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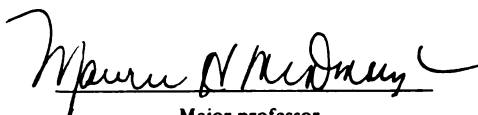
**LOCAL COMMUNITY TREE MANAGEMENT OF ZIZIPHUS
MAURITIANA: AN EXPLORATORY STUDY FROM THE
MID-ZAMBEZI VALLEY, ZIMBABWE**

presented by

Sarah Lynn Funkhouser

has been accepted towards fulfillment
of the requirements for

M.S. degree in Forestry


Major professor

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By

Sarah Lynn Funkhouser

A THESIS

Submitted to
Michigan State University
In partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Forestry

1999

ABSTRACT

LOCAL COMMUNITY TREE MANAGEMENT OF *ZIZIPHUS MAURITIANA*: AN EXPLORATORY STUDY FROM THE MID-ZAMBEZI VALLEY, ZIMBABWE

By

Sarah Lynn Funkhouser

Throughout much of the mid-Zambezi Valley, *Ziziphus mauritiana* or musawu as it is commonly known, is a uniquely adapted tree to both drought and intensive coppicing conditions. Residents in this area use this small thorny tree for its fruit, shade, fodder and fuelwood. During the fruiting season (June to September) large quantities of fresh fruit are sold at local markets or along the roadside to middlemen, transporters and retailers. Preliminary observations prior to this study suggested an industry of considerable size and one that has the potential to generate significant food and cash incomes for household, many of whom are low-income, in the Zambezi Valley. Individuals must make decisions about natural resource management based on a complex arrangement of private, communal and State held property rights, where rules of access do not always equate with behavior. It is the management and tenure arrangements of musawu that have been the basis for this study.

For Lazarus Zhuwao

ACKNOWLEDGEMENTS

The research for this study would not have been possible without the generous assistance of several organizations. I would like to acknowledge the generous funding made possible by The International Development Research Centre (IDRC) in Zimbabwe. Funding was also gratefully accepted from the Department of Forestry, MAWGAP and CASID all at Michigan State University.

I would like to particularly thank my advisor Maureen McDonough for her never-ending support during times of academic need and personal adversity. She never let me believe that I couldn't do this work. Karen Potter-Witter and Pat Barnes-McConnell also provided unfailing support no matter what my call. Thank you all.

This work would not have been possible without the generosity afforded me by many residents of Chikafa. I was graciously welcomed into their homes and their world. Lazarus Zhuwao was always there when I needed him. His untimely death leaves a large hole in the mid-Zambezi Valley.

Finally, I must thank my family. Without my husband's unyielding belief in me, this thesis might not have come to fruition. Thank you Tim for all you have done to make this work possible for me. And my dear sweet daughter Amalia...for the countless afternoons when Mommy had to work on her thesis, I owe you a lot for your patience and dedication.

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CHAPTER ONE

INTRODUCTION

Ziziphus mauritiana, commonly known as *musawu* by the people of the mid-Zambezi Valley, is the centre of a salient industry. During the Zimbabwean winter (June-September) there are numerous musawu trees producing their small reddish-brown fruit on the alluvial soils of the mid-Zambezi Valley. Each morning hundreds of men, women and children diligently venture out to the trees on their homestead, fields and in common pool areas and collect the ripe fruits. Some areas of the valley have strict management rules regarding musawu, e.g. a tree that has been swept under and circled with thorny brush is designated as owned and conceptually protected from 'outside' collectors. This kind of tree management is more strictly enforced in some communities than in others (Bruce, Fortmann and Nhira, 1993). While the fruit is eaten fresh, it can also be dried for use throughout the year. The fruit is also used as the base for distilling a local, and potent, alcoholic beverage—*kachasu*. Through much of the mid-Zambezi Valley during the fruit season, large quantities of the fresh fruit are sold at local markets or along the roadside to middlemen, transporters and retailers. Much of this fruit is delivered to the major outdoor market in Mbare (Harare) as well as to the smaller markets of Murewa, Guruve and Mt. Darwin. This naturalised fruit is not only important to household economies in the valley but also to their livestock and the wild animals that rove there. Elephant seem to be

particularly fond of the fruit and leaves of *Ziziphus*, consequently, they spend ample time in musawu groves during the fruiting season.

The formal market sector of Zimbabwe has not yet tapped into the possibilities of this horticultural cash crop industry. Local residents consider musawu an indigenous tree and seem fairly knowledgeable about its silvicultural applications. According to Kadzere and Jackson (1997), while production and planting is lacking on indigenous trees in rural areas, residents are well aware of musawu's adaptation to drought and coppicing conditions—which make it a uniquely valuable tree for such a variable arid environment. Preliminary observations prior to this study suggest an industry of considerable size and one that has the potential to generate significant food and cash incomes for households, many of whom are low-income, in the Zambezi Valley. Knowledge about management activities is diffuse and mostly unrecorded.

Musawu research

Much research has been done elsewhere in the world on developing new *Z. Mauritiana* cultivars and on increasing fruit production (Kadzere and Jackson, 1997; Smith, *et al*, 1992; Verheij and Coronel (eds.), 1991; Murty and Subrahmanyam, 1989). Some of this work has been started at the Horticultural Research Center (HRC) in Zimbabwe (Kadzere and Jackson, personal communication, 1995), yet little is known about the underlying story of the *Z. mauritiana* industry as it occurs in the mid-Zambezi Valley.

.....
The beginning of this story will set the scene of a 'system' or 'community' in which fruit tree management is a central theme.

The setting

Imagine a steamy 4 1/2-hour drive from the bustling urban center of Harare, Zimbabwe. The paved road heads north and slowly winds into a seemingly different world: flat, dry, dusty and what many would call exceedingly "rural". This other world is the mid-Zambezi Valley and the Zambezi escarpment marks its gateway, which is akin to standing atop a seaside cliff overlooking an ocean of flatness as far as the eye can see. The paved road ends and corrugated dirt road begins.

On this particular excursion it is October. The land aches for the summer's rains yet to come. Residents and visitors alike cannot rid themselves of an ever-present layer of dust. The heat can