consider mainly five factors at collection in the ranking order of means: appearance (1.53), maturity (1.8), taste (1.8), size (2.1) and sorting (2.7) of fruit. The results show that appearance is the most important factor. Sorting of fruits in this case refers to deciding, at the collection time in the forest / fields, on whether the fruits were of saleable quality or not.

TABLE 4.13 Ranking of fruit and other characteristics considered at collection in Chipata and Ndola districts, Zambia

Fruit and other Parameter	Collectors, n	Mean Rank
Appearance	40	1.53 ±0.72
Maturity	18	1.8 ±0.94
Taste	25	1.76 ±0.66
Size	25	2.12 ±0.73
Sorting	3	2.67 ±0.58

Retailers. As Table 4.14 shows, the study indicates that procurement of fruits at retail stage is done with six factors in mind. For Chipata, appearance (3) is the most important aspect followed by the other five factors in order of ranking, i.e. using the means: taste (3.5), price (3.8), ripeness (6), clean selling site (6.1) and size of the fruit (7). For Ndola, the order is appearance (2.5), taste (3.9), price (3.8), ripeness (5), clean selling site (5.2) and size of the fruit (5.3). The order of importance of the factors that are considered is the same for the two districts. There is no significant difference except for the size of the fruit.

TABLE 4.14 Fruit procurement factors at district level

Factor	Parameters		p-value	Conclusion
	Weighted Means Rank			
	Chipata	Ndola		
Appearance	3.00	2.54	0.45	ns
Taste	3.48	3.92	0.49	ns
Price	3.67	4.60	0.19	ns
Ripeness	6.00	4.95	0.08	ns
Clean selling site	6.10	5.19	0.22	ns
Size	7.24	5.38	<0.01	s

4.3.4 Transportation of the fruit

Collectors. During group discussions and through observation it was learnt that several transportation modes are used for the fruit at collection stage. The analysis of the survey data presented in Figure 4.18 shows that for the entire study, transportation of the fruit is done mostly on foot (63.6%). The other modes are by bicycle (22.7%), public vehicles (9.1%) and wheelbarrows (2.3%). At the district level, on foot accounts for 55.6% in Chipata and 65.7% for Ndola. It is followed by the use of bicycle in both districts with 44.4% in Chipata and 17.1% in Ndola. Unlike in Ndola where public vehicles (11.4%) and wheelbarrows (2.9%) are used, there is no use of such transport modes in Chipata. The majority of the collectors (97.1%) transport their fruit to the marketplace. Fruit distribution may not involve much cost in monetary terms as only 14.3% of collectors incur some transportation cost. Where there is no transportation it means retailers go to buy at selling points.

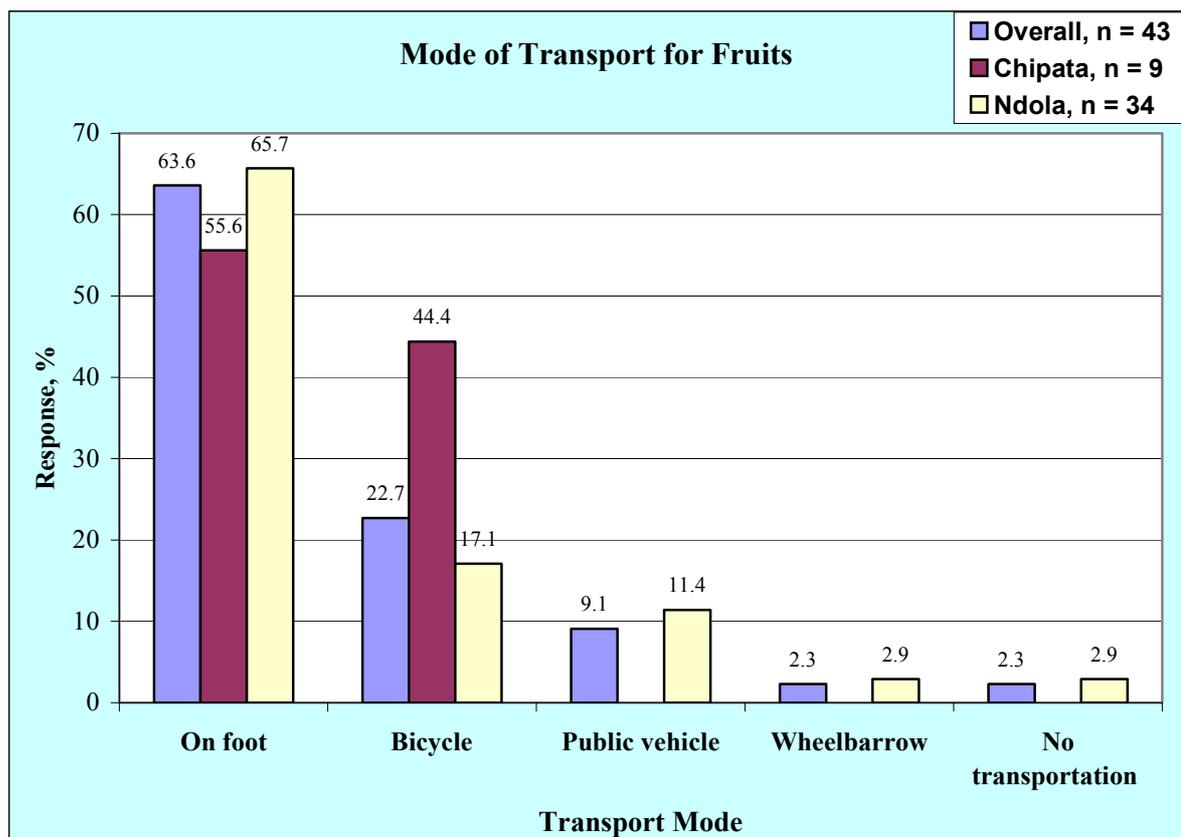


FIGURE 4.18 Transportation mode for fruits from collection sources to the markets

Retailers. Table 4.15 shows the modes of transport used at the retail stage. The commonest mode of transport used in the trade of *Uapaca kirkiana* fruit is on foot (23%). The others are public vehicles (23%), bicycles (19%) and wheelbarrows (3%). About 32% of the collectors take their fruit to the market for sale. In such cases there is no transportation involved for retailers.

TABLE 4.15 Transport mode for fruits at retail stage

Transport mode	Respondent, % (n =53)
No transportation	32.3
On foot	22.6
Public vehicle	22.6
Bicycle	19.3
Wheelbarrow	3.2
Total	100

4.3.5 Trade constraints

Constraints at collection. There are nine trade problems experienced and mentioned by the collectors (see Figure 4.19). The hard nature of work in the fruit business (37%) is the most commonly mentioned while exploitation by retailers who set the fruit prices is the least commonly mentioned constraint (2%). Low profitability (28%) and seasonality (13%) of business are indicated as very important following after the nature of work. The other constraints are low demand of fruits especially at peak time season (7%) and spoilage of fruits (6%), harassment (4%) during collection and selling, transport (2%) and high competition (2%). During the PRA meetings, the other constraints in the marketing of *Uapaca kirkiana* mentioned were limited and/or lack of skills and the dispersed nature of the tree fruits. It was mentioned during group discussions and also observed that fruits are heavy and transported from far off places to the marketplaces. The participants to these discussions in both Ndola and Chipata also said that they have observed deforestation activities that may threaten the fruit trade.

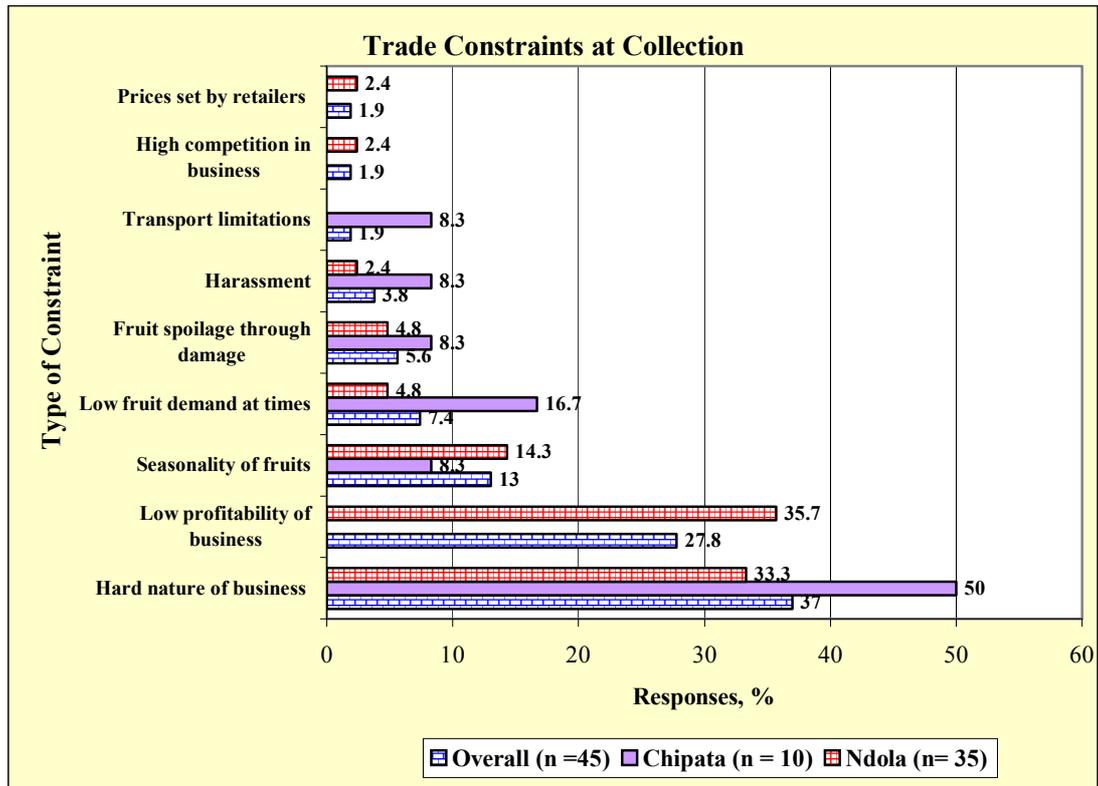


FIGURE 4.19 Problems in the *Uapaca kirkiana* trade at collector stage in Zambia

Constraints at retailing. Figure 4.20 shows the 13 trade problems experienced at fruit retail stage. For the whole study the problems the retailers mentioned were high fruit perishability (23%) low profitability (18%) short business duration (11%) and hard-labour nature of business (11%), low prices at peak of trading (9%), transportation cost (8%) and customers tasting the fruit before buying (6%). The other problems have the same number of respondents by percentage. High prices, fruit damage and dirty environment have 3% each, while lack of permanent market areas, difficult to order and sell fruit and difficult buyer preferences had 2% of each. Two percent of retailer respondents that said they did not experience any problem. According to group discussions, the short duration of business is at times worsened by the inconsistent supply of fruits by collectors.

At district level the problems mentioned by retailers in Ndola are high perishability (23%) low profitability (21%), hard-labour nature of business (13%), short business duration (8%) low prices at peak of trading (9%), transportation cost (9%) and dirty environment (4%). The rest of the problems were reported by about 2% of respondents and include: high prices, fruit damage,

customers tasting the fruit before buying, fruit damage, lack of permanent market areas, difficult to order and sell fruit, and difficult buyer preferences. Two percent of retailer respondents that said they did not experience any problem.

In Chipata there are seven problems mentioned. These are high perishability (23%), short business duration (23%) and tasting of the fruit before buying (23%). The rest of the problems were mentioned by about 8% of respondents and include: low profitability, low prices at peak of trading, high prices and damage of fruit. No respondents said they did not experience any problem in the business as retailers in Chipata.

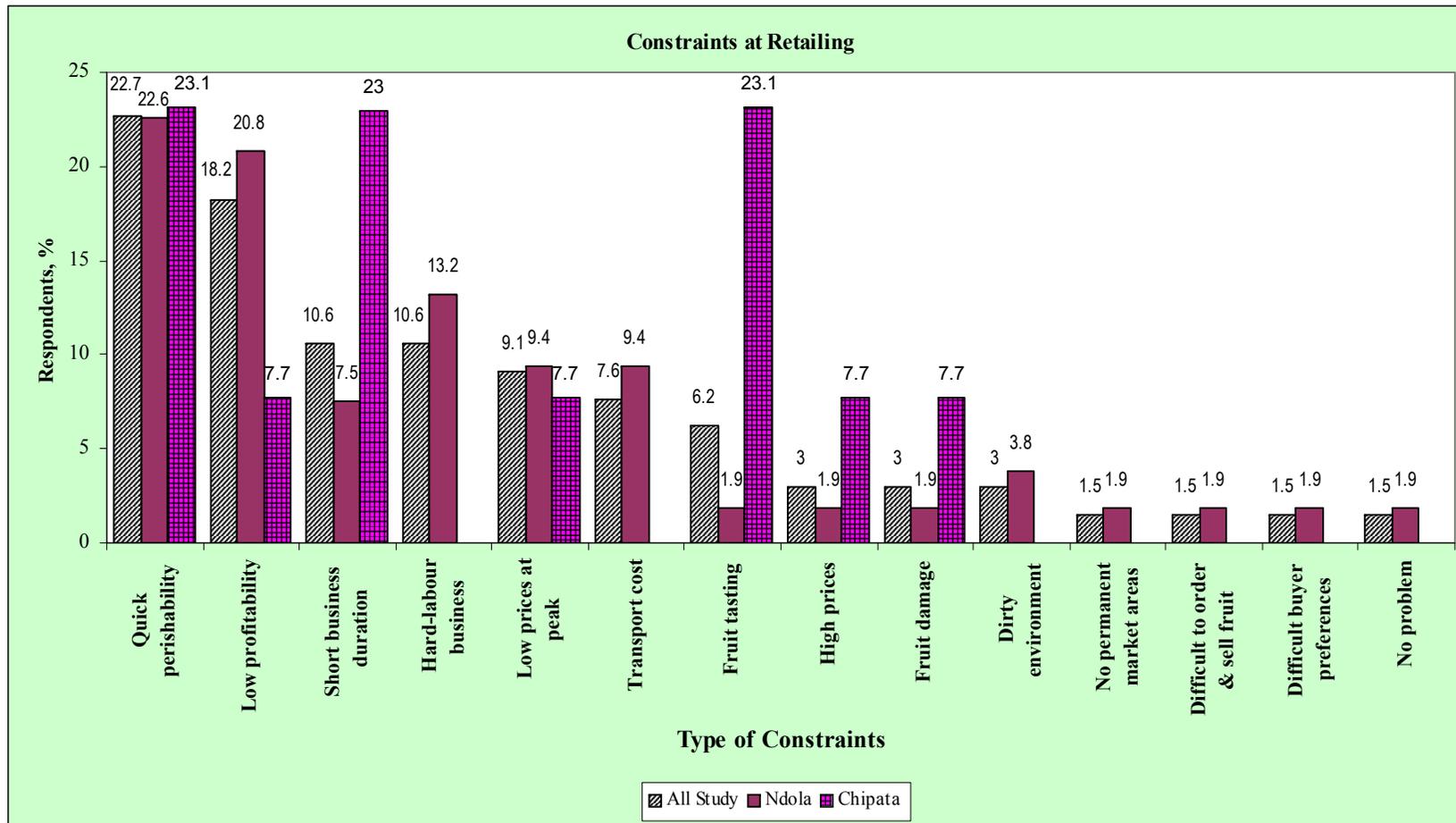


FIGURE 4.20 Trade constraints experienced by the retailers (n=42)

4.4 Conclusion

In this chapter, what has been presented is the basic market conditions (the first component of the SCP model). The study has so far shown that the *Uapaca kirkiana* is a preferred species with good demand at both individual and household level. The most important attraction for the consumer market is taste. It has also been indicated that this important fruit is lost during trade through perishability and physical damage associated with transportation.

Chapter Five:

Results on Market Structure, Conduct and Performance

Chapter Five is the second chapter on results of the study. The data presented here are on the fruit market structure, conduct and performance, including marketing participation conditions, shares, investments and distribution pathways. There is also data on pricing and product differentiation. Trade accruals are also examined, too, as a performance component of the study model. The component gives results on the marketing costs and the socio-economic benefits from the trade in *Uapaca kirkiana* fruit.

5.1 Market Structure for *Uapaca kirkiana* Fruit

5.1.1 Trade entry and exit conditions

From the group discussions, it was learnt that although the trade is accessible and that many people can manage it, there are potential barriers to entry into trade in *Uapaca kirkiana* fruits at both collector and retailer levels. Table 5.1 shows that the barriers are similar for both Ndola and Chipata. The findings in the table reflect the qualitative statements made during the discussions, and should therefore be interpreted accordingly.

The barriers to entry and exit from the *Uapaca kirkiana* fruit trade include: capital needs, distance involved in collection, labour demand, lack of institutional support, limited information about the market for the fruit, limited revenue from the trade, quick perishability of fruits and seasonal resource availability. Rapid perishability of *Uapaca kirkiana* fruit discourages sales. It was mentioned during the PRA group discussions that labour involved in collection is a serious deterrent into the trade of *Uapaca kirkiana* fruits.

At retail stage, capital needs (initial investment, transportation and market fees/levies) limited business expansion among traders. The mean initial capital for retailers was K28 044.00 for Ndola and K6 194.00 for Chipata.

TABLE 5.1 *Uapaca kirkiana* fruit trade entry and exit factors

Factor	Collectors		Retailers	
	Ndola	Chipata	Ndola	Chipata
Capital requirements/needs	✓	✓	✓	✓
Distance involved in collection	✓ ✓	✓	✓	✓ ✓
Labour demand	✓	✓	✓	✓
Lack of institutional support	✓		✓	
Limited market information	✓	✓	✓	✓
Limited revenue from the trade	✓	✓	✓	✓
Quick fruit perishability/spoilage	✓ ✓	✓ ✓	✓ ✓	✓ ✓
Seasonal resource availability	✓	✓	✓	✓
Transportation difficult	✓	✓ ✓	✓	✓
Exploitation through pricing by retailers	✓			

The strength of the response is indicated by either a single or double ticks

5.1.2 Market concentration at collector stage

Figure 5.1 shows the estimated shares for the 2003/4 season. Based on the survey results at collector stage, the overall market share is 12% by fruit weight for the largest trader (responsible for 2% of the overall fruit trade), 33.1% for the three largest traders and 47% for the five largest (about 5% of the overall fruit trade) of all the traders.

For Ndola district, the shares are 13% for the largest collector (responsible for 3% of the overall fruit trade) and 52% for the five next largest collectors, which represents 13% of the fruit traded by all the collectors. For the district, the largest collector traded 44% of the fruit by weight, and the rest contributed 56%.

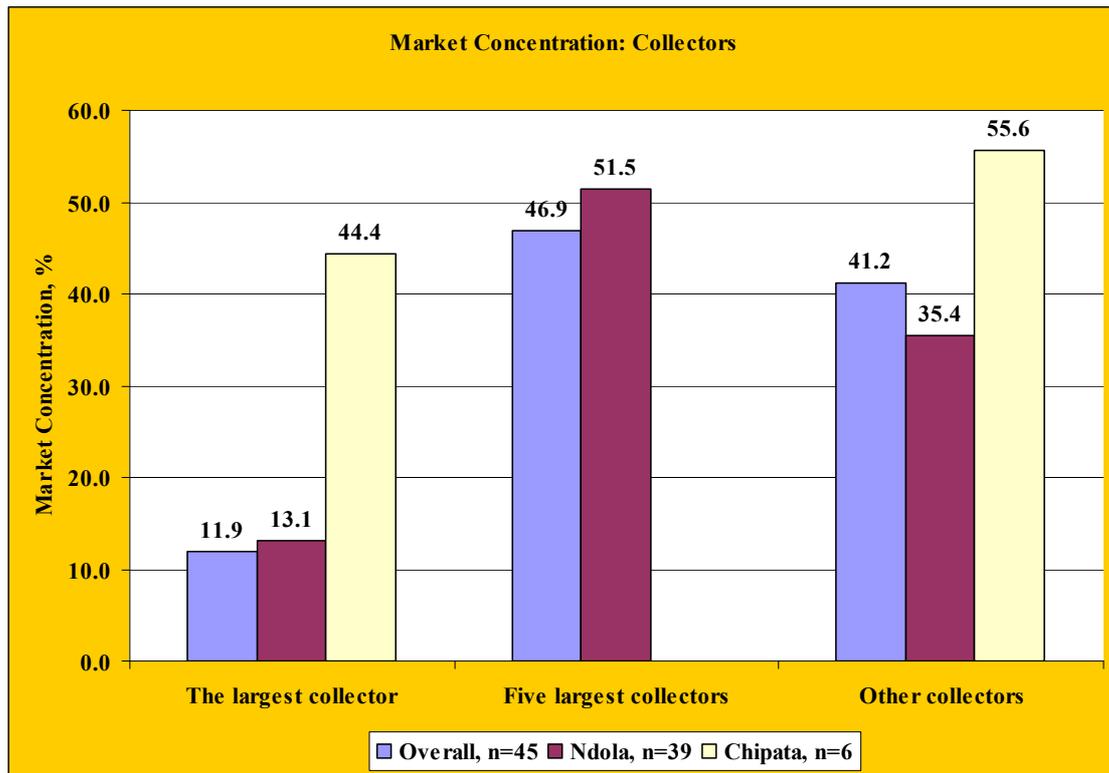


FIGURE 5.1 *Uapaca kirkiana* fruit market concentration for collectors

5.1.3 Investment in trade

During the group interviews it was revealed that the financial costs of trading in fruit by both the retailers and the collectors include transport, hiring, storage, packaging materials and market fees. The initial financial investment is almost nil for the collectors. They invest mainly in their own labour and time for the collection. There is also investment in assets used for transportation and storage such as bags, baskets and bicycles (including repairs in the case of bicycles). For retailers, the average initial financial investment annually was significantly different ($p < 0.05$) between the districts (Figure 5.2). The average investment is more by 70% in the Ndola markets (Masala, Chifubu and Mutapa) than in Chipata markets (Kapata, Kaumbwe and Saturday). It is K20 000.00 in Ndola and K6 000.00 in Chipata. The highest amount is K40 000.00 at Masala market, which is the central market in the city of Ndola and the lowest is K2 000.00 at Kapata market in Chipata. The local economic situation might be influencing trade differently in the two districts.

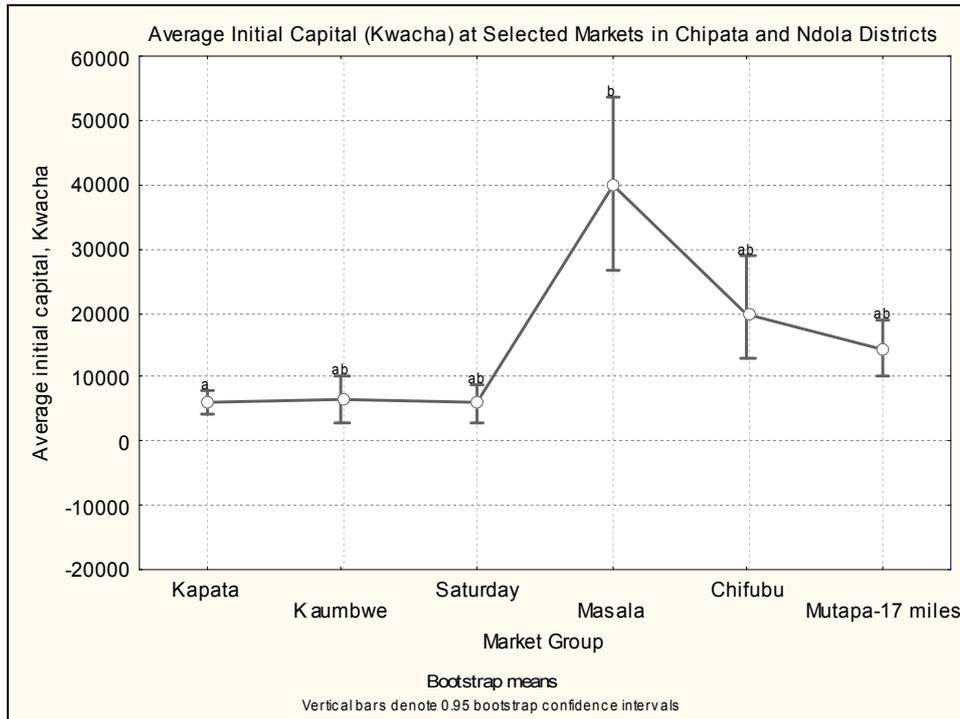


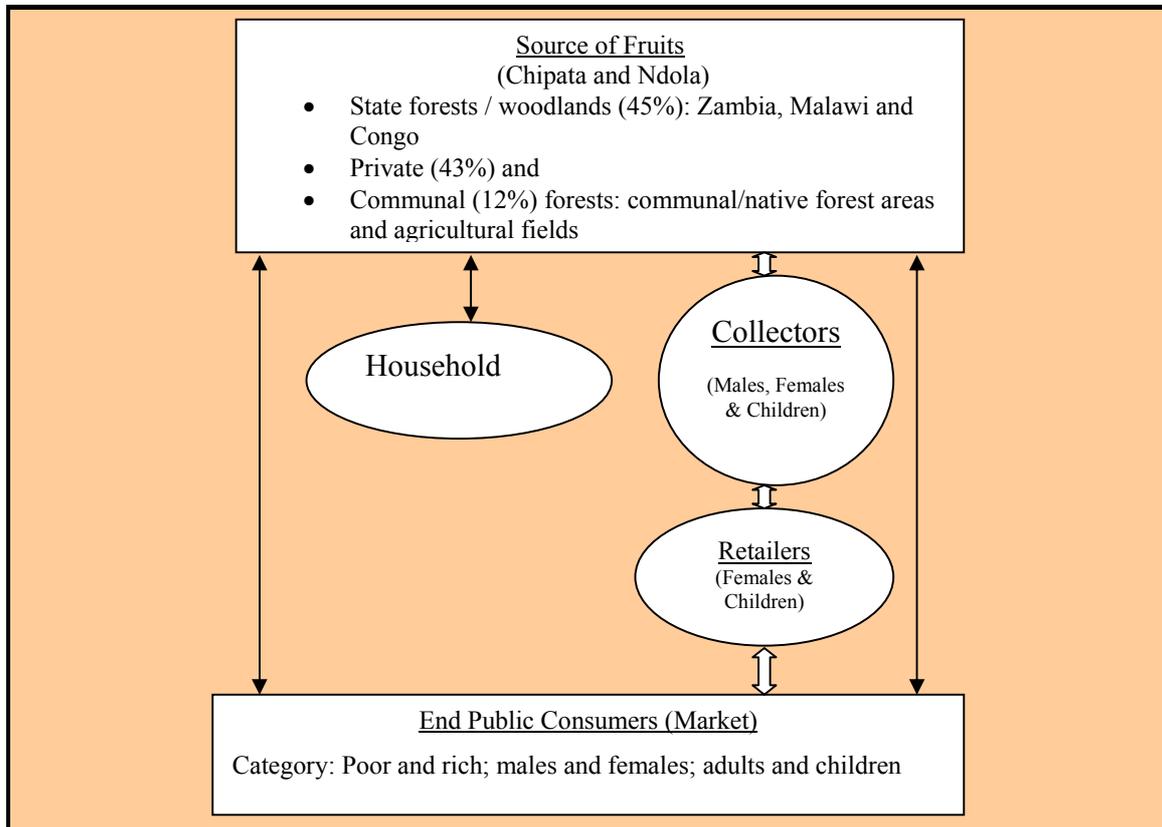
FIGURE 5.2 Average initial annual capital for retailers at Chipata (Kapata, Kaumbwe, Saturday) and Ndola (Masala, Chifubu, Mutapa)

5.1.4 Distribution and market pathways

a) Fruit trade pathways

The fruit from the forest reached the end consumers through various pathways. Based on the observational walks, mobility maps and the flow diagrams constructed during group discussions sessions, it seems that fruits move mainly from collectors through retailers to consumers. Usually, the collectors/wholesalers are the first link in the marketing chain. Collectors sell to retailers and then the retailers sell to consumers (see Figure 5.3). The value chains are the same for Ndola and Chipata Districts. The majority (95%) of retailers prefer buying from collectors rather than middlemen (see Table 4.9). Section 4.3.1 (Table 4.7) presents the survey results. From the marketing survey it is clear that a substantial number of the traders (44.8%) obtain their fruit from state forest estates, 43.1% of traders source the fruit from private forests/woodlands especially farmlands and only 12.1% obtained the fruits from communal (i.e. agricultural fields and communal/native forest) areas. For Ndola, there are three state forests where the community

at Mutapa obtains the fruits, namely, Kasaria (>6, 000 hectares), Lumina and Ngala (5, 000 – 6, 000 hectares).



Block arrows indicate large flow of fruit while line arrows show other flows.

FIGURE 5.3 Generic demand and supply pathways of *Uapaca kirkiana* fruit

There are also times when consumers obtain the fruits directly from the forest and the collectors. The household consumption is included in Figure 5.3 to show the other routes to the end use although it is not part of the trade pathways. This study has also established that about 70% of collectors, also retail in fruit.

The collectors are involved in retailing for the following reasons as revealed during both the group discussions and the surveys:

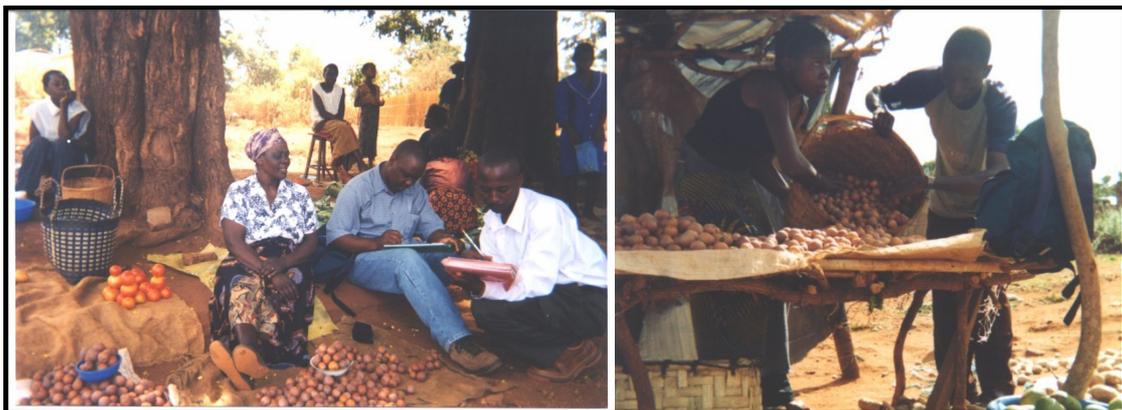
- To earn more money. The collectors have observed and also believe that selling in bulk earns them less than when selling in smaller amounts.

- To cater for some customers that want or can only afford to buy small quantities.
- To sell the fruit when there are no retailers that want to buy in bulk.
- To determine fruit prices. Some collectors want to find out how much retailers make so that they can determine a reasonable wholesale price in relation to retail prices and get a good share of the profit.
- As a complimentary activity to other businesses in the market or elsewhere such as farming.

b) Fruit Market outlets

It was learnt through observation and group discussions that the market outlets comprise formal designated market, streets and residential places. The market outlets comprised vending, roadside, residential and town centre markets. The retailers trade from more than one place depending on the location and market situation. Thus, some traders sell at different locations at the same time with the help of family members. The traders said that selling fruits from different places was a strategy to earn more money from the trade.

During the current study, it was observed that at these points of exchange, the market has permanent infrastructure in the form of buildings and stalls. There are also stalls erected on the streets/roadsides and in residential areas. The fruits are also sold from the ground (Plate 5.1).



a) Trading from the ground under trees next to a road b) Stall next to a road

PLATE 5.1 Retailing of fruit net to a road in shade of tree and in a stall

c) Market information system

Through group discussions and observations, it was known that the market information about consumers and prices for the *Uapaca kirkiana* fruit is obtained in an ad hoc manner from amongst the traders and consumers either within their residential or market places. Most of the information sharing is via direct communication in the market places. The marketers just take the fruits to the market hoping there are buyers. Product preferences are also shared among suppliers by word-of-mouth and consumers at the point of transaction. Table 5.2 shows the results from the survey with the majority (50%) of collectors obtaining the information through inquiries to the buyers. The other sources of information were traders at the markets (30%) and other within the area (13%). Some collectors (8%) did not obtain any information about consumers prior to selling at the market. They just took the fruit to the market for selling, and depended on their previous knowledge about the market for the fruit.

TABLE 5.2 Collector' source of information about fruit consumers

Market/Customer information source	Response (n=39), %
Customers make inquiry	50.0
Traders at the marketplace	30.0
Other collectors/traders within the area	12.5
No information obtained	7.5
Total	100

5.2 Market Conduct for *Uapaca Kirkiana* Fruit

5.2.1 Pricing

a) Pricing factors considered

Table 5.3 shows that at least 12 factors are considered by the collectors and the retailers when deciding on the price for the fruits. For retailers the most commonly regarded factors are price (46%), price taking (33%), and total cost (12%). For the collectors the factors are: total cost (33%), negotiation (14%), price taking (10%), quality (13%), quantity (13%) and availability (8%). The other factors the collectors considered are target profit margin, demand for the fruits, customer affordability and purchase price for fruits. Some respondents (12%) in Ndola could not isolate the costs and only gave a blanket statement that includes any cost they incur in the process

of obtaining the fruit for trade. The costs can be transportation, labour and unit price. Some retailers (3%) said they did not consider any factor.

TABLE 5.3 Pricing factors considered by the fruit collectors and retailers

Pricing factor	Respondents, %			
	Collectors	Retailers		
	Overall (n=47)	Overall (n=57)	Ndola (n=36)	Chipata (n=21)
Purchase price for fruits	1.6	46.4	30.4	78.3
Price taking	9.5	33.3	39.1	21.7
Total cost	33.3	11.6	17.4	-
Labour / Risks	3.2	2.9	4.3	-
No factor considered	-	2.9	4.3	-
Demand for fruits	1.6	1.4	2.2	-
Quality of fruits	12.7	1.4	2.2	-
Negotiation with buyers	14.3	-	-	-
Quantity of fruits sold	12.7	-	-	-
Availability of fruits	7.9	-	-	-
Target profit margin	1.6	-	-	-
Customer affordability	1.6	-	-	-
Total	100	100	100	100

At district level, in Chipata only two factors are considered. These are purchase price for fruits (78%) and price taking (22%). These factors are among the important ones in Ndola as well where 39% and 30% consider price taking and purchase price of the fruits respectively.

b) Price determination and payment mode

The majority (83%) of collectors claim to determine the prices of their fruits. Only 30.6 % of these collectors are aware of the prices at which other collectors in their locality are selling, while less than half (44.4%) know the retail prices for the fruits in town (Table 5.6). In the case of collectors, price determination is in such a way that, the traders who sell first in the season determine the prices, and then the others accept these set prices. In some cases, collectors justify

this method of pricing as a way of avoiding conflicts arising from competition. For collectors, the total costs incurred are the commonest pricing mode followed by the negotiations with the buyers where as at retail stage purchase price (46.4%) is commonest followed by price taking (33.3%). Information from other markets and probably other retailers in the same market also contribute in determining fruit prices at retail stage.

There are more collectors than retailers that claim that they determine the prices for their fruits (i.e. 83% versus 64.9% respectively). For retailers, 64.9% claim to determine prices for their fruits compared with collectors. The majority (87.9%) of the retailers are aware of the prices through communication with fellow retail traders (Table 5.4).

TABLE 5.4 Price determination by traders for own *Uapaca kirkiana* fruit

Subject	Response, % Yes	
	Collectors	Retailers
Whether the trader determines the fruit prices	83 (n=47)	64.9 (n=57)
Whether trader is aware of fruit prices by others when setting theirs	30.6 (n=15)	87.9 (n=33)
Whether trader knows the prices in town	44.4 (n=27)	No data

The community members who participated in the PRA discussion sessions said that the fruits are traded as a cash-and-carry commodity. The mode of payment for *Uapaca kirkiana* fruits is predominantly cash at both collector (68.8%) and retailer (91.2%) stages. Payment is also made on credit and in kind whereby goods are exchanged for fruits. Cash payment is preferred to the other two forms because the traders need the money raised for immediate reinvestment in making orders for fruits. Cash payment is also required because it is difficult to collect credit, and many traders consider the prices affordable to most consumers. Sales on credit to consumers are rare and only done in cases where the traders know the consumers and in times when there are plenty of fruits on the market.

c) Price differentiation

The average price per kilogram of the fruit for peak and non-peak times in the study season are shown in Table 5.5. There is a definite downward trend from peak to none peak except at Lusaka (see Column 3, Table 5.5). The price changes (ibid.) for the 2003/4 season seem to be dependent on supply and demand conditions. The retail prices are significantly higher ($p < 0.5$) in Ndola than in Chipata markets. In Ndola, the highest prices are at the Masala market group, whereas for Chipata District they are at the Saturday market group. Price declines, at the retail level, are much more acute for Chipata than for Lusaka and Ndola districts.

TABLE 5.5 Average selling prices for collectors and retailers of *Uapaca kirkiana* fruit

Traders	District	Average price, K/kg ⁶			
		Time of the 2003/4 <i>Uapaca kirkiana</i> Fruit Trading Season			
		November (Peak/Start)	December (Non-Peak)	% difference in prices between peak and non-peak period (Nov - Dec)	Overall (Mean)
Collectors	Chipata	406	314	23	360
	Ndola	636	409	36	522
	Lusaka	1 481	1 200	19	1 340
Retailers	Chipata	997	454	54	726
	Ndola	1 121	1 042	7	1 082
	Lusaka	2 174	2 509	-15	2 341

The prices for *Uapaca kirkiana* fruit range from K314.00 at collector stage in Chipata District to K2 509.00/kg at retailer stage in Lusaka. The collector prices for Lusaka are shown in Figure 5.4. The prices per kilogram are between K875.00 in November and K1 150.00 in December at town centre markets. At the town periphery markets the prices range from K2 086.11 in November to K1 250.00 in December. At the town centre the prices are higher in December than in November while it is vice versa in the periphery markets. It was also learnt through PRA discussions in Chipata that prices range from K2 500.00 to K1 000.00 per *denge* (basket).

What is particularly important to note about the present fruit prices is their apparent uniformity. The unit measures looked the same but were actually different in some cases. Thus, the value for

⁶ For purpose of practical meaning and interpretation, the prices have been rounded off to the nearest Kwacha

money was not necessarily the same. This is because there are customary pricing practices in the trade. Prices are maintained but the quantities sold are reduced through some unethical practices. The malpractices include putting grass/paper or candle wax at the base of the containers as price adjustment activities. Other participants mislead unsuspecting buyers by cutting and sewing/mending containers up thereby reducing the actual quantities purchased by consumers. Such competition tricks cause price analysis difficulties.

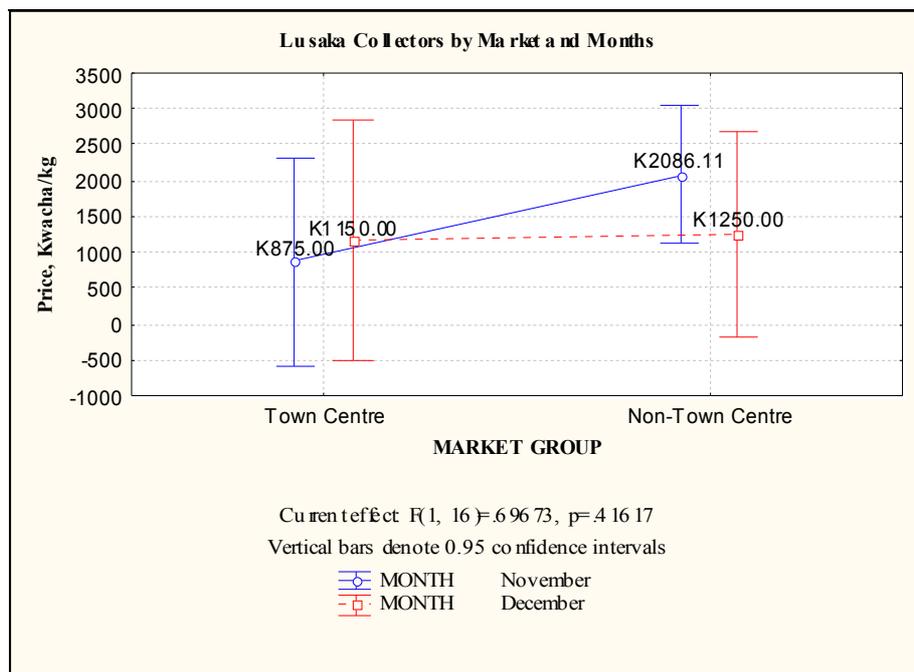


FIGURE 5.4 Collectors' fruit prices in Lusaka urban and peri-urban markets

5.2.2 Product differentiation and strategies

Elementary differentiation is done and observed in the form of presale activities that are similar at collector and retailer stages although they are more activities in Ndola than in Chipata (see Table 5.6). The priorities given to the promotion activities differed significantly ($p < 0.05$) between the two study districts. They differed in sorting ($p < 0.05$) and washing fruits ($p < 0.05$) with a higher (value) priority in Ndola for sorting than in Chipata and vice versa for washing.

TABLE 5.6 Promotion activities by fruit retailers and collectors

Promotion Activity	Respondents, %					
	Retailers (n=56)			Collectors (n=46)		
	Ndola	Chipata	All Retailers	Ndola	Chipata	All Collectors
Remove damaged fruits	30.0	40.9	32.9	45.7	47.4	46.0
Wash fruits	28.3	36.4	30.5	40.7	42.1	41.0
Clean / wipe fruits	22.5	11.4	19.5	12.3	10.5	12.0
Sort fruits	15.8	4.5	12.8	1.2		1.0
Pack fruits	2.5	2.3	2.4			
Clean selling area		2.3	0.6			
Give extra fruits		2.3	0.6			
Provide water for customers to wash the fruit	0.8		0.6			

For retailers in Ndola the chief promotional basic and strategic presale-processing activities by percentage are (see Table 5.6) removing the damaged fruits (33%) and washing them (31%). The other activities are clean fruit without using water (20%), sort fruits (13%) and pack fruits (2%). Other activities such as giving extra fruits, clean selling area and providing water for buyers to clean the fruits and themselves before they ate the fruits are conducted by 1% of respondents for each of these activities. Retailers have observed that cleaning the fruits improves its appearance and subsequently marketability.

For collectors, there are only three activities of which removing the damaged fruits (46%) and washing them (41%) are the most important. The third activity is cleaning fruit without using water (1%).

The other strategies to increase fruit sales as revealed through both observation and PRA group discussions include allowing tasting of fruits when buying, reducing / negotiating prices, supplying sweet fruits, door-to-door selling and retailing. Collectors engage in fruit retailing to accommodate those who cannot or do not like buying in large quantities.

5.3 Market Performance

5.3.1 Marketing costs

Both collectors and retailers incur costs that include time to travel and labour to collect the fruits, transportation and in some cases hiring of labour. The traders say the largest cost is incurred on transport. About 47% of retailers and 14% of collectors pay for transportation of fruits from transaction points to market areas (Figure 5.5). The costs are for any of the transportation modes used such as bicycles and vehicles (see section 4.4), except where collectors deliver the fruit to the market.

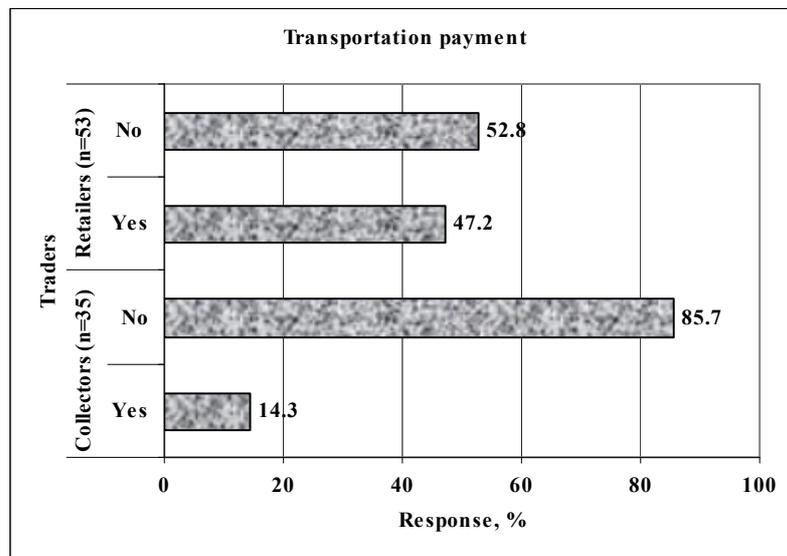


FIGURE 5.5 Percentage of traders that pay for transportation of the *Uapaca kirkiana* fruits

Traders have other cost points when trading in formal market areas, which vary according to marketplaces and sites. Table 5.7 shows that the most common charge that the retailers pay is market entry fees (74%) and the least is emergency deposit (2%). At study site level, 87% and 44% pay the market entry fees in Ndola and Chipata respectively. The entry fees are the only

charge paid in Chipata while for Ndola, market-stand charge (5%) and emergency (3%) are the other costs incurred.

TABLE 5.7 Market charges paid by traders

Market Costs	Responses, %		
	Retailers, n=54		
	Ndola	Chipata	All
Market entry levy	87.2	44.4	73.7
Market stand charge	5.1	-	3.5
Emergency deposit/do	2.6	-	1.8
No fees paid	5.1	55.6	21.1
Total	100	100	100

The amounts of the charges paid for (including those not presented in the Table 5.9 but revealed through the PRA sessions and observations) are:

- The daily market entry fees/rentals range from K100.00 to K1 000.00 depending on the market area. These charges are regardless of the quantity of the fruit brought for sale. The lowest fees of K100.00 are in Chipata and the highest of K1 000.00 are paid in Ndola.
- Storage charges for commodities are either weekly at K1 500.00/week or per day at K300.00/basket,
- Weekly market maintenance charges,
- Charges for market space (stand/stall) are K500.00 per day for each stand owned,
- Purchasing materials for transportation, storage and packaging (31.4% of retailers). The materials purchased include plastic bags for packaging and reed baskets for storage and transportation of fruits.

5.3.2 Socio-economic benefits from marketing *Uapaca kirkiana* fruit

a) Marketing margins

Table 5.8 shows the estimated marketing margins. For collectors, the daily gross margins from fruit sales range from K3 000.00 to K5 000.00 per day. For retailers the gross margins range from K2 000.00 to K35 000.00 with an average of K8 000.00 per day. At district level, the

average for Ndola traders is K9 500.00, and K4 500.00 for Chipata District. The gross marketing margins are significantly different ($p < 0.05$) between Ndola and Chipata. The margin is K40.00/kg in Chipata compared to K50.00/kg in Ndola.

TABLE 5.8 Marketing margins for trade in *Uapaca kirkiana*

Parameter	Markets, Price, K/kg	
	(p<0.05)	
	Chipata	Ndola
1. Collectors (Producer price)	359.67	522.25
2. Retailers (Consumer price)	725.75	1 311.46
3. GMM (2-1)	366.08	789.21
4. TGMM _{cdc} ([3/2]*100)	50.44	60.18
5. GMM _p (100- 4)	49.56	39.82

Notes: GMM_p = Gross marketing margin (p = producer or collector);

TGMM_{cdc} = Total gross marketing margin (cdc = complete distribution channel)

b) Benefits from *Uapaca kirkiana* fruit trade

Figure 5.6 shows the opinion of the retailers on the contribution of trade in the *Uapaca kirkiana* fruit to the household income. The opinion of the majority of the retailers is positive. For the whole study, 88% (i.e. combined strongly agree with agree) of the retailers agree that selling the *Uapaca kirkiana* fruits contribute valuable income to the total household earnings. Similarly combined positive responses indicated that 82% in Chipata and 91% in Ndola of the retailers agree that the trade contributes remarkable income to the traders. By percentage, there are more retailers in Ndola (42%) that strongly agree that trade in *Uapaca* fruit contributes remarkably to income than in Chipata (19%).

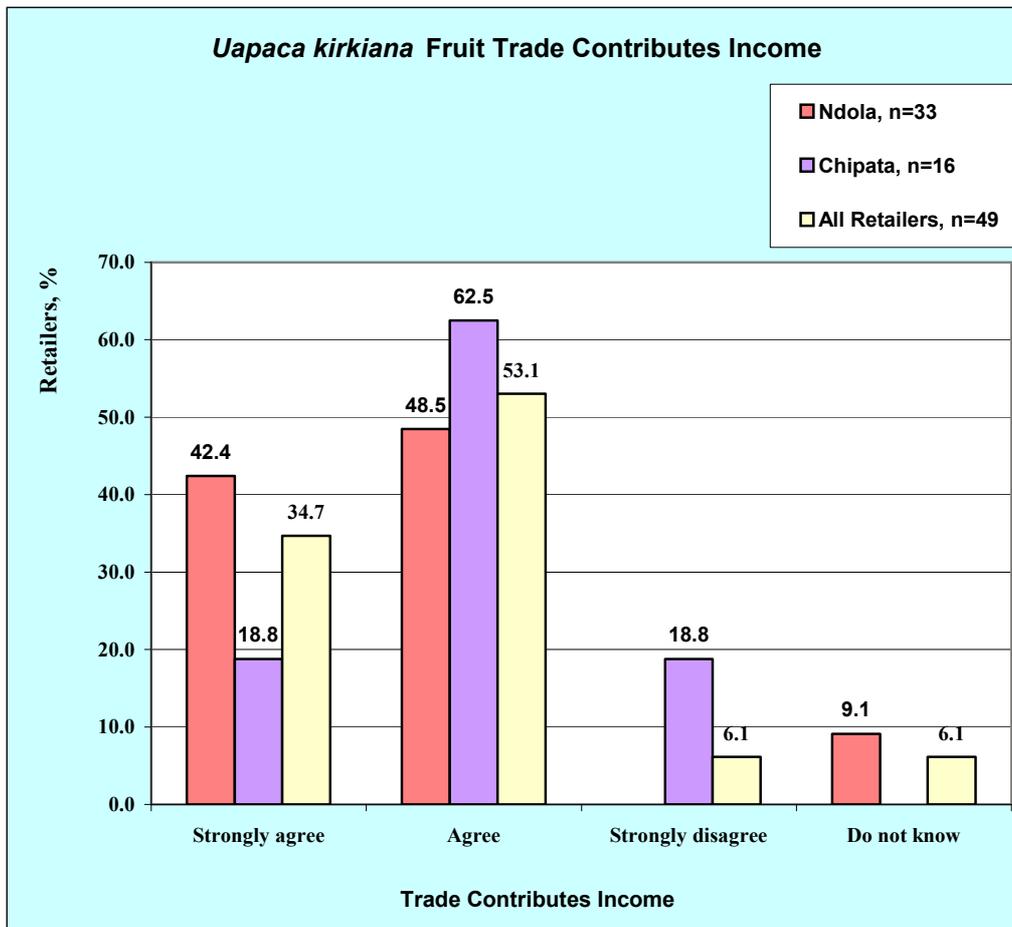


FIGURE 5.6 Retailers' opinion on the contribution of *Uapaca* fruit trade to household income

As an example of the benefits, Plate 5.2 shows a house built from earnings generated through trade in *Uapaca kirkiana* fruit as additional income for the family. A trader in *Uapaca kirkiana* fruit in Chipata owns the house. Other traders manage to buy other assets such as cattle from income generated through selling the fruit.



{Photo by: Moombe, 2003}

PLATE 5.2 A house built from the proceeds of *Uapaca kirkiana* fruit trade in Eastern Province

Because of the value the market actors attach to the *Uapaca kirkiana* fruit, they suggest a number of interventions to help sustain their important livelihood. The major interventions are fruit sales promotion, planting and active management of trees. The community members suggest improving awareness on the potential of *Uapaca* trade to generate income and developing skills in raising *Uapaca* seedlings and growing trees. Table 5.9 is a presentation of the opinion of retailers on these interventions, with more retailers who agree than who disagree.

TABLE 5.9 Retailers' opinion on trade and resource management interventions

District	Retailers' opinion, %	Intervention		
		Advertise to improve <i>Uapaca</i> fruit sales	Plant <i>Uapaca</i> trees to increase fruit supply	Just manage <i>Uapaca</i> trees to increase fruit supply
Ndola n=36	Strongly agree	8.3	27.8	19.4
	Agree	36.1	36.1	50.0
	Disagree	33.3	8.3	11.1
	Strongly disagree	16.7	16.7	11.1
	Do not know	5.6	11.1	8.3
	Total	100	100.0	100
Chipata n=18	Strongly agree	5.6	44.4	17.6
	Agree	72.2	33.3	58.8
	Disagree	5.6	-	-
	Strongly disagree	11.1	16.7	5.9
	Do not know	5.6	5.6	17.6
	Total	100.0	100	100.0

There are some tree management activities that involve tree resource owners of both sexes. This was learnt at PRA meetings especially in Chipata. The activities are tending and protection of trees, especially protecting those located in agricultural fields against fruit theft. Cultivation is done in a taugya/agroforestry system. This is a system whereby agricultural and tree crops are tended together by farmers.

The combined response of those who strongly agree and those who just agree to the interventions in Ndola are 44.4% for promoting the *Uapaca kirkiana* fruit, 63.9% for planting and 69.4% for managing *Uapaca* trees. For those who strongly disagree and those who just disagree are: promoting the *Uapaca kirkiana* fruit 50%, planting 25% and managing 22.2% *Uapaca* trees.

Similarly in Chipata those who agree to promoting the *Uapaca kirkiana* fruit constitute 77.8%, and 77.7% agree to planting and 76.4% to managing *Uapaca* trees. The retailers who disagree with promoting the *Uapaca kirkiana* fruit constitute 16.7%, while 16.7% and 5.9% disagree to planting and managing *Uapaca* trees respectively.

The collectors' position on the three proposed interventions also reflects the retailers' position. Table 5.10 reveals that 80% agree to promote the *Uapaca kirkiana* fruit, 90% to planting and 100% to managing *Uapaca* trees interventions.

TABLE 5.10 Collectors' opinion on trade and resource management interventions

Intervention	Collector Opinion, % (n=30)				Total
	Strongly agree	Agree	Disagree	Strongly disagree	
Advertise <i>Uapaca</i> fruits to improve sales	20.0	60.0	20.0		100
Plant <i>Uapaca</i> trees to increase fruits supply	60.0	30.0		10.0	100
Just manage <i>Uapaca</i> trees to increase fruit supply	40.0	60.0			100

5.4 Conclusion

The data presented here indicates an underdeveloped system. The investment levels are low, concentration is high, the distribution route/chain is short, infrastructure is poor, the pricing mechanism is unclear, information system is not organised and there is only basic processing of the fruits. However, the potential for development is there. Some of the benefits realised from the indigenous fruit trade are impressive.

Chapter Six:

Results on Institutional Arrangements for *Uapaca kirkiana* Marketing

This third chapter on the study results is about the institutional arrangements for the marketing of *Uapaca kirkiana* and other IFTs as well as the management of the general natural forest resources. Here, contextually, institutional arrangements may only refer to the existing formal forestry policy provisions and the informal rules/regulations at either local traditional or fruit trade community level or both, that are designed to govern and/or develop the NTFP/IFT trade industry. Therefore, the data presented here focuses on the nature of the salient provisions, outcomes of implementation/administration especially with regard to marketing promotion, natural forest resources management. The key constraints in developing the NTFP/IFT sub sectors and the potential interventions are also highlighted.

6.1 Marketing institutional framework

6.1.1 Membership in development organisations

Only 10% of the fruit collectors and 20% of retailers are members of some organisation or group. These organizations or groups are mostly informal with only the Zambia National Marketing Association incorporated as a business entity. However, the majority (72%) of the collector traders acknowledge the need to have and belong to a developmental or business organisation (Table 6.1).

TABLE 6.1 Membership of fruit traders in development organisations

Response, %	Traders	Subject	
		Are you a member of any organization?	Is there a need to be organised or form an organisation as fruit traders?
Yes, %	Collectors	10.4 (n=48)	72.4 (n=29)
	Retailers	20.0 (n=55)	
No, %	Collectors	89.6	27.6
	Retailers	80.0	

The fruit traders that are willing to belong to an organisation perceive the following as some of the important benefits from membership of trade organisations:

- (a) Sharing trading ideas that could help with their business develop;
- (b) Helping one another transport *Uapaca kirkiana* fruits;
- (c) Learn or know other uses of *Uapaca kirkiana* fruits;
- (d) Manage trees, much of which have been destroyed; and through such activities get tokens of motivation from government for participating in planting trees; and
- (e) Have a uniform fruit price at the market.

The fruit traders that did not think there was any need to belong to a trade organisation gave the following reasons to support their position:

- (a) Trading was going on well and without difficulties. These traders feared that clubs/organisations would bring confusion,
- (b) Lack of cooperation among traders. The traders preferred working individually, and (c) The traders did not own the indigenous fruit trees. This position was more pronounced among the collectors than the retailers. However, during group discussions the community members said that the individual farmers own the trees growing on their agricultural/farm land.

6.1.2 Rules and regulations guiding *Uapaca kirkiana* fruit trading

It appears that generally there may be no specific rules to regulate *Uapaca kirkiana* trading in the study districts. Only 31% of collectors (n = 45) said there were rules/laws that regulated fruit trade, while 68.9% said there were no rules in existence.

The categories of regulations that were mentioned are trading in formal market areas, cleaning of these markets, pricing and management of trees. The rules comprised selling of fruits only in formally designated marketplaces and cleaning of the markets to allow their good running and avoid diseases breakouts (e.g. Cholera). Cleaning involved employing cleaners at K5 000.00 per day. Some traders felt that fees should be revised from a blanket charge for all collectors and traders to one based on quantity traded.

The institutional guide about pricing dealt with unnecessary overcharging i.e. the traders were supposed to use one and non-exploitative selling price. There were also restrictions on cutting of trees whereby no trees were to be cut especially during collection.

Generally, traders were supportive of the regulations as they promoted good management of the markets and the fruit trade business. In addition to these rules, the traders suggested making rules for solid waste management, enforcing market rules strictly, having uniform prices. In their opinion, this would ensure effective management of the *Uapaca kirkiana* fruit trade.

6.2 The Forestry national policy provisions and impact

6.2.1 Policy provisions

Figure 6.1 shows that the majority (63.2%) of foresters think that the national forestry policy did not provide adequate support for IFTs. About 31.6% think that there was sufficient provision for IFT while 5.3% did not know.

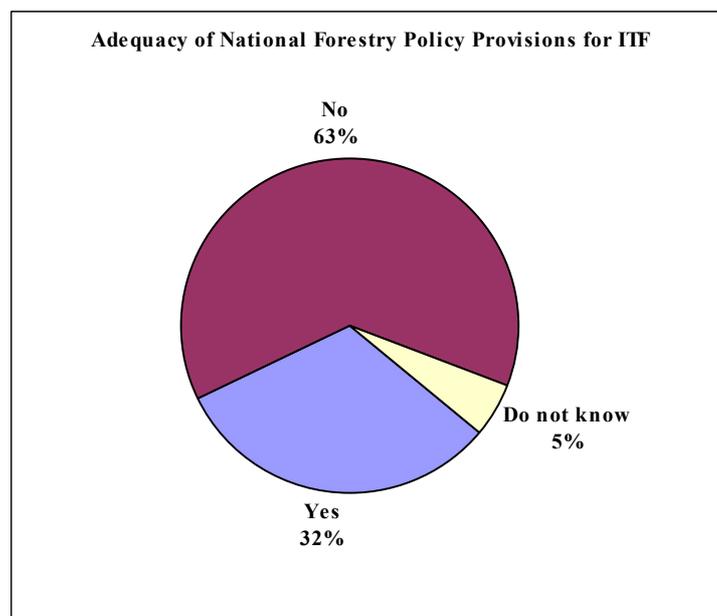


FIGURE 6.1 Zambia's 1998 national forestry policy provisions for IFT/NTFP

6.2.2 Policy impact

Seventy percent of officers said the national forestry policy had impact on management of natural resources while 25% said it did not have any impact. Regarding IFTs, 68% of the officers said the policy had no impact, while only 5% said there was some impact on the marketing of IFT and/or NTFP. On both the natural resources and IFTs specifically, the respondents asserted that

the impact was reflected in a policy commitment to the provision of training in marketing, harvesting and preservation of NTFP, and to encouraging involvement in the production and marketing of NTFP. The other impact of the policy comprises promoting NTFP production and marketing (5.3%). Some/other respondents did not know (21.4%) whether there is an impact (see Table 6.2).

TABLE 6.2 Views of Forestry Department officers on the national forestry policy impact

National Forestry Policy impact	Yes	No	Other	Total
On management of natural resources (n=20)	70.0	25.0	5.0	100
On IFTs (n=18)	5	68.4	26.6	100

6.3 Institutional constraints

6.3.1 National forestry policy implementation constraints

Figure 6.2 shows the constraints to the implementation of the forestry sector policy. According to the officers interviewed, the problems were:

(a) Inadequate resources (finance, human and material) (37.6%) resulting in: (i) lack of information on NTFP such as variety, status, quality and stocking levels, (ii) no inventories done and systems developed to assess the resources, (iii) no market-drive strategy for indigenous NTFP including *Uapaca kirkiana* and other IFT, (iv) no value addition to the products, (v) uncoordinated NTFP marketing system, and (vi) NTFP potential management and implementation mechanism that are not developed and not yet widely understood by most rural communities.

(b) Inadequate technical capacity (12%). There was lack of capacity to add value to most NTFP and produce the required participatory NTFP management guidelines.

(c) Limited government and traditional support (27%), including in law and policy. There was inadequate government technical and financial support to communities and industries. The government's attitude was that NTFP were not important and as such not placed among key priority areas in its programmes. The indications of lack of commitment by or support from government that was mentioned were twofold. The lack of policy on NTFP resources and human

resources and instruments (machinery) to manage NTFP, and also lack of appropriate processing and packaging facilities for NTFP.

(d) Limited publicity and education/awareness (17.1%), with the resultant effects of: (i) poor monetary values being attached to NTFP and management of the NTFP raw material base, (ii) people having inferiority complex regarding the utilisation and marketing of NTFP, (iii) limited knowledge on the preservation methods of indigenous fruits and low quantities produced of NTFP.

(e) Low motivation/moral levels of stakeholders (7.3%)

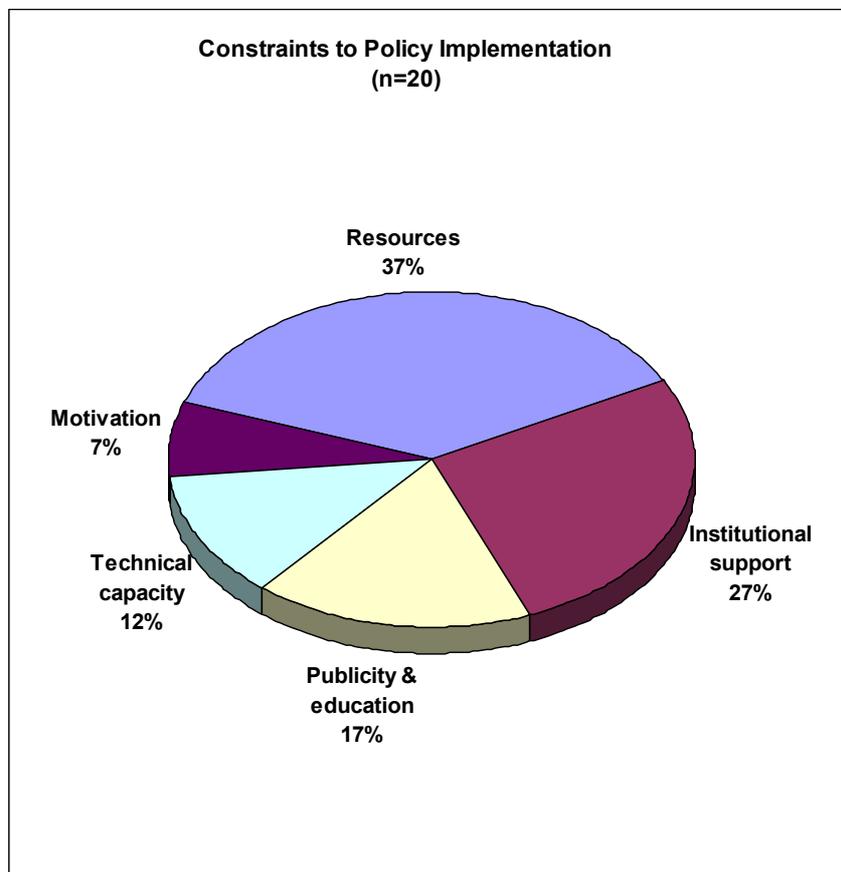


FIGURE 6.2 Constraints to policy implementation

6.3.2 NTFP development constraints

The lack of policy implementation was coupled with a number of NTFP development constraints shown in Figure 6.3. The constraints are: (a) limited technological capacity including information (28.1%), (b) no appreciation of NTFP by government, the market and community (25.0%), (c) lack of market and product development (21.9%), (d) lack of industry promotion (12.5%), (e) difficult accessibility (long distances involved in some cases) and low quality of NTFP (9.4%) and (f) poor management of NTFP resources (3.1%).

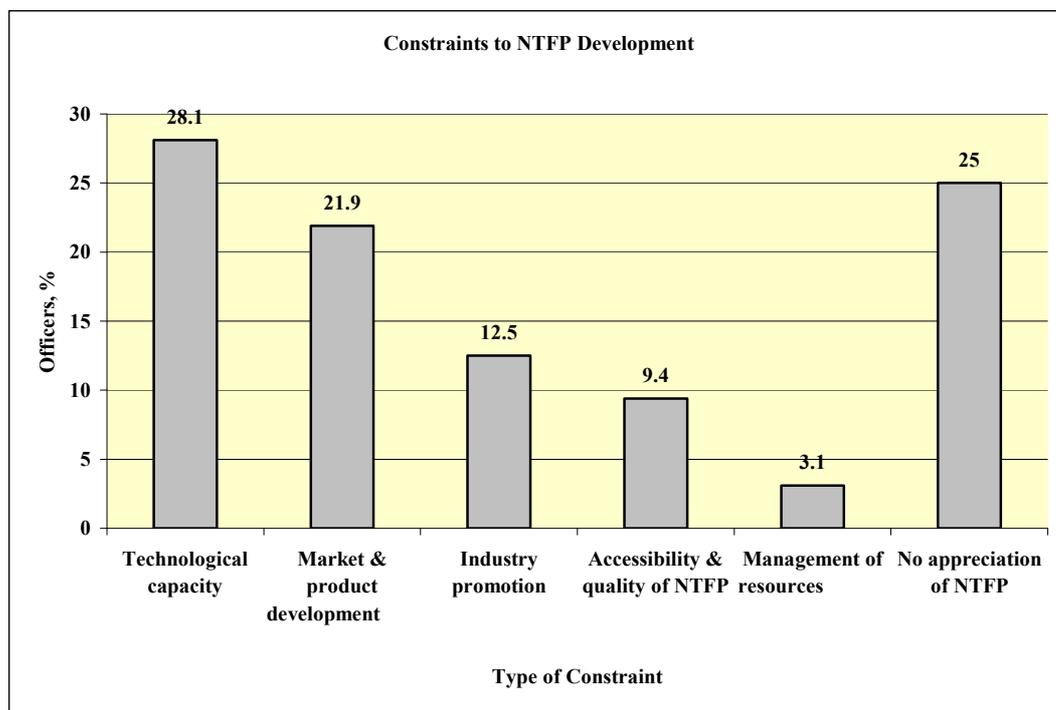


FIGURE 6.3 Constraints to the development of NTFP

6.4 Improvement interventions for IFT

Table 6.3 shows the suggested interventions on the marketing and improvement of IFT and/or NTFP. The officers think institutional intervention in IFT marketing is most needed in two areas. The areas are the value addition/post-harvest technology (50%) and establishment of marketing and market linkages (29%). Publicity and education on IFTs (17%) and Policy formation and formulation (4%) are also required to improve IFT marketing. For the IFTs improvement, research on development and management (37%) and both ex- and in-situ management of IFTs

(27%) were mentioned as very important. There was also intervention required in improving law and policy enforcement (17%), developing actors' harvesting and processing skills (17%) and establishing processing industries and marketing (3%).

TABLE 6.3 Institutional interventions on IFT as proposed by Forestry Department officers

Proposed intervention	Response, %	
	Marketing of IFT (n=16)	Improve IFT (n=19)
Post harvest/value addition technology	50.0	-
Marketing development & linkages establishment	29.2	-
Publicity and education on ITF	16.7	-
Policy formation and formulation	4.2	-
Research on development and management	-	36.7
Ex- and in-situ management of ITF	-	26.7
Improve law and policy enforcement	-	16.7
Develop actors' harvesting and processing	-	16.7
Establish processing industries and market	-	3.3
Total	100	100

6.5 Conclusion

These data in this chapter reveal that institutions (i.e. policy and rules/regulations) exist to direct both natural forest resources management and trade in NWFP/IFT. However, these are still weak in provision and impact at management and trade levels. The prominent shortcoming is capacity both in technology and resource mobilisation.

Chapter Seven:

Discussion of Research Results

This chapter is a discussion of the results presented in the previous three chapters. It seeks to explain the scenario for the marketing of the *Uapaca kirkiana* fruit in Zambia. In the discussions, comparison is made with findings from similar studies. The principal discussion areas comprise consumer behaviour and attitude, fruit production and product value addition, as well as market linkages and strategies. The institutional arrangements with regard to *Uapaca kirkiana* fruit trade are also discussed. The chapter concludes with a discussion on the trade challenges.

7.1 Traders and Consumers of Indigenous Fruits in Zambia

7.1.1 Traders of *Uapaca kirkiana* and other indigenous fruits

The participants in the *Uapaca kirkiana* fruit marketing chain were mostly married, female adults. These findings support earlier studies conducted in Zambia on *Uapaca kirkiana* and other NTFP by Mwanza and Kwesiga (1994) and Mkonda *et al.* (2003) who found that 81% of *Uapaca kirkiana* fruit marketing was done by females of whom 92% were married and between the ages of 21 and 41 years. The household size for collectors and retailers was close to the national average which, according to ROZ (2002) is five persons for each household. Having more married participants in the marketing of the fruit may suggest that the trade is an important livelihood coping strategy for income generation at household level. Sufi and Kaputo (1977) observed that the fruit was a fundamentally important income source for families. Emerton (1998) also estimated that one-third of rural households harvest wild food resources in the form of fruits.

The current study revealed that fruit trading has been practiced for a long time with some retailers claiming to be involved for more than half a century. However the average number of years traders were involved was much lower at seven and ten years for collectors and retailers respectively. These results were close to observation by Mkonda *et al.* (2003) whereby 60% of the traders had been involved in selling *Uapaca* between three and nine years while 8% had been in the business for more than 10 years.

In the current study, and similar to the reports by Emerton (1998), all family member categories participated in the trade chain but with different focus areas. Men, children and women all

harvested indigenous fruits. Haq *et al.*, (2008) also observed that women play a major role in the harvesting, processing and marketing of underutilized indigenous tree products.

For both study areas, there were more women at collection/producing and retailing stages than men, with more men at collection than retailing. Children participated more at retailing than collection level. A similar situation exists in Zimbabwe, where Ramadhani and Schmidt (2002) observed that more children were participating in retailing than collection. These researchers felt that labour, transport, transaction costs and the amount of capital investment incurred in the collection and retailing stages of the trade influenced the situation. Emerton (1998) found in Zambia generally similar results except at production level where children dominated the activities. This might suggest that household members' participation in trading was determined by the existence and timing of other activities for example farming activities. Ham *et al.* (2008) reports that fruits were collected when there were minimal agricultural activities. In Zambia, Sonkasonka (1990) also found that traders' activities coincided with agriculture labour requirements. This linkage of fruit trade with agriculture implies that farming activities influence production of IFTs and possibly the division of labour roles in a household.

The current study had revealed that the general level of education is low among the traders. The collectors had lower educational level (with the majority attaining primary education) than the retailers. Ramadhani and Schmidt (2002) assert that educated traders can more easily attempt marketing innovation opportunities than ones who are not educated. Mithöfer and Waibel (2001) also observed that the educational level was among the factors that positively influenced the sale of *Uapaca kirkiana* fruit in Zimbabwe. None of the two researchers defined education contextually. Nonetheless, their findings suggest, by proxy, that the current population scenario in the study areas of the young actors with basic education indicates potential for market development or expansion in the study areas. However, to turn the potential into actual trade expansion and meaningful socio-economic benefits, the current low educational standards among traders need targeted intervention, which could be focused on training in trading/business management skills.

7.1.2 Consumers or buyers of indigenous fruits

Similar to traders, married females formed the majority of the buyers or consumers of the *Uapaca kirkiana* fruits. The highest educational standard in the market chain was among consumers. This may be because the marketing of the fruit was done in cosmopolitan areas with mix of

people of different societal status, including education. Ramadhani and Schmidt (2008) also report that in Zimbabwe the purchasing behaviour for both *Uapaca kirkiana* and *Strychnos cocculoides* was associated with gender, marriage status, education, the market and production sites for the respective fruit. Their study further revealed that educated people were more likely to buy *Uapaca* and *Strychnos* fruits than less educated people. Similarly, married people were more likely than unmarried ones to buy *Uapaca* rather than *Strychnos* fruits.

These findings suggested that there might have been a family influence in the purchasing behaviour for IFTs (Ramadhan & Schmidt, 2008). One possible explanation for such influence would be a higher level of appreciation of the nutritional and other value of the IFTs because of knowledge about the products. Another explanation could be that families engage in marketing and buying of *Uapaca* and other IFTs as a livelihood strategy. These findings, including that of the current study, identify and stress the importance and need to educate (sensitise/raise awareness about/publicise) the population on the value and benefits of consuming IFTs. In this regard, strategic extension services and/or events would be appropriate.

7.2 Production and Marketing Chain

7.2.1 Production, post harvest handling and fruit losses

In the two study sites, the system for the post harvest handling of fruits involves mainly transportation and storage. Transportation and storage systems were underdeveloped at both production and retail stages. Transportation at both collection and retail levels was restricted to using bicycles and on foot. The storage technology was equally underdeveloped with facilities limited to sacks and on the ground storage, neither of which was designed specifically for fresh product storage. There were no remarkable differences between sites and trader groups except for fruit storage methods where more retailers stored fruits in containers than collectors who stored mostly on the ground. This study therefore inferred that the post harvest handling of indigenous fruits was poorly developed. The minimally developed post handling system and the high perishable nature of the fresh fruit resulted in traders incurring losses. In similar studies, about 61–88% of marketers/respondents indicated that postharvest losses were a major constraint for *Uapaca kirkiana* (Kadzere *et al.*, 2001 in Akinnifesi *et al.*, 2008).

Ham, *et al.*, (2008) attribute some of the fruit losses to the crude methods of harvesting fruits which cause excessive bruising to the fruit, thus reducing the shelf life, quality and

market/commercial value and the potential income generation. Such methods include throwing, hitting stems with heavy objects, and shaking stems or branches to dislodge fruits (Akinnifesi *et al.*, 2008; Kadzere *et al.*, 2005).

Losses or wastage were also partly due to limited capacity to market the fresh produce (Haq *et al.*, 2008) and partly because of supply exceeding demand (Saka *et al.*, 2008). The current study revealed that at retail stage, it took about three days for *Uapaca kirkiana* fruit to spoil. Therefore, capacity would include organization to procure, transport and advertise/promote and actually sell within this time span. From the current study, however, it took 1.5 days on average before the fruits were completely sold off and a total of about three to four shelf life days.

The current study did not investigate the actual loss incurred. However, there are similar studies by Akinnifesi *et al.*, (2008), that suggest that in developing countries (including Zambia) about 25–50% fruit nutrient and quality is lost directly or indirectly along the market chain from production to consumption. According to Akinnifesi *et al.*, (2008), this loss cause up to 55% wastage of the collected fruits.

Lessons from these studies are that market improvements need to be focused on transportation and storage systems. Further, to avoid losses of the fresh fruits there is a need to develop indigenous fruit handling, preservation and processing technologies. This might require further investigation on the postharvest management practices for fruits.

7.2.2 Fruit marketing and information pathways

a) Fruit marketing pathways

The study shows that traders and some consumers/buyers obtained the fruit from more than one source, but mostly from state forest estates. This included sources from Zambia, Malawi and Congo. Fruits were also sourced from communal and private forest areas. This might suggest easy availability of the fruits in these areas and/or countries. While it might be true for Zimbabwe, Zambia and Mozambique where wild populations of IFTs still flourish in many areas (Akinnifesi *et al.*, 2008), it might not be the case for Malawi. In Malawi some wild fruits are disappearing and others like *Uapaca kirkiana* are becoming sparse in some natural areas. Lack of stewardship and increasing population pressure are the casual factors identified (Akinnifesi *et al.*, 2008; Mwase *et al.*, 2006), as well as forest fragmentation and wildfires in the case of the overall decline natural populations of *Uapaca kirkiana* through out the miombo woodlands

(Mwase *et al.*, 2006). Such scenarios point to need for good management of forests/woodlands for the IFT based enterprises to expand within and across international borders. Resources inventories are also needed to know the currently correct extent of resource loss.

The current study also showed that from the sources to the end consumers, the trade chain has no explicit division of activities by actors. Thus, although the collectors are the usual first link in the marketing chain, selling to consumers through retailers, the system is not consistent. Retailers also collect fruit in some cases. There are direct links between collectors and end consumers. In Zimbabwe, the marketing system for IFTs had also no clear division of marketing activities between the actors involved. Sometimes fruit producers/collectors and retailers were involved in gathering, transporting and selling fruits in the markets (Ramadhani & Schmidt, 2008) similar to the current study in Zambia. In fact, in Ndola and Chipata there was intra trade whereby collector-retailers in the villages also obtained fruit by buying from fellow community members. In Cameroon, according to Ndoye (1995), a trader could simultaneously act as an NTFP assembler/wholesaler or a wholesaler/retailer, depending on the strategies pursued at different times of the seasons or the year. The IFT marketing system does not, therefore, seem to enjoy the benefits of specialization in business or trading.

As indicated implicitly in the foregoing paragraph, the supply chains for IFT were fairly short. According to Ham, *et al.* (2008), the longest chain consists of collectors, wholesalers, retailers and consumers. The current study, showed that the chain was shorter with only collectors/wholesalers, retailers and consumers. Despite this, traders in the current study areas engaged in more than one stage of the market chain. This scenario may not be particular to Zambia alone. Ham, *et al.*, (2008) observed that farmers sometimes effectively eliminated all middlemen sold their fruits directly to the public at markets, and therefore negotiated a better price. In the current study, similar reasoning existed whereby direct marketing served mainly to increase the returns to their labour. Collectors in Ndola and Chipata said they retailed their fruits to gain more money.

Similar reasoning exists among traders elsewhere. In Zimbabwe, according to Ramadhani and Schmidt (2008), the wholesalers were obtaining the lowest share of the price despite having the market and therefore opted to retail to recover some of their costs. In the Philippines, some farmer/community groups decided to avoid the intermediaries when marketing their own products and reported to have been successfully produced and marketed locally produced products such as

quality jams and jellies (Haq *et al.*, 2008). Training and education in business and processing skills for rural communities could improve their earning potential by teaching them to trade and process fruit instead of mere collectors of fruits.

Ramadhani (2002) disputed the common assumption that collectors are exploited by wholesalers and middlemen in the NWFP trade as it was not supported by the findings on the marketing system of *Uapaca kirkiana*. The collectors could still sell fruits to retailers and vendors. Since the use of many channels in the marketing of fruits also exists in Zambia as established by the current study, it might be concluded that there was no exploitation of collectors by middlemen.

Along the supply chain, the fruit distribution distances varied in the study sites. A maximum of 324 km was involved between the point of purchasing or collection and the market. Some of the Lusaka based retailers obtained the fruit from Chipata in Eastern Province. For Chipata, the supply distance ranged from at the market delivery by middlemen/collectors to 15 km away from the markets places (Mkonda *et al.*, 2003). The implication of long-distance transportation is that mechanical damage to the fruits is increased, thereby reducing their market value (Ham, *et al.*, 2008). The current study confirmed that traders experienced loss due to long transport distance.

In the study areas being reported on, (*ibid.*) the mode of distributing the fruit along the trade pathway was predominantly by foot and bicycles. In Zambia walking long distances (up to 10 km) especially in rural areas is still the predominant form of transport (Sonkasonka, 1990). Lack of easier forms of transport leads to fruit wastage (Packham, 1993), as was reported in the current study.

At the end of the supply chain or points of exchange, the markets involved in the study had permanent but poor infrastructure in form of buildings and stalls on the streets/roadsides and in residential areas. The major points of trade for IFTs included local/rural markets, roadside and urban markets. It is known from earlier studies that the local markets trading share was 35.6% against 31.1% for roadside marketing (Ham, 2003; Mwanza & Kwesiga, 1994). For the current study, one factor that would possibly contribute to such market outlet shares would be the market entry fees/charges that stopped some of the traders using the designated markets. However, based on the findings of these different studies, it seems the development of market infrastructure in the study sites has been minimal.

b) Market information system

Market information is among the important aspects for effective and efficient product distribution. In the study areas there were some positive basic synergetic communication between the suppliers and the consumers. However, despite this seemingly positive situation, the *Uapaca kirkiana* marketing information channel was not defined properly. The actors get information on a one-on-one basis. The study did not reveal any proactive information system on the consumer preferences, prices and value of the fruit. Generally, the collectors and retailers were operating with very limited prior knowledge on the market scenario in terms of prices and particular needs and wants of the consumers or buyers of the fruit. Some pricing at retailer and collector stage relied on visits to the market and neighbours. Moreover, retailers had no information on consumers' quality needs and demand for the fruits except for aspects such as appearance, cleanliness, taste, maturity and size of fruits. According to Mander (1998), such type of communication frequently causes over- and under supply to occur in the markets. Such a situation does not favour industrial development because it can send wrong and detrimental signals to the trade industry.

There are similar results elsewhere. Haq *et al.*, (2008) indicate that access to information was lacking throughout the production pathway including information on the community-driven benefits, from germplasm resources to consumption. According to Ham, *et al.*, (2008) and Haq *et al.* (2008), the small-scale production and the commercial development of IFT enterprises is hampered by poor linkage of producers with consumers and the market, and the lack of market information on indigenous fruits. Therefore, producers and potential users of IFT are unaware of the benefits of the crop and the technologies that may be appropriate to their needs.

The current IFT trade system in Zambia indicates a rudimentary market that is still in a development process. In such a system, there is low operation efficiency whereby actors incur costs without actually increasing consumer utility or benefits. This can restrain advancement of the trade's full potential to the detriment of business through traders getting discouraged to either enter or sustain their businesses (Kohls & Uhl, 1998). Logically, therefore, to develop the marketing of *Uapaca kirkiana* and other IFT, the marketing information system needs enhancing. Extension services should be provided to the traders to give insights on obtaining and managing information about the market especially in a competitive business environment.

7.2.3 Market concentration

The current study has indicated a high concentration of the market at collector level. The concentration ratios revealed through the study were similar to the situation that prevailed in Zimbabwe in 1999/2000 season where there was high concentration of wholesalers. In Zambia (i.e. study sites) the largest collector handled 12% while in Zimbabwe the largest trader handled 17% of total volume of fruit. The three largest collectors in Zambia traded 33% of the volume of fruit while in Zimbabwe the three largest handled 39% of fruit (Ramadhani & Schmidt, 2002).

Concentration is felt to play a large part in determination of market behaviour within an industry because it affects the interdependence among traders. A large degree of concentration suggests a likelihood of a non-competitive behaviour in a market (Scott, 1995). According to Ramadhani and Schmidt (2008), a high market concentration indicates market power. The concentration ratios that existed in the study sites suggested that the collectors could have the market power thereby enabling them to determine the fruit prices.

7.3 Indigenous Fruit Demand Drivers Influencing Consumer Behaviour and Attitude

7.3.1 Preferences and tastes of consumers of indigenous fruits

In the study sites, the current findings show *Uapaca kirkiana* as the most preferred and popular fresh IFT followed by *Anisophyllea boehmii*. According to Akinnifesi *et al.*, (2008), a study covering 451 households in Malawi, Zambia, Tanzania and Zimbabwe showed *Uapaca kirkiana* as the first preference. The others in order of preference after *Uapaca* were *Strychnos cocculoides*, *Azanza garckeana*, *Ziziphus mauritiana* and *Adansonia digitata*. The current study confirmed the superiority of *Uapaca* among IFTs in Zambia.

The current study has shown that *Uapaca kirkiana* was preferred both as a fresh and processed fruit product for several reasons, including sweetness and nutritional value. Nutrition and taste are the popular reasons for choosing *Uapaca* among farmers in addition to small stature and quality timber (Haq *et al.*, 2008). Recent research has suggested that rural communities can increase their nutritional well-being and incomes by utilizing and marketing fruit tree products (Jordaan *et al.*, 2008). IFT are among the cheapest yet richest sources of food on which the poor that are insecure in food and are chronically malnourished depend especially in Malawi, Tanzania, Zambia and Zimbabwe (Saka *et al.*, 2008). In the Miombo, IFT including *Uapaca* are

rich in sugars, essential vitamins, minerals, oils and proteins necessary for human nutrition (Akinnifesi et al., 2008).

In addition the fruit was consumed for hunger satisfaction and mostly as a snack, leisure/*habit* and to quench thirst. The value of *Uapaca kirkiana* as a snack is important, however, in times of famine, IFTs become the principal source of food and play a substantial daily dietary role of rural people (Akinnifesi et al., 2006).

Uapaca and other IFTs need strategic promotion to increase their benefit to traders and their families. Fruit marketing promotional strategy can capitalise on the current demand and purpose for consuming the fruit such as the provision of vitamins. Development of IFT processing industries would also contribute to national socio-economic development.

7.3.2 Fruit and marketing characterization based demand drivers

Some fruit demand drivers were based on the fruit characteristics and market environment. Based on the results of the current study, there were 11 attributes of fruit and marketing environment the consumers considered when making decisions to purchase the fruit. Most of the consumers valued taste, appearance and cleanliness. Taste was the most *strongly considered*. The other factors considered were graded fruits and the quantity of fruits sold.

The study has also shown that consumers of *Uapaca kirkiana* regarded quality (taste, cleanliness, etc), prices and packaging as important when selecting fruit for direct consumption. In some studies on non-IFTs consumers also regarded quality (texture, taste and flavours) more than price (Harker et al., 2003). These seem to support the current study results where some traders assert that the fruit prices were easily affordable by many people, and hence it was not a strong concern for the consumers. Consumers preferred to buy clean, graded and packed fruits.

Buying behaviour for *Uapaca kirkiana* was also influenced among others by appearance, price, size, quantity, pest infection, maturity, packaging, and source of fruit. Interestingly, the most important attributes revealed in the current study were similarly shown as such in a study by Ramadhani and Schmidt (2008). Consumers preferred to buy round, fresh fruits rather than rough, non-fresh fruits (Ramadhani & Schmidt, 2008). In addition, Ramadhani and Schmidt (2008) reported that colour and freshness influenced purchasing behaviour.

Some buyers preferred brown to yellow fruits. These findings suggested that the ideal product identified by the buyers as a whole was a small packet containing small, brown, round, fresh *U. kirkiana* fruits.

Thus, in order to increase sales Ramadhani and Schmidt (2008) recommend that traders must provide fruits with the characteristics identified by the consumer. To ensure this, there should be strategic extension services targeting basic market research to enable the traders to link consumer preferences to the type of fruits to supply the particular markets. These might be addressed in two major ways to improve the fruit trade. One way would be through marketing strategies where such factors as pricing, cleanliness, maturity, packing, selling site and appearance could be addressed. The other way is scientific research. Matters of size of fruit, pests and taste may require genetic improvement.

The current study reveals that the main problems experienced by consumers were to do with the fruit characteristics and to a minor extent the state of the forest resource from where the fruits were sourced. Earlier studies e.g. Gondo *et al.* (2002) and Mwanza & Kwesiga (1994) found similar problems. Production, product and market characteristics influence the demand for fruit. According to Kohl and Uhl (1990), such characteristics may be perishability, large price and quality variations, seasonality, alternative product forms, bulkiness of product and geographic specialisation of production. The current study has shown that each of these attributes affected the demand for *Uapaca kirkiana*. They are discussed below.

Fruit characteristics: The seeds cause sores in the mouth, eating the fruit cause stomach pains, diarrhoea or constipation and loss of appetite; fruits on the market are rotten and infested with pests or maggots as well as having bad smell. Fruit had different tastes and the sweet and sour or bitter fruit were mixed and sold together. Consumers' attitude was that the fruit did not satisfy hunger and were inconvenient to eat, as one has to squeeze the pulp from the fruit. Different tastes may result substantially from tree-to-tree variation in fruit characteristics and thus to a lack of uniformity in quality. Mwase *et al.* (2006) report high variation high genetic diversity in *Uapaca kirkiana* population in Malawi. For this reason IFTs might not fetch a good price (Haq *et al.*, 2008).

Food safety is a very important issue in fresh and minimally processed products. Minimal or fresh-cut processing of fruits provides convenience to food service and retail consumers, but may

result in severely limited shelf life because of undesirable pathological and physiological changes after processing (Fallik, 2004). This is a serious challenge for the concept of domestication-commercialisation linkages developed around the resource-poor farmer-traders.

Perishability: The shelf life of the fruit is short; it perishes rapidly due to rotting. Product longevity is one of the commonest problems in fruit trade. According to Kohls and Uhl (1990), it is estimated that up to 10% of the value of fresh fruits in general is lost in the marketing process. Buyers prefer fresh fruits and their purchase behaviour is influenced by the appearance of the fruits at the marketplace. Processing of the fresh fruits into finished products would increase the satisfaction of consumers and eventually sales for the traders. It would also contribute to the conservation of the forest resources of promote the domestication of the particular tree resources.

Fruit availability: The consumers experience seasonality and inconsistent supply of the fruit by the traders. The fruit is available at most only a quarter of a year due to their seasonal nature. Gondo *et al.* (2002) and Mkonda *et al.* (2003) also observed fruit seasonal availability and rapid perishability as problems experienced by consumers. Most fruits have seasonal production and demand patterns that also influence their marketing (Kohls & Uhl, 1990), suggesting that these are among the important constraints in the marketing of the fruit. Although seasonality can be a disincentive to some traders in *Uapaca kirkiana*, it can equally be a merit. Availability of fruits at a time when most agricultural foods supplies are low improves food security especially for the rural consumers.

Unhygienic marketplaces: Most of the marketplaces were said to be unclean. Respondents complained that the sellers did not keep the fruit hygienically and so it attracted flies. Fruit solid waste disposal was unorganised. The nature of the waste from *Uapaca kirkiana* fruit demands solid waste disposal management. In some markets in Chipata District, there were market management committees that oversaw the cleaning of the market places. These could be emulated and encouraged in other areas especially in conjunction with the local government institutions (Councils) responsible for market. Currently in Zambia, there is politically oriented support on environmental hygiene where the republican presidency⁷ has launched a *Keep Zambia Clean Campaign*. This could be led and sustained at council level. Many buyers wanted to buy packed fruits for easy carrying, attractiveness and hygiene. Under such circumstances, promotion of hygiene and general cleanliness ought to be of paramount importance.

⁷ Under the directive from the Late Republican President Dr Levy Patrick Mwanawasa, SC

Fresh versus processed fruit: The reason for consuming fruit was generally the same for the two study sites with sweetness and nutritional/vitamins value as the most popular reasons. The fruit was consumed both in raw and processed form. Referring to the Indian scenario, Haq *et al.*, (2008) reported that the high nutritional value and medicinal properties of some fruits could be exploited by producing products for niche markets, such as health foods or natural products. They observed that many of the IFTs have considerable marketing potential. Sonkasonka (1990) and Sorenson (1993) made similar observations whereby traditionally, local fruits are either eaten raw or processed in form of drying, cooking or pounding for oil and other products with the processed and unprocessed fruits being occasionally sold to urban areas for cash income. Saka *et al.* (2008) observed similar utility forms in Burkina Faso where local knowledge systems indicated that indigenous fruits were used in the preparation of meals as fats, spices and soups. As indicated by the current study, low levels of processing might be because of limited technology to add value to the product.

Unlike Ndola, in Chipata District the majority of consumers preferred raw to processed fruit. The reason for the differences in consumption form preference is not clear or certain but could be about awareness level. The urban Ndola-market might be more exposed to processed (exotic) fruit products than the Chipata market.

For Chipata the indication of preference was based on the knowledge that exists among the consumers of what was possible to produce. In Chipata, it appeared that the people were more aware of the potential products into which the fruit could be processed. This could have been due to the ICRAF project on domestication and commercialisation that was disseminating and scaling up some product development technologies in Chipata District. Experience has also shown that effective utilization of indigenous knowledge (IK) and local community preferences were a key to the domestication of trees and the commercialization of their products (Saka *et al.*, 2008). More investigation on IK may be required and used as vehicle to the expanded commercialization of the IFT trade especially among the poor.

Much of the foregoing reasoning for consuming and preferring raw to processed fruit products seems to revolve around limited knowledge of the alternative utility forms of the fruit. It seems the fruit has not been rigorously promoted especially with the aid of available and potential processing technology. Aside from increasing the income for traders, promoting the processing

of fruit would encourage resource management to satisfy expanded markets including people who have apprehension for unfamiliar foods (Fallik, 2004). It is however, important to note that knowledge exists about the importance of processing the fruit and could be investigated further.

7.4 Marketing Conditions and Costs

7.4.1 Market storage conditions

The current results have shown that storage facilities for fresh fruits are not designed for that purpose. They therefore contributed to the loss of the harvested fruits, and as Akinnifesi *et al.* (2008) noted, could be a serious cause of fruit spoilage and lower quality in the post harvest stage. There have been losses of about 95% in IFT from miombo ecozone. Storage would protect fruits from weather and reduce loss through spoilage (Kaaria, 1998; Ramadhani, 2002). A short shelf life of about three to four days limits household utilisation and marketing. In the sites for the current study, poor storage would be associated with poor market infrastructure. Lack of marketing sheds and storage facilities in Zimbabwe shortened the fruits' shelf life causing massive losses due to perishability and eventually traders' failure to recover costs (Ramadhani & Schmidt, 2008).

The findings by Kadzere *et al.* (2005) and Saka *et al.*, (2008) were that post harvest techniques to preserve and prolong storage and shelf life were still largely underdeveloped for *Uapaca kirkiana* fruits. Cold storage of *Uapaca kirkiana* fruits was only possible for up to four weeks. The fruits that could not be immediately consumed, preserved or marketed would be spoiled especially during the peak ripening season when large quantities of the fruits were exceedingly available in excess of demand. A study by Kadzere *et al.*, (2005) demonstrated the potential for low temperature storage and using polythene packaging to lengthen storage and shelf life of fresh *Uapaca kirkiana* fruit; to delay fruit softening and using clay pots to advance fruit ripening.

The current study has reaffirmed the problem of fruit loss in transit to consumers. Further focused investigations targeted at developing technologies to abate this are necessary. This study confirm observations by Saka *et al.*, (2008) and Akinnifesi *et al.* (2008) that processing of fruits and execution of a market strategy that would provide basic marketing support, including infrastructure and information on what to produce and where to sell is needed. This would improve household food security.

7.4.2 Transportation and other costs

Transportation or distribution costs might not have involved much cost in monetary terms at collection stage. Only about 14% of the respondents indicated that they incurred transportation costs at this stage. This was possible because the majority walked to markets with fruits on their heads. Even though no assessment of the actual expenditure was done in the current study, more expenditure on transport would be expected at retail stage. This is because at retail stage more public transport was used than at collection. There was longer distribution distance involved at retail than at collection. These expectations are supported by results of other studies (Ramadhani and Schmidt, 2008; Jordaan *et al.*, 2008; Ham *et al.*, 2008).

In a study by Ramadhani and Schmidt (2008), the cost of transport also differed depending on the means of transport and the market location, with traders in remote and poor road infrastructure paying 50% more than those closer and better road conditions. Jordaan *et al.* (2008) also observed that transport costs constituted 42% of the total variable costs to transporting the product to the market, to the possible detriment of an enterprise.

As indicated already in the present discussions, transportation was observed as contributing to marketing costs through causing mechanical injury to fruits (Akinnifesi *et al.*, 2008). According to Ham, *et al.*, (2008), transport and logistics inefficiencies were among the various factors that increased transaction costs. Unsuitable means of transport is also an important obstacle faced by producers, collectors and retailers. Because of the unreliability of transport there was significant loss of fruit which in the case of *Uapaca kirkiana* fruit accounted for 13% - 32% of all marketing costs incurred by producers in Zimbabwe (Ramadhani & Schmidt, 2008).

The other marketing costs of trading in fruit by both the retailers and the collectors included hiring labour, storage, packaging materials and market fees. The collectors invested mainly in their own labour for fruit collection. Therefore, the initial financial investment for them was minimal. This situation made collection of IFTs an efficient labour allocation strategy for poor households (Mithöfer, 2005). There is also investment in assets used for transportation and storage such as bags and baskets. In Zimbabwe, traders also incurred similar costs including time spent in presale activities and marketing time (Ramadhani & Schmidt, 2008).

At site level, there were differences in initial amounts invested per annum. The rural markets had lower investment amounts than the urban markets. Arnold and Townson, (1998) state that

activities that expand and make more sustainable contributions to livelihood enhancement tend to be capital and skill oriented. It may be correct to expect better prospects with *Uapaca kirkiana* fruit trade growth in Ndola than in Chipata.

Fruit tasting was also identified as major cause of profit loss in the current study and that by Ramadhani (2002). The way in which fruits were displayed, either on stands or on the ground, made it easier for consumers to taste the fruits. Market traders have indicated that consumer tasting was also a big problem that led to notable losses (Ham, *et al.*, 2008; Ramadhani, 2002).

7.5 Market Prices for Fruits

7.5.1 Fruit pricing: factors and determination methods

Multiple pricing factors were used by the retailers and collectors. In order of importance, the factors for retailers comprised purchase price for fruits, price taking, total cost, and labour / risks involved. The situation was slightly different for collectors in that the retailers do not consider some factors mentioned by collectors and the collectors have total cost as the most important factor. The total cost was followed by negotiation with buyers, quality and quantity of fruits, price taking, availability of fruits and labour / risks involved. Others were demand for fruits, and target profit margin. In Cameroon, a study of the relationship between market prices and fruit traits in *Dacryodes edulis* found that retailers charged consumers higher prices for fruit with desirable traits, whereas wholesalers only paid a negotiated price regardless of fruit characteristics (Tchoundjeu *et al.*, 2008).

For collectors, there are also cases where the price of the fruit is dependent on the amount of money needed to solve particular problems faced by the owner of the fruits (i.e. target profit margin). There were yet other collectors that included customer affordability and both trader types consider total cost. Affordability as a pricing strategy involves customer discrimination whereby fruit prices varied according to the customer's buying power.

In the study sites, this was usually dependent on the seller's assessment of the buyer's power. In similar veins, during some days, prices depended on the fruit availability on the market. In this case few fruits translated into higher prices and vice versa. For total cost pricing, some respondents could not itemise the cost items and only gave a blanket statement that included any cost they incurred in the process of obtaining the fruit for trade.

It seems retailers were more concerned about prices than collectors, which is a clue to some competition at retail marketing level. The other reason retailers were more aware of fruit prices than collectors could be that they sold in proximity to each other, whereas collectors were more scattered.

The study results showed that pricing involved traders themselves setting the prices. This was mainly by price leaders. The mode of payment was mainly cash. Traders needed the money for investment or purchase of commodities. In some cases, the prevalence of short-term and random contacts between sellers and buyers accounted for common use of cash payment for *Uapaca* and *Strychnos* fruits (Ramadhani & Schmidt, 2008). These study results agree with Ham, *et al.* (2008) that in many southern African countries, there is no defined or formal mechanism for the setting of market prices of indigenous fruits. Prices are determined by adding a profit to all costs.

Credit sales were made mostly to dispose and avoid loss of fruits through rotting. Apart from having clear time frames for payment regardless of the price in the season, the transactions on credit had no other conditions such as interest or higher premium. Similar results on *Uapaca kirkiana* were reported in Zimbabwe where there was no evidence of contractual arrangements between buyers and sellers (Ramadhani & Schmidt, 2008). These findings by both studies were contrary to Mkonda *et al.* (2003) who observed that selling on credit attracted higher prices in Chipata.

7.5.2 Price variation and information system

The fruit prices revealed in the current study fluctuated within the season. The prices were not the same at low and at peak supply. Price declines, at the retail level, were much more acute for Chipata than for Lusaka and Ndola districts.

For collectors, the price declines were biggest in Ndola, and smallest in Lusaka. In the case of the retailers there was a bigger price decline in Chipata than in Ndola. The price behaviour for Chipata and Ndola markets suggests much competition, whereby there is an inverse relationship between fruit quantities sold and their prices. On the contrary, the prices actually increase in Lusaka, while they are declining in Ndola and Chipata. This finding reflects poor market integration between Ndola and Chipata, and could be due to Lusaka obtaining fruit from other

places such as Choma District in Southern Province, Kabwe District in Central Province and Chongwe District in Lusaka Province. It is possible that retailers in Lusaka keep their prices relatively high even though their procurement costs are going down. These findings correlate with that of Ramadhani and Schmidt (2008) who found that prices of *Uapaca* and *Strychnos* fruits varied according to the regional locations of the markets. In urban areas, for example, fruit prices were higher than in semi-urban areas/growth points and rural markets

Fresh produce prices are the most volatile of any food product. Due to high degree of perishability, fresh produce prices commonly experience a magnitude of price changes rare for other more stable commodities (McLaughlin, 2004). More dynamic markets and closer buying as well as selling prices are usually associated with the rapid perishability nature of fruits and the lack of storage facilities (Pérez, *et al.*, 1999).

Customary pricing practices were observed during the study. Prices are maintained but the quantities sold are reduced through some unethical practices. Other participants mislead unsuspecting buyers by cutting and sewing/mending containers up thereby reducing the actual quantities purchased by consumers. Such competition tricks make price comparisons difficult. Ramadhani (2002) observed similar unethical practices among *Uapaca kirkiana* fruit traders in Zimbabwe. The lack of marketing transparency created leeway for price manipulation by the better-informed actors at all stages of marketing. Wholesalers pressed the tin bases inwards or filled the tin with grass material/papers in order to hold fewer fruits (Ramadhani & Schmidt, 2008).

With regard to pricing information system, the current study found that it was rudimentary. Most information was by word-of-mouth through contacts usually at markets. In such cases, as it was also reported for a study in Zimbabwe, day trading determined the market exchange of the fruits (Ramadhani & Schmidt, 2008). Lack of information caused pronounced price differences between regions and even within a given market place. The remoteness of the areas and poor communication might have caused some of these differences (Ramadhani & Schmidt, 2008).

The presented findings highlight the need for the development of market information systems for IFT.

7.6 Fruit Markets and Marketing Strategies

7.6.1 Markets

Market assessments for fresh fruit in the region indicate that a substantial amount of trade occurs, but that it is generally informal (Akinnifesi *et al.*, 2008). Although there is a substantial amount of trading of indigenous fruits in both rural and urban areas of Zimbabwe, the system was still underdeveloped (Ramadhani & Schmidt, 2008). Studies that were conducted in Malawi by Kaaria (1998) and in Zimbabwe by Ramadhani (2002) also found that the trading of IFTs was poorly developed (Ham, *et al.*, 2008). Similarly, the current study has revealed that although the market for *Uapaca kirkiana* existed in Chipata and Ndola as exhibited by the many buyers and the traders, it was largely informal and not developed.

Several market studies that were conducted in southern Africa indicate that the marketing of indigenous fruits was strongly characterised by six factors i.e. wild harvesting, high transaction costs, generic products, small amount of added value, orientation to local markets and limited promotion (Akinnifesi *et al.*, 2008). The current study did not engage in detailed investigation of these factors. However, its findings are generally in support of the earlier results reported by Akinnifesi and others. For example, the *Uapaca* fruit was traded in raw form by nearly 100 % of the traders captured in the study, the promotion strategies were basic, and apart from procurement from wild/natural woodlands across borders, there was no export involved. Thus, according to Akinnifesi *et al.*, (2008), the current *Uapaca* market was inefficient because IFTs were marketed as generic products, even in low-income markets. The current market therefore requires support to develop and expand. To be successful, the support might be linked to tree domestication. In Cameroon for instance, a strong marketing component has been developed in parallel with the tree domestication programme (Tchoundjeu *et al.*, 2008).

7.6.2 Value addition and marketing strategies

Under the current study marketing strategies involve product processing or differentiation. There was no trading of processed products from the *Uapaca kirkiana* fruit in the current study areas in Zambia.

The indigenous fruit marketing system is characterized by a lack of sophisticated product differentiation activities. At the producer and wholesaler levels, pre-sale processes such as washing, grading, sorting and packing do not exist. Traders believe that the fruits coming from

trees are clean and that there is no need for further processing. In Tanzania, indigenous fruits are not displayed as prominently as other produce in rural markets (Ham, *et al.*, 2008; Ramadhani and Schmidt, 2008). However, about 90% of *U. kirkiana* fruit retailers did presale activities (Ramadhani and Schmidt, 2008). According to Ramadhani (2002) and Ramadhani and Schmidt (2002), 3-4% of Zimbabwean retailers believe that perishability is quickened with washing the fruits. An alternative is to wash the fruit just before eating by the consumers. This is done in Chipata where water is provided for buyers to wash the fruits before eating them.

The current study shows the situation did not exclude processing. There were basic processing activities such as cleaning selling areas and fruit by washing and brushing them, sorting and packing fruits especially at retail stage. Unlike at collector stage, fruits were also packaged in plastics and recycled waste paper materials at retail level. According to Mkonda *et al.*, (2003), in Chipata the practices to increase competitiveness comprise sorting and grading (few actors, 2%), intercepting suppliers (to reduce competition and increase bargaining power), maintaining regular customers, selling by credit (which attracts premium), hiring labour (but for a short time period, few hired and usually/especially relatives), carrying out market intelligence, storing fruits temporarily to allow full ripening and allow tasting of fruits by customers. In Zimbabwe, in addition to these value addition activities, traders protected fruits from the sun (30% of respondents) and graded the fruits (80% for *Uapaca kirkiana*) (Akinnifesi *et al.*, 2008).

In Zambia there is no indication that the presale activities are done to direct the price formation process as none of the traders indicated this as being the case. Presale activities are done chiefly to boost fruit sales and not necessarily to influence prices. The purpose for conducting presale promotional activities were basically the same as for the Zimbabwe case where (Ramadhani, 2002) the practices are conducted to facilitate hygiene environment for the fruits. The traders also use the activities as preference creation strategy. It was also observed that more consumers were attracted to clean graded and packed fruits (Ramadhani & Schmidt, 2002).

Uapaca kirkiana jam is formulated and produced in Zambia and Tanzania (Gondo *et al.*, 2002). In Zambia only a few people process fruits into jam and wine and only at a small scale. Jam is processed in Chipata but at an elementary scale. The fruit differentiation on the market is at both collector and retailer stages. The processed fruit products in Chipata were packaged in both recycled and new bottles. In the study areas in Chipata, the processing of fresh fruits into finished products was initiated by ICRAF. ICRAF assisted farmers to process *Uapaca kirkiana*

fruit into jam and wine at a small-scale in selected pilot project villages in eastern Zambia (Jennifer, pers.com 2003).

The knowledge and technology exist about value addition. Ham (2005) quoted in Akinnifesi *et al.*, (2008) observed that there are IFT-based small cottage industries in different countries in the region including in Zambia, such as wine production from *Syzygium*, *Uapaca kirkiana*, *Strychnos*, *Ziziphus* and *Sclerocarya*.

The benefits of processing have been discussed in many studies (i.e. Akinnifesi *et al.*, 2008, Ham, *et al.*, 2008, Haq *et al.*, 2008, Jordaan *et al.*, 2008, Saka *et al.*, 2008, Njovu, 2003 and Gondo *et al.*, 2002). The benefits include production of quality and marketable products, generation of substantial cash income, improved household welfare, improve the fruit's taste, conservation of species, preserve the product, provide a palatable product and enhance food security.

This knowledge should give hope to and benefit countries such as Zambia where processing is still in its infancy. What seems to be the problem in the study sites for the current study is limited indigenous and contemporary knowledge of the existence of the market, technology and benefits of processing the fresh fruits into finished products. Akinnifesi *et al.*, (2008) found low knowledge levels of processing (i.e. 28% of respondents had knowledge). What is needed therefore is to educate the traders on the issues outlined above and provide strategic support to the marketing system.

7.7 Socio-economic Importance of Trading in *Uapaca kirkiana* and other IFTs

The current study has indicated that there was some profit gained from the sale of *Uapaca kirkiana* fruits. Impact assessment has shown that the developing indigenous fruit tree industry has potential to improve the livelihood of many farmers. For example, individuals in the current study sites could earn enough from trade in *Uapaca kirkiana* and other fruit-based products to build a new house and buy cattle. Despite this, the development process for the trade industry seems extremely slow. Lack of policy and hence prioritisation by government can be among the major causal factors together with low demand for the fruit.

The traders in Ndola get better monetary benefits per kilogram from the trade than traders in Chipata. This may be a consistent reflection of the different economic setting in the two study places. Ndola is a mining area with a relatively better economy than Chipata. The daily gross

margins can actually be lower than what is observed. This is because labour is not factored in by most of the traders.

However, while traders may get very little from fruit sales, the value attached to the proceeds is great. This is because to those in abject poverty even meager income available may mean the difference between life and death. In the current study areas the traders have indicated that trade in *Uapaca kirkiana* contributes to household income to a great extent. Ramadhani and Schmidt (2008) also confirmed this observation in Zimbabwe where fruit traders use money from fruit trading to subsidize their household income.

The role of wild edible products inclusive of *Uapaca kirkiana* fruits, in food security during famine is extremely important (Emerton, 1998). *Uapaca kirkiana* fruit marketing also employs many people in the study areas. The income is needed for purchasing basic household goods et. seq.: paying house rent, transport fares, farm inputs, meeting social desires the payment of school fees or provide seasonal income when agricultural labour needs are low (Haq et al., 2008; Ramadhani & Schmidt, 2002; Sunderland et al., 2004).

Several studies have shown that there are benefits in trading in IFTs (Mithöfer, 2005; Jordaan et al., 2008; Ham et al., 2008). Mithöfer (2005) showed that although the gross margins from indigenous fruit trees are lower than those from livestock and crop production, the return to labour is higher. Households marketing fruits have been able to maintain income flows above the poverty line throughout the year (Jordaan et al., 2008). In rural communities in Malawi, Mozambique and Zambia, 26–50% of the respondents relied on IFT (especially *Uapaca* and *Parinari*) as coping mechanisms (Akinnifesi et al., 2008). Harvesting fruits from the wild can boost rural employment and generate substantial income, especially from processing and adding value (Saka et al., 2004). IFT reduced vulnerability to poverty by 33% during the critical period. For households collecting and selling *Uapaca kirkiana* fruits, the income share was 4.1% (Mithöfer et al., 2006, Ramadhani, 2002).

7.8 Institutional arrangements in marketing *Uapaca kirkiana* and management of forests

7.8.1 Existence and scope of institutional arrangements:

The study shows that a national forestry policy (NFP), reviewed in 1998 and law exist in Zambia. The key principle of NFP is to ensure sustainable flow of wood and NTFP and services, protection and maintenance of biological diversity for the benefit of the contemporary and future generations. The strategy is through the active participation of all stakeholders. The NFP identifies five thematic policy areas among which are forest based industries, NTFP development, gender considerations and sustainable management of forest resources (NFP, 1998).

This study did not investigate the situation at traditional community level. However, other studies indicate (Oduval *et al.*, 2008) that social and political institutions for regulating and protecting forest products and IFT exist among the *Bembas* of Zambia.

The current study has further revealed that there are also rules/regulations at formal markets to govern mainly selling and managing markets. The rules comprised selling of fruits only in formally designated marketplaces and cleaning of the markets to allow their good running and avoid diseases breakouts (e.g. Cholera), and to a lesser extent management of trees.

However, although the formal policy existed, it did not provide adequately support (according to 63% of the respondents) for the NTFP/IFT trade. This situation is particular to the study areas (in Zambia), because according to Oduval *et al.*, (2008) policies that support the development of NTFP hardly exist. Further, where policies exist they often lack clarity in objectives, targets and development strategies. In this regard, the policies, governing markets might be weakly enforcement. In this connection, some respondents suggested stricter enforcement of the regulations.

For the current policy in Zambia, 70% of the respondents felt that the policy had failed to have a clear impact on the management of resources.

What is needed is a comprehensive review of the policy framework to make them more inclusive and specific to subsector level. The review would make the policy and legislative instruments more effective in regulating the utilization of forest resources (Oduval *et al.*, 2008). An understanding of the dynamics of these institutions may provide opportunities for forest resources

conservation and as such very important for the development of the IFT industry (Oduval *et al.*, 2008).

7.8.2 Institutional implementation

The central problem with institutional frameworks is largely related to limited capacity and in effect stifling the implementation of policy processes. This seems to agree with what Oduval *et al.*, (2008) identified as the cause of ineffective implementation of regulations: the fragmentation and inconsistency of institutions, most of which work in isolation, lack sufficient human resources and have poor inter-communication and information exchange. For example, some forestry officer could not tell whether the policy had in fact been implemented.

At informal level, the limited implementation of the rules might have been due to lack of trader organizations enforcing such rules. This could be avoided through establishing trader organizations that can foster (according to Oduval *et al.*, 2008) a clear sense of group identity, cooperative behaviour and established rights to the resource. Where local groups are well organized and can control forest access, rural enterprises tend to fare well (Oduval *et al.*, 2008).

Based on the current study, there seems to be a positive and cooperative attitude among traders regarding the rules that existed at marketplace management level. The suggestions some trader respondents made which included instituting rules on solid waste management, formation of trader groups/institutions and firm enforcement of the any rule attest to this support. This attitude/behaviour could be a strong starting platform for engagement and development of trader and trade/business governance institutions. The willingness to form such groups is another important avenue for operationalising the enhanced/developed institutional frameworks. Such groups/organizations like producer, trader and retail cooperatives would greatly benefit the industry.

7.9 Challenges in Marketing *Uapaca kirkiana* and Other IFTs

Generally for the current study, among the many constraints associated with marketing of the *Uapaca kirkiana* fruits, perishability, low profit gains, short business time, heavy fruits, low collection prices, transport costs and consumer tasting of fruits are among the major problems. These constraints prevent traders and direct consumers from obtaining the full potential benefits from trees. These problems were not however, experienced in the same magnitude along the supply or sites level.

7.9.1 Perishability / loss of fruit

Perishability was mentioned only at retail stage but at both sites and with almost equal rating. Fresh fruits are highly perishable and incur direct or indirect nutrient and quality losses along the market chain from production to consumption estimated at 25–50% in sub-Saharan Africa (Akinnifesi *et al.*, 2008).

7.9.2 Seasonality

Overall, the results suggest that in *Uapaca kirkiana* fruit trade the seasonality of fruit was also an important factor among the traders.

7.9.3 Heavy fruits

Overall, the results suggest that in *Uapaca kirkiana* fruit trade the hard physical nature of business was an important factor among the traders. The hard nature of work in the fruit business is the most commonly mentioned at collection. This is even more acute when fruit is transported to the market with non-motorised means and worsened by the dispersed nature of the tree fruits. Gondo *et al.* (2002) and Njovu (2003) also observed that the distance involved in procurement limits access to the markets. They further assert that for the forests that are along major highways, selling of NTFP does not pose a problem unless for forests with low volume of traffic where there would be no economically viable local market.

7.9.4 Low fruit prices and business profitability

Some traders in Zambia either avoided entry into or exit from the trade on account of limited revenue from the business. At retail stage, capital needs limit business expansion among traders, a factor also observed by Jordaan *et al.* (2008) in Malawi. Though the figures for initial capital seem low, it is cited as a constraint to sustaining the trade business. These restraints to either engaging in or expanding the business are important among resource-poor traders. At present, in Zambia, there are no suggestions of legal or institutional arrangements including customary/traditional that impede entry into *Uapaca kirkiana* fruit trade. Surprisingly, the retailers in Ndola construed low profitability of business as a problem while not a single collector considered it as such in Chipata. This could be the influence of the local economic environments.

7.9.5 Transport costs

Transport limitations were mentioned in Ndola but not in Chipata. In Chipata District, the retailers spent less on transport as they used mostly on foot and bicycles to transport their fruit to the urban markets. In some countries (Haq *et al.*, 2008) such as Nepal, most IFT collected from the wild did not reach the wholesale markets primarily because of transport problems.

7.9.6 Consumer tasting of fruits

During the current study, tasting of fruits was indicated mainly at retail stage and in Chipata more than in Ndola. Thus, the problem was less for collectors. The problem was reported in similar studies elsewhere but with slightly different results. In Zimbabwe, the tasting problem was most serious at wholesale section, followed by the retail and collection sections. This was because wholesalers spread their fruits on the ground and hence made them more likely to be tasted. In the retail section, fruits not packed in plastic bags were more susceptible to tasting than packed ones (Ramadhani and Schmidt, 2008), a similar situation to the current observation in the Zambian study sites.

7.9.7 Processing of IF

In Malawi and Tanzania lack of processing equipment and packaging materials, capital to acquire processing equipment, and absence of markets, are the main constraints by rural processing groups face. If these constraints are seen in the context of the product priority-setting exercise, it seems that they effectively prevent rural processing groups from focusing on the production of higher-value products such as wines and oils (Ham, *et al.*, 2008).

7.9.8 Institutional/Technical challenges

The results of the current study clearly reveal that there is some shortcoming in the current forest policy framework. Specifically, there is lack of comprehensive policy strategy elements to support the establishment of a market system for the trade of indigenous fruits. Limited government recognition of the opportunities offered by IFTs to promote development, as well as incapacity to implement forest policy by government institutions coupled with severe budgetary limitations of these departments are critical characteristics of the situation.

According to the respondents the following would help improve marketing of IFT in Zambia: formulation of NWFP policy, publicity and sensitisation, market research and development through collaborative institutional arrangements and post harvest technologies, conduct studies on

preservation, extraction, storage and marketing and specialisation of human resources to ensure promotion of the NWFP. All these are important issues towards the development of *Uapaca kirkiana*. The ability to analyse the problem seems to exist although Watts (2002) observed lack of capacity to analyse policy.

Sunderland *et al.* (2004) argue that it is difficult to assess where government policies can assist local producers in the form of organisation, sustainable harvesting strategies and forestry reserves support. They assert that this is because of variability in NTFP from wild harvested species. Like many other indigenous fruits, *Uapaca kirkiana* has long been utilised as a food source, but its role as a short-term survival food measure has been overlooked by agricultural and development policies in the past (Kadzere *et al.*, 2005). Local communities continue to regard natural forests as government resources. Lack of community involvement results in wanton destruction of forest resources and the emerging degradation and deforestation problems Zambia is experiencing (Mulenga, 1999). One way to address this concern would be through development and implementation of subsector policies and strategies like one on *Uapaca kikirana*.

7.10 Conclusions and Lessons

The discussion of the results shows that the marketing scenario for the *Uapaca kirkiana* and other IFTs in the Zambian study sites is in many ways similar to the southern Africa sub region. Similar to other areas for example in West Africa, it is characterized by underdevelopment. The principal areas of nascent development are value addition or processing and information systems. This coupled with the seemingly weak institutional framework for the NTFP/IFT sub sectors. The academic and strategic/business challenge is to generation of knowledge and application of the same in a focused and consistent manner for the benefit of society especially the poor elements.

Chapter Eight:

Conclusions and Recommendations

This chapter is divided into two sections: the conclusions and the recommendations. As a concluding chapter, it gives an overall executive summary and recommendations that stem from the study results and discussions. The conclusions outline the outputs of the study against the study objectives. The recommendations are on proposals for further research in marketing, policy and other relevant interventions as evidenced in the current study document.

8.1 Study Summary

The ambit of the research was the marketing of *Uapaca kirkiana* and implications for livelihood security and forest conservation. The research was prompted by the need to contribute to the facilitation of the domestication and commercialisation/marketing of indigenous tree fruits in order to improve nutrition and incomes in southern Africa.

The market potential for native fruits that exists can only be achieved through a sound knowledge base on markets and marketing. This information is still scanty (Chilimampungu, 2001; Mumba *et al.*, 1996). The principal handicap of those involved in production and trade of NTFP for both local people and private-sector enterprises is the lack of market information, market access, the difficulty of obtaining information on approximate processing technologies for their products, the demand for and value of their products (Dübeck, 1999; Wickens, 1999). The information on market acceptance is limited, resulting in a narrow and imperfect knowledge of markets for the promotion base of commercialisation (Simons, 1998). The few marketing studies on indigenous fruits conducted in Zambia have not been extensive and comprehensive. Therefore, inadequate information on the markets for and marketing of *Uapaca kirkiana* indigenous fruit was the research problem identified for this study. The research was conducted to gather and analyse information on the existing market and marketing system of *Uapaca kirkiana* fruit in Zambia.

Through this research, additional knowledge has been gained. The following paragraphs provide succinct statements of the research output presented under the five study objectives.

8.1.1 Supply and demand

The first objective of the study was **to assess the supply of and demand for the *Uapaca kirkiana* fruit**. The key concern here was to establish the existing production and consumption of the *Uapaca kirkiana* fruit in the study areas of Chipata and Ndola districts. Findings related to this object are that, to begin with, the existing collection and processing technology involves fruit collection from several sources by individuals at household level. In the trade, mostly married female adults are involved. It is usually done at the end of the year following the biological fruit production cycle. There are no organisations involved in fruit collection for trade. Fruit is collected from both government and private estates. The collection is mostly by basic and non-motorised means. The use of bicycles and foot are the most common technology in use at collection despite the long distances covered. The fruit is stored after collection to ripen and whilst awaiting transportation to market points. During storage traders incur fruit losses from rotting. Loss of fruit is also experienced during transportation where there is substantial damage to fruits. The link between supply and demand activities is done through trading using several unit measures: baskets, tins, cups, plates and heaps of fruits.

The fruit stock from sources is reported to be adequate to sufficiently supply the existing demand, and satisfy the preferences and tastes of customers. This study has shown that the demand for the fruit is propelled by the desire for sweetness, vitamins and satisfying hunger (i.e. to sustain life), among others. Such desires are addressed by consuming the fruit in basically two utility forms. The raw form is the commonest (97.4%) followed by the processed form. Very few people consume the fruit in both the raw and processed form at present. An analysis of the responses revealed that some of the consumption preferences were due to the limited knowledge on the possible utility options on the part of the consumers. Processing of the fruit is welcomed by consumers for various purposes including health, food security, value addition, better products and foreign exchange earning.

8.1.2 The structure, conduct and performance of *Uapaca kirkiana* fruit market

The second objective for the study was **to analyse the marketing of *Uapaca kirkiana* fruit**. This was targeted at examining the structure, conduct and performance of the *Uapaca kirkiana* market. On this deliverable, the study output is that the organisation of fruit marketing is chiefly

an individual or a household level business. There are no business groups or remarkable membership in trade organisations. The majority of the traders are married women. The trade is characterised by small-scale working capital, suggesting limited or slow business growth for many players. Reasons for this include limited product development where there is mainly trade in the raw fruit and a lack of promotional activities. Promotional activities comprise mainly cleaning and/or sorting to remove damaged and soiled fruits, as well as social aspects such as presentable appearance of the sellers and public relations. There are also no set mechanisms for price determination and differentiation. This is partly due to limited product differentiation and partly because of seemingly limited knowledge on the possibility to process the fruit. However, there are minor variations involving processing at collector and retailer stages and supplying direct to the end consumers at each of these levels. The channels of fruit marketing are straightforward and short. Fruits are collected and sold to retailers who sell to end consumers. The existing market information sharing system is principally not advanced but by word-of-mouth.

The markets and marketing costs are related to transportation, market entry charges/fees and purchasing of packaging materials in some instances. As indicated, consumers are mainly individuals. The largest consumer entity is the household. There are no large-scale buyers of the fruit in either raw or processed forms or indeed for processing into finished valued added products. However, prospects are there for product development through value addition because the market exists and seems starved for better products.

8.1.3 Marketing constraints and opportunities for *Uapaca kirkiana* fruit

The third objective for the study was **to investigate marketing constraints and opportunities for *Uapaca kirkiana* fruit.** The study has revealed that the challenges for the fruit traders are many. Among the issues at trader (i.e. collector and retailer) level are the physically hard nature of work, low profitability of business, seasonality of fruits, fruit spoilage through damage, transport limitations, high competition in business and limited power to set prices (especially at collection level in Ndola). The others are marketing/business skills limitations, tasting of fruits by buyers especially at retailing and high perishability of the fruit. Limited promotion mechanisms/frameworks are the problems at institutional scale. There is limited functional policy support for NTFP/IFT by way of an operational strategy.

Despite the constraints mentioned above, there are some marketing development opportunities. The first is the existence of demand. Second, there is processing technology on the market although it requires further refinement especially at local peasant level. Though the processing activities taking place in some areas of the study sites are at small-scale level, they give hope for expansion and growth of the trade in the fruit. Better still, and thirdly, there are research activities e.g. by both strategic (e.g. ICRAF) and academic institutions to provide more accurate knowledge to facilitate accelerated development including interventions.

8.1.4 The forest policy framework

The fourth objective of the study was **to examine the forest policy framework with reference to the indigenous fruit trade**. More specifically, what policy framework elements exist for the trade in indigenous tree fruit? This study has shown that forest policy principles and strategies exist but inadequately provides for the general non-wood forest products and indigenous fruits. The current policy is premised on shared forest resource management and promotion of non-wood timber forest products for improved rural livelihoods. The policy may have some key tangible outcomes. This study indicates that the most probable areas are two fold: first, improved provision of training in marketing, harvesting and preservation to entrepreneurs and second; encouraging involvement in the production and marketing of non-wood forest products. However, the study has also shown that there is some doubt on whether there is appreciable impact of any kind yet on the non-wood forest products trade.

8.1.5 Recommendations for improved marketing of *Uapaca kirkiana* fruit

The fifth objective was **to provide recommendations for the improved marketing of *Uapaca kirkiana* fruit**. The important suggestions on the marketing of *Uapaca kirkiana* fruit are presented in section 8.2 below.

8.2 Recommendations

The current study has generated some knowledge on the marketing of *Uapaca kirkiana* fruit and as such contributed to the knowledge pool on indigenous fruits and/or non-wood forest products. However, more work is still required academically and strategically to develop the native fruit industry hopefully to large commercial magnitude. Towards this end, and on the basis of the findings of the current study, the following proposals are made:

8.2.1 Policy, development and capacity building

a) Development of a comprehensive sub sector policy strategy/programme

Currently, there is little policy provision thrust towards the development of *Uapaca kirkiana* and other indigenous tree fruits. Although the existing policy acknowledges the importance of promoting non-wood forest products, it lacks specificity on promotion of indigenous tree fruit. Probably, because of this weak policy provisions, there is very little support to the marketing of *Uapaca kirkiana* and other indigenous tree fruits. A national policy is probably the only certain means of demonstrating government support and recognition of the socio-economic opportunities offered by the *Uapaca kirkiana* and indigenous tree fruits. Therefore, a review of the current national policy is suggested to create a coherent policy strategy that will sufficiently guide the development of the indigenous fruit tree sub sector. The policy needs to stress aspects of publicity and education/awareness as the current study has revealed that they seem weak.

b) Infrastructure and general market development

Two areas are important for the physical development of infrastructure to support *Uapaca kirkiana* trade industry. First, the marketplaces and the infrastructure that comprises stalls/stands and shelters should be built, improved or expanded for space to facilitate selling activities and storage. Currently, the fruits are lost largely because the infrastructure especially storage, is not designed for this purpose. It is therefore proposed that strategic intervention be made to design and improve infrastructure. Because it may not be feasible under the current economic malaise, the infrastructure could be for all fresh produce.

Because of the nature of the fruit waste that easily attracts a lot of flies; some consumers are discouraged to purchase the fruit. It is therefore proposed that the markets design and management are improved to include suitable sanitary facilities for general hygiene.

Second, a lot of fruits are lost while being transported. It is proposed that transportation facilities be designed that will reduce fruit wastage through physical damage. The innovations in this area would target designing baskets specially to carry fresh easily damaged indigenous fruits. Such innovations should also include traders on foot. In this respect, the innovation should factor in the principles of ergonomics as some people exit trade due to the heavy physical labour. As a long term strategy, the feeder roads can also be improved. Such linkages between fruit wastage and poor road conditions need to begin being appreciated by government as they are vital in rural development.

c) Capacity development of traders and the trading system

The capacity development areas should comprise:

- **Training in processing.**

At market level, there is little development due to the under-developed skill capacity of most market traders. The education of a large number of market players is low, creating serious implications and/or limitations for developing the *Uapaca kirkiana* industry. The limited capacity of market players to cooperate and promote their own development would result in an industry, which is potentially large but gravely underdeveloped. Knowledge exists and efforts to develop processing have been made but the majority of the players are unaware of such innovations. There is very limited fruit processing. Training in processing is proposed, as it will contribute immensely to the commercialisation of the *Uapaca kirkiana* fruit. Under the training programme, developing and publishing guidelines for processing and marketing of fruits can be some of the specific deliverables.

- **Research-extension-trader-agribusiness linkage scaling up**

The current and other earlier studies have undoubtedly contributed knowledge on the marketing of *Uapaca kirkiana* fruit, but there is more to learn about the fruit trade. Equally important is the need to disseminate the appropriate information/knowledge to the various stakeholders in the *Uapaca kirkiana* fruit trade. There is weak and inefficient market information sharing system in the industry including between traders. Research should therefore work to strengthen communication among both primary and secondary players especially the traders who have limited access to information like pricing and other potential utility forms of the fruit. For example, consumption in only raw form is a result of ignorance about processing. Equally, information about the nutritive value of the fruit can help improve demand and enable it compete

better with other fruits including exotic ones. Therefore, this study is recommending public awareness and education by extension methods among traders and other stakeholders (like formal, private and agribusiness sectors) to accord them an opportunity to make enlightened choices about the product. The strategic extension/education intervention packages may be to:

- Broaden the narrow perspective of indigenous tree fruits in academia, business and government,
- Initiate and sustain co-operation among stakeholders such as the traders and formal market authorities that need to work together e.g. to ensure clean fruit selling points,
- Systematically promote the consumption of the fruit in additional forms either unknown or currently unacceptable to the majority of the consumers. This can, aside from increasing the income for traders, have multiplier effects of promoting resource management to satisfy expanded markets including people with apprehension for unfamiliar foods.

- **Facilitate organisation of traders in producer groups.**

Currently, there is almost no membership in a trade organization. It is proposed that traders in IFT are assisted or educated about forming business organizations/groups. The organisation of the collectors into producer or commodity groups in the various areas can offer several opportunities for improving the production and marketing of *Uapaca kirkiana* fruits. Among the several benefits of producer groups is, firstly, the possible ease with which they could be accessed and offered assistance like training and credit facilities. They could also negotiate prices better as groups.

- **Processing of fresh fruits.**

A number of potential products and opportunities for product development have been identified in this study comprising jam, juices and wines, etc. The fresh fruits should be processed into these and other finished products desired by consumers. This study has shown that there is potential demand for processed goods from *Uapaca kirkiana* and great potential to reduce loss of fruit at both forest and trade (post harvest) levels. Processing would tap into this demand.

8.2.2 Research for improved understanding of markets

a) Determining the policy impact on non-wood forest products

Are there any proven outcomes of the policy on the development of the non-wood forest products? What elements are needed as part of the comprehensive policy strategy for native fruit

product development? What links are implied between product development and forest resource base management? How could these be included in the policy and other strategic instruments of business governance and development? The national policy may need review to refocus its thrust.

b) Assessing the demand of and desired products from the fruit for product development

Consumers have expressed interest in several products (jam, wine, drinks and even sweets in some cases). To guide production, a more specific/focused assessment of the demand for the products is suggested. What are the other products the fresh fruit could be processed into? How can the current products be refined to meet the consumer desires? Investigate the quality of the existing products and outline improvement areas and processes. This could consider the available knowledge from traditional sources to integrate into the products development processes.

c) Assessing market shares

This study did not assess market shares at retail stage, therefore this should be investigated. Market shares help locate the market power. This eventually helps in understanding the market type (monopoly, oligopoly, perfect, etc) and therefore, eventually designing strategies to improve the marketing economics. Market shares at retailer stage are not investigated in the current study. This gives a blurred picture of the market power. Therefore, scrutiny of the shares at this level is proposed.

d) Forming trader groups/organisations

Investigate the feasibility and methods of organising traders (collectors, retailers) into trading groups/organisation. Forming trader groups may help the growth of the fruit trade business because of some merits.

e) Examine the transportation technology for the fruit

Much fruit is lost through handling while in transit to the final consumers. Among the causal factors are carriers, which are mainly baskets made from reeds and bamboos. Can the transportation containers be redesigned to help reduce the fruit loss through damage? Carrying the fruits as head loads is a very difficult thereby denying people an opportunity to sustain their lives through trading in *Uapaca kirkiana* and other ITF. Are there any ergonomic improvements that can alleviate the physical hardness of transporting the fruits from the source to market

transaction points? The use of different carry tools like containers (crates, baskets, bags, etc.) and *trolleys* could be investigated.

f) Investigate the fruit loss shares along the market supply chain

Determine the fruit loss shares at the different stages of the trade supply chain (collection, retail or processing). The fruits are lost in varying volumes at different trade nodes. Knowledge on these stages would help development of strategic measures to minimise losses and improve income levels of the traders. What is the extent of post harvest loss of the *Uapaca kirkiana* fruit along the trade chain?

g) Conduct research on how to establish a market intelligence system for the fruit traders

Is it possible and worthy it to develop a market sharing information system amongst traders? The fruit traders obtain information in a seemingly inefficient way. Information sharing is mainly by word of mouth among traders.

h) Assess contribution of *Uapaca kirkiana* trade to household income

What is the exact dependence on the fruit by households? What is the exact socio-economic value of the fruit? This knowledge would help articulate arguments/advocacy for the development of a policy sub sector strategy. An in-depth investigation in this domain is proposed.

i) Craft shared forest resource management schemes

Traders especially collectors should be encouraged to participate in the management of tree resources. Developing a sense of ownership of the trees will contribute to the conservation of the forests. Such schemes should include management of individual trees on communal and private land. Common property or open access rights in larger areas, which frequently promote resource degradation, should be assessed. There are many arguments about the shared forest management concept, but people's involvement may be the concrete basis for forging a sustainable supply of the fruit resources. What is needed is to study the possibility of such a concept for the trader groups.

Finally, the opinions expressed in this closing chapter could be combined in the actual implementation of studies as they are related in concept. This will reduce costs, too. It is expected that these strategic and academic ideas will contribute to the domestication and

commercialisation/marketing of *Uapaca kirkiana* and other native tree fruits and thereby facilitate nutrition and enhance income amongst poor households in the southern African region and elsewhere.

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Appendices

Appendix 1 Research Instrument for Fruit Consumers

QN: _____ Day: _____ Date: ____/____/____

Analysis of the Marketing of Indigenous Tree Fruits in Zambia
Research Instrument for the Indigenous Tree Fruit

FRUIT CONSUMERS

1. Name other fruits you consume apart from Masuku? Would you rank them (including Masuku) in order of preference?

Fruit Consumed	1.Mango	2.Masuku	3.	4.	5.
Rank					

2. Which attributes of Mango fruits do you prefer to those of Masuku fruits?

3. Which attributes of Masuku fruits do you prefer to those of Mangoes fruits?
.....

4. How do you obtain the Masuku fruits you consume?

1. Buy	2. Collect from forest	3. Gift	4. Other, specify:
--------	------------------------	---------	--------------------

5. In what form do you consume the Masuku fruits? 1. Raw 2. Processed

6. Which form would you prefer to consume them?

1. Raw as fresh fruits	2. Processed; specify:
------------------------	------------------------

Why

7. In which of the following ways do you prefer the Masuku sold to you? *Indicate level of preference*

Ways	Tick	Rank in order of MOST preferred	(May give reasons)
Packed			
Unpacked			
Sorted into sizes			
Graded			
Heaps / loose			
Use unit measure: <i>Cups/Plates</i>			

8. Why do you consume the Masuku?

1. As snack	2. For vitamins	3. Satisfy hunger	4. Sweetness	5. Specify other:
-------------	-----------------	-------------------	--------------	-------------------

.....

9. At how much (**price**) do you buy the Masuku fruits (indicate unit measure)? (*Use table below*)

Unit Measure	1. Small cup	2. Large cup	3. Plate	4. Heap	5. Specify other:
Price					
Month					
No. of Fruits (<i>Count if possible</i>)					

10. What is your mode of payment for the fruits?

1. Cash	2. Credit	3. In kind (specify):
---------	-----------	-----------------------

.....

11. Do you regularly buy from a particular seller? 1 = Yes 2 = No
Give reasons.....
12. Do you think these fruit prices are fair? 1 = Yes 2 = No
Why do you say so?.....
13. Are there when times you consider the prices at different times to be cheap or expensive?
1 = Yes; If yes, what periods? *(Use table below)* 2 = No

Price level	Period (month)	Price/unit measure
Cheap?		
Expensive?		

14. What AVERAGE price would you be **MOST** willing to buy the Masuku fruits (indicate quantity)?.....
15. Do sellers use any ways (/practices) to attract you to buy their Masuku fruits? 1 = Yes 2 = No
If yes, indicate methods observed **(If No, check if the respondent observed following!)**

1. Keeping selling area clean	2. Grading/sorting fruits	3. Allow tasting of fruits	4. Display fruits in open areas/market places	5. Specify other:.....
-------------------------------	---------------------------	----------------------------	---	------------------------

16. Which month do you eat **MOST** of your Masuku fruits? Why the **MOST** in this month?.....
17. In which month do you eat the **LEAST**?.....
Why the **LEAST** in this month?.....
18. How many of the following unit measures of Masuku do you buy/consume per day (or per week or per month) **(Select appropriate units)?**

How many times do you consume the fruits? (Use table below)

Qty measure		1. Small cup	2. Large cup	3. Plate	4. Heap	5. Specify other:
Day	No. bought					
	Freq.					
Week	No. bought					
	Freq.					
Month	No. bought					
	Freq.					

19. Did you eat Masuku or Masuku products in the following years (Tick)?

2003	2002	2001	2000
------	------	------	------

20. Do you think there is enough fruit on the market to buy throughout the fruit season? 1. Yes 2. No
21. Has the fruit availability on the market been consistent during the past three years? 1. Yes 2. No
Why?.....
22. What attracts you **PARTICULARLY** to buy and eat the Masuku fruits? [*Similar to Qn. # 8*]
23. What characteristics do you consider important when buying and /or consuming Masuku?

Characteristic	Tick	Consideration Strength			
		1. Strongly considered	2. Considered	3. Not Considered	4. No answer
Price					
Appearance (Damage, colour)					
Selling site					
Source					
Taste					
Cleanliness of fruits					
Packaging of fruits					
Fruit Maturity stage					

24. Do you think something should be done to **improve** and make the Masuku more valuable to you? 1.Yes 2. No
If yes, what do you suggest should be done.....

Do you think the following characteristics of Masuku should be improved? (*Tick or circle*)

1 Taste	2 Size	3. Perishability period	4 Pulp Content	5. Reduce fruit size
---------	--------	-------------------------	----------------	----------------------

25. What do **YOU** think about indigenous fruits in **general**?.....
26. What do **OTHER PEOPLE** say about indigenous fruits in **general**?.....
27. What do **OTHER PEOPLE** say about Masuku fruits in **general**?.....
28. Would you classify people who trade in Masuku & other indigenous fruits as POOR or RICH?
Why.....

Problems and Interventions

29. What problems do you experience as a consumer of the Masuku fruits?
30. Do you agree that the following fruit characteristics are a problem to you as a Masuku consumer?

Characteristic	Degree of agreement			
	1. Strongly Agree	2. Agree	3. Disagree	4. Strongly disagree
Different Taste				
Appearance (damage, colour)				
Seasonality				
Short Perishability				
Fruit Sizes				

31. Do you agree that there are differences among fruits in the following attributes? (*Use table below*)

32. *[NB: No question 32!!]*

Characteristic	Degree of agreement				
	1. Strongly Agree	2. Agree	3. Disagree	4. Strongly disagree	5. Do not know
Taste					
Small fruits are better than big ones					
Brown fruits are better than yellowish - white					
Pulp quantity (If of same size)					
Fruit infestation					
Fruit (Maturity) precocity					

33. Do you agree with the following opinions? (*Use code and table below*)

Code:	1. Strongly Agree	2. Agree	3. Disagree	4. Strongly disagree	5. Do not know
--------------	-------------------	----------	-------------	----------------------	----------------

Opinion	Agree (Code)	Give Reasons
Masuku fruits should not be sold because they are just collected from the forest		
To improve the marketing of Masuku there is need to advertise them because they will not sell		
Masuku trees should be planted to increase the fruit supply		
Masuku trees should be JUST managed to increase the fruit supply		
Masuku fruits are inferior forest produce		
Indigenous fruits provide relief in times of hunger		
The current tree cutting rate raises serious concern that the Masuku trees will be potentially depleted		

34. What is your general comment on the Masuku trading places?.....
35. Do you have any general suggestions/opinion/comments to make on the marketing of Masuku?.....
36. Occupation:.....
37. Average income per year OR month OR week (*indicate unit*):.....

38. District	39. Location/Area	40. Name of Market/Residence

Name (optional)	Tribe	Sex	Age	Marital status	Family size (#)	41. Education level

*Code: 4 & 5: no code (5: to be coded later) 6: (1=Male, 2=Female) 8: (1 = Single, 2 = Married)
10: (1 = No formal education, 2 = Primary, 3 = Secondary, 4 = Tertiary level)*

Enumerator:.....

Appendix 2 Research Instrument for Fruit Wholesalers

QN: _____ Day _____ Date: ____/____/____

Analysis of the Marketing of Indigenous Tree Fruits in Zambia
 Research Instrument for the Indigenous Tree Fruit

WHOLESALEERS

Resource Harvesting and Management

1. When did you start collecting/procuring Masuku for sell?
 2. Why did you start selling Masuku fruits?
 3. Do you collect throughout the fruit season? 1 = Yes 2 = No
 If No, why.....
 4. Which months (**Tick**) do you collect your Masuku fruits?

1 October	2. November	3. December	4. January	5. February
-----------	-------------	-------------	------------	-------------
 5. Which months do you collect **MOST** of the Masuku fruits?.....
 6. What fruits characteristics do you consider when collecting them?

Characteristic	Rank in order of importance
 7. What is your **AVERAGE** annual initial capital in the Masuku business?.....
 8. Which (**geographical**) area do you procure your fruits?

1.	2.	3.	4.	5.	6.
----	----	----	----	----	----
 9. Why do you get the Masuku fruits from these areas?

1. Nearest homestead	2. No collection restrictions	3. Plenty of fruits	4. Specify, other:.....
----------------------	-------------------------------	---------------------	-------------------------
 10. How do you get the fruits?

1. Collect self from ground	2. Buy from community members	3. Specify other:.....
-----------------------------	-------------------------------	------------------------

 Other specify.....
 11. Which physical location do you collect the fruits?

1. Private forest	2. Communal forest	3. Govt. forest	4. Agric. fields	5. Other, specify
-------------------	--------------------	-----------------	------------------	-------------------
 12. Why do you get them from these areas?

1. Nearest homestead	2. No collection restrictions	3. Plenty of fruits	4. Other, specify:.....
----------------------	-------------------------------	---------------------	-------------------------
 13. Who **else** is involved in the procurement (collection) of the fruits you sell?

1. Spouse	2. Male children	3. Female children	4. Hired Labour	5. None	6. Other, specify....
-----------	------------------	--------------------	-----------------	---------	-----------------------

- If you hire labour how much do you pay per person?.....
 AND for how long (days, weeks, etc)?.....
14. Apart from hired labour, do you pay the others who assist you? 1. Yes 2 = No
 At how much?.....
 15. Do you get hired by someone in their Masuku business? 1. Yes 2. No
 If yes, by who.....
- AND how much do you charge (indicate unit).....
16. Do you always have enough Masuku fruits to collect from your source? 1. Yes 2 = No
 If No, give reasons?

17. How much do you **NORMALLY** collect in a day (OR week, month or season)? How often do you collect them (*indicate quantity/time unit*)

Parameter	2003			
	Daily	Weekly	Monthly	Per Season
Quantity collected				
Frequency of collection				

18. How much did you collect in 2002.....

19. Which mode of transport do you use to procure the Masuku fruits?.....

20. How much of what you collect do you consume at household? (Estimate).....

21. How long does it take you to reach the fruit collection area from your homestead using this mode? (**applicable only**)

Mode of transport	1.bicycle	2.walking	3. other
Time			

22. How long does it take you to reach the fruit selling area from your homestead by...? (**applicable only**)

Mode of transport	1.bicycle	2.walking	3. Other specify:.....
Time			

23. Are the trees where you collect Masuku fruits managed? 1 = Yes 2= No

If yes, what type of management activity is done?

1. Patrol protection	2 = Fire management	3.Other, specify
----------------------	---------------------	------------------

If No, Why are the trees/forests not managed?

24. What is your opinion on forest/tree management?

Resource Post-Harvest Management

25. Do you store your fruits after collection for ripening? 1 = Yes 2 = No, **GO TO 29**

If yes, where, how and what duration? (*Use table below*)

Storage place	How (e.g. in bags, loose, etc)	How long (e.g. days, weeks, etc)

26. Does the storage affect your fruits in any way? 1 = Yes 2 = No

If yes, what are the effects of storage?.....

27. How long does it take for your fruits to get spoiled when stored?

28. Does it cost (do you pay) you anything to store your fruits? 1 = Yes 2 = No

If yes, what does it cost and how much? (*Use table below*)

Type of storage cost	Cost of storage, Zk

29. Do you do anything to the fruits before you sell them? 1 = Yes 2 = No

If yes, what do you do? (*Indicate ranking!*)

Activity	Tick	Rank in order of most frequently done
1. Sorting/grading		
2.Remove damages		
3. Washing		
4. Packaging		
5. Other, Specify		

30. Are you a member of an organisation or club? 1 = Yes 2 = No

If Yes, what type of organisation?

31. Why are you not organised as fruit traders?

32. How do you transport your fruits to the market place?.....

1. Walking/On Foot	2. Bicycle	3. Ox-cart	4. Vehicle	5. Other, specify.....
--------------------	------------	------------	------------	------------------------

33. Do you pay for transporting your fruits to the market? 1 = Yes 2 = No,
If yes, **how much** do you pay for **what quantities**?

Transport type	Charge or Cost	Quantity paid for
1. Walking / On Foot		
2. Bicycle		
3. Ox Cart		
4. Vehicle		
5. Other, specify		

34. Do you pay any market fees 1. Yes 2. No
If **yes**, how much (indicate units).....

35. Do you lose some of your fruits at some stage in the trading business? 1 = Yes 2 = No
If **Yes**, estimate the **amount** lost:
AND indicate **how it is lost**

Fruit Pricing and Selling

36. Do you determine the prices for the fruits you sell? 1 = Yes, 2 = No

If **Yes**, are you aware of the prices at which they are selling before you set yours? 1 = Yes 2 = No
If **No**, who determines the prices?

37. What factors do you consider when setting the prices for your Masuku?

1. Price taker	2. Negotiate with buyer	3. Consider labour	4. Base on order price
----------------	-------------------------	--------------------	------------------------

Other:.....

What are the prices for the Masuku fruits in the following periods? (*Use table below*)

Parameter	Year			2002
	2003			
	Start season (Oct-Nov)	Mid season (Dec)	End season (Jan-Feb)	
Price, ZK				
Unit measure or Quantity				

What modes of payment for the fruits do you accept?

1. Cash	2. Credit	3. In kind, specify:.....
---------	-----------	---------------------------

Do you also retail (sell in small quantities) at times? 1. Yes 2.No
Give reasons.....

What are your prices when you retail? (Indicate units)

Month	1. October	2. November	3. December	4. January
Price				
Unit measure				

38. Are there any changes over the past two seasons in the fruit quantities of *Masuku* you trade? 1 = Yes 2 = No,

If **yes**, what changes have you noticed?.....

39. Do you sell everything you collect for sell each day? (Write code) 1 = Yes 2 = No

1. October	2. November	3. December	4. January	5. February
------------	-------------	-------------	------------	-------------

If **No** in any month, give reasons.....

40. How much money do you get per day from selling your Masuku?

41. Who are the buyers of your fruits?

1. Retailers	2. Individuals of different classes	3. Organisations	4. Specify other:.....
--------------	-------------------------------------	------------------	------------------------

42. What quantity does an average customer buy at a time?.....

43. Do you have preferences for buyers? 1 = Yes 2 = No

If **Yes**, what are your reasons for the supplier preferences?

44. What do you do to increase the sales of your fruits? Rank them in order of MOST common

Activity	Rank in order of
1. Sorting/grading	
2. Remove damages	
3. Washing	
4. Packaging	
5. Other, Specify	

45. What characteristics do your customers look for when they buy the Masuku fruits for eating?

Characteristic	Rank
1.	

46. Which place do you sell your fruits from?

1. Central market, Name.....	2. Households	3. Roadside vendors	4. Specify other:.....
------------------------------	---------------	---------------------	------------------------

47. Who else is involved in selling your fruits?

1. Spouse	2. Male children	3. Female children	3. Hired Labour	4. Other, specify:...
-----------	------------------	--------------------	-----------------	-----------------------

48. How do you get information about customers?.....

49. Are there any rules, regulations or laws that affect that you have to abide by in your Masuku business? 1. Yes
2. No

If yes, which ones.....

What is your opinion about these rules/ laws / regulations

What rules would you propose?

50. What problems do you experience in your fruit selling business?.....

Proposed Interventions

51. Do you agree with the following opinions

1. Strongly Agree	2. Agree	3. Disagree	4. Strongly disagree	5. Do not know
-------------------	----------	-------------	----------------------	----------------

Opinion	Agree (Code)	Give Reasons
Masuku fruits should not be sold because they are just collected from the forest		
To improve the marketing of Masuku there is need to advertise them		
Masuku trees should be planted to increase the fruit supply		
Masuku trees should be JUST managed to increase the fruit supply		
Masuku fruits are inferior forest produce		
Indigenous fruits provide relief in times of hunger		
The current tree cutting rate raises serious concern that the Masuku trees will be potentially depleted		

52. Do you have any suggestions/comments to make regarding the marketing of Masuku on:

.....

General Research Site Information

1. District	2. Chiefdom	3. Village	4.
-------------	-------------	------------	----

Respondent's Demographic Information

1. Name (optional)	2. Tribe	3. Sex	4. Age	5. Marital status	6. Family size	7. Educ. level
--------------------	----------	--------	--------	-------------------	----------------	----------------

Code: 1 & 2: no code (2: to be coded later) 3: (1=Male, 2=Female) 5: (1 = Single, 2 = Married) 7: (1 = No formal education, 2 = Primary, 3 = Secondary, 4 = Tertiary level)

Enumerator:.....

Appendix 3 Research Instrument for Fruit Retailers

QN: _____ Day _____ Date: ____/____/____

Analysis of the Marketing of Indigenous Tree Fruits in Zambia
Research Instrument for the Indigenous Tree Fruit

FRUIT RETAILERS

General

1. What fruits (indigenous & exotic) do you NORMALLY sell? Please them rank in order of MOST commonly sold.

Fruit Consumed	1.Mango	2.Masuku	3.	4.	5.	6.	7.
Rank							

2. When did you start selling *Masuku* fruits? (b) In which month did you start in 2003?.....
 3. What is your **AVERAGE** annual initial capital in the Masuku business?.....
 4. Apart from this market/place where else do you sell Masuku fruits?
 Why.....

Fruit Procurement and Handling

5. Which place (source) do you get your Masuku fruits?.....
 6. How do you get the Masuku fruits? (**Indicate ALL applicable!**)

1. Buy from traders	2. Collect from forest	3. Gift	4. Buy from other community members
5. Other, specify:			

7. How much do you purchase them?

Quantity bought (indicate Units)	Price

8. (a) How much do you spend on procuring (buy, receive, etc) Masuku at a time? (**Select applicable period**) (b) How often do you buy?

Quantity & Frequency (Indicate units)	Time Period		
	Daily	Weekly	Monthly
Quantity bought			
Frequency of buying			
Comments			

9. How much money do you get per day from selling your Masuku?.....
 10. Do you use the same quantity unit measures throughout the season? 1 = Yes 2 = No
 If **NOT** give reasons?.....

11. On average, how many **days per week** do you sell Masuku?. **AND** how many **months in a season**?
 12. What form of payment do your Masuku suppliers accept?

1. Cash	2. Credit	3. In kind (specify):
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13. What characteristics do you consider when procuring (buying, etc) Masuku fruits? (**Use table**)

Characteristics	Tick	Please rank in order of MOST common (Important) consideration (1: MOST IMPORTANT, TO LEAST IMPORTANT)
Appearance (Damage, colour)		
Taste (Sweetness)		
Cleanliness		
Price		
Selling site		
Maturity stage		
Fruit size		
Grading/ Sorting		

Packaging		
Source		
Other: specify		

14. Do you always have enough fruits to purchase from your source within the season? 1 = Yes 2 = No

15. Do you have regular suppliers of the fruits? 1 = Yes 2 = No

Give reasons?

16. Do you do anything to your fruits before selling them? 1 = Yes 2 = No

If yes, what do you do? (*Indicate ranking!*) (Use table)

Activity	Tick	Rank in order of most frequently done
Remove damages		
Washing		
Sorting/grading		
Packaging		
Other, Specify		

17. How do you transport your purchased fruits to the selling place?

Mode of Transport	1. Bicycle	2. Walking	3. Other, specify
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18. Do you pay for transporting your fruits to the market/selling place? 1 = Yes 2 = No,

If yes, **how much** do you pay for **what quantities?** (Use table)

Transport type	Charge or Cost	Distance/charge	Quantity/Charge
1. Walking /on Foot			
2. Bicycle			
3. Ox Cart			
4. Vehicle			
5. Other, specify			

19. Who else is involved in the procurement (collection, buying, orders) of the fruits you sell?

1. Self only	2. Spouse	3. Male children	4. Female children	4. Hired Labour	5. Other, specify:
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If you hire labour, at how much **AND** how long

20. Apart from hired labour, do you pay the others for assisting sell Masuku? 1 = Yes 2 = No

If Yes, at how much (indicate units)?

21. (a) What market fees did you pay per day in 2003 and 2002 fruit seasons? (b) For what period? Use table

Year	Fee amount	Unit Time (e.g. month, week, day)
2003		
2002		

22. What other costs do you incur in your business? (Indicate quantity)

23. Do you store your fruits? 1 = Yes 2 = No, GO TO 27 (if No)

If yes, where, how and what duration? (Use table below)

Storage place	How (e.g. in bags, loose, etc)	How long (e.g. days, weeks, etc)

24. How long does it take for your fruits to get spoiled when stored?

25. Does it cost (do you pay) anything to store your fruits? 1 = Yes 2 = No

If yes, what does it cost and how much? (Use table below)

Type of storage cost	Cost of storage, Zk

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26. Does the storage affect your fruits in any way? 1 = Yes 2 = No

If yes, what are the effects of storage?.....

27. (a) What quantity of fruits do you lose in a day or week? (b) How is it lost?

Quantity	How do you lose it

Pricing and Selling

28. Do you determine the prices for the fruits you sell? 1 = Yes, 2 = No

If **No**, who determines the prices?

If **Yes**, are you aware of the prices at which others are selling before you set yours? 1 = Yes 2 = No

29. What factors do you consider when pricing your Masuku fruits ?

1. Price taker	2. Negotiate with buyer	3. Consider labour	4. Base on order price	5. Total cost
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Other:.....

30. What modes of payment do you accept from your buyers?

1.Cash	2. Credit	3.In kind, specify
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31. What are the **AVERAGE cash** prices for low and high demand periods?

(At what price do you sell the Masuku at these times?) (Use table below)

Unit measure	2003		2002	
	Peak Period (December)	Non-Peak Period (Nov & Jan)	Peak Period (December)	Non-Peak Period (Nov & Jan)

Why different prices.....

32. What do you do to increase the Masuku fruit sales?

Attribute	Rank in order of most commonly used (1 = Most...to Least) (May give/note reasons!)
1. Sorting/grading	
2.Remove damages	
3. Washing	
4. Packaging	
5. Allow tasting	
6. Other, Specify	

33. What other business do you do during the Masuku fruit season apart from selling Masuku?

34. May you rank the importance of Masuku trade as an income source in relation to other business you do?

Customers

35. Who are your customers OR buys your fruits? (Men, women, boys, girls, rich, poor, etc)

36. Has the number of customers changed over YEARS? 1 = Yes 2 = No

If Yes, how has it changed?.....

37. How much money does **your average** customer spend on Masuku per each transaction? (If possible by GENDER)

Unit measure	Average expenditure per transaction

	Both sexes	Females	Males
Small Cup / bowl			
Large cup			
Plate			
Other specify			

38. What characteristics do your customers look for when they buy the Masuku fruits?

Characteristics	Rank in order of MOST to Least looked for characteristic

39. Which characteristics do you find difficult to meet in satisfying consumers?
(Which ones usually stop willing buyers to buy?)

40. What fruits would you market instead of Masuku fruits and still hope to satisfy your buyers/customers fruit tastes?

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Other concerns

41. Are you a member of an organisation (association, club, group)? 1 =Yes 2 =No

If Yes, which one?

42. What problems do you experience in your indigenous tree fruit trade?

43. What do people say about indigenous fruits?

44. (a) Are there any rules or laws that affect your fruit trade? (b) How do they affect the business?

45. Do you agree with the following statements? (Indicate degree)

1. Strongly Agree	2. Agree	3. Disagree	4. Strongly disagree	5. Do not know
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Opinion	Agree strength (Use Code)	Give Reasons
Masuku fruits should not be sold because they are just collected from the forest		
To improve the marketing of Masuku there is need to advertise them		
Masuku trees should be planted to increase the fruit supply		
Masuku trees should be JUST managed to increase the fruit supply		
Masuku fruits are inferior forest produce		
Indigenous fruits provide relief in times of hunger		
The current cutting rate of Masuku trees raises concern that the Masuku trees will be potentially depleted		
Selling Masuku contributes income to your household		

46. Do you have any suggestions to make regarding the tree fruit business

General Research Site Information

1. District	2. Chiefdom	3. Village	/	Residence Compound

Respondent's Demographic Information

1. Name (Optional)	2. Tribe	3. Sex	4. Age	5. Marital status	6. Family size	7. Education level

Code: 1 & 2: no code (2: to be coded later) 3: (1=Male, 2=Female) 5: (1 = Single, 2 = Married) 7: (1 = No formal education, 2 = Primary, 3 = Secondary, 4 = Tertiary level)

Location _____ Enumerator

Appendix 4 Research Instrument for Government Forestry Officers

Date: _____ / _____ / _____

Analysis of the Marketing of Indigenous Tree Fruits in Zambia
Research Instrument for the Indigenous Tree Fruit

GOVERNMENT FORESTRY OFFICERS

1. Are you aware of any existing customary control measures (laws, regulations and rules) regarding production and management of indigenous non-wood forest resources?
1 Yes 2 No 3 Do not know 4 Other, specify,.....
- 1.2 Which ones?
2. Do you know the existing Forestry Policy? (Circle) 1 Yes 2 No 3 Not sure
4 Other, specify.....
3. Do you think the current forestry policy has made practical improvement on the management of the forest resources? (Circle) 1 = Yes 2 = No 3 Do not know 4 Not sure
5 Other, specify.....
- 3.2 If yes, which ones?.....
- 3.3 If **NO**, what do you think are the reasons for lack of improvement?.....
4. Do you think the current forestry policy needs review?
1 Yes 2 No 3 Do not know 4 Not Sure 5 Other, specify.....
- 4.2 Why do you think it needs/does not need review? (Delete inapplicable).....
5. What is the impact of the current forestry policy on marketing of indigenous tree fruits and other non-wood forest products, if any?
6. Do you think the current forestry policy provides adequately for the indigenous tree fruits? 1 = Yes
2 = No 3 Do not know 4 Not sure 5 Other specify:.....
- 6.2 If **NO**, why do you say so?
7. In your opinion, how can the **management** of indigenous fruit trees be improved in Zambia?
8. How can the **selling (marketing)** of indigenous fruits be improved in Zambia?
9. In your opinion, what constrains the development of the non-wood forest products industries in Zambia?
10. What are the constraints to the effective implementation of the National Forestry Law and Forestry Policy in Zambia?

11. Department	12. Division	/Branch	/Section	13. Station
14. Name	15. Job Title	16. Duration of Service	17. Sex	18. Educ level

Code: Educ Level: 1 College certificate 2 College diploma 3 University degree 4 Postgraduate
Sex: 1=Male, 2=Female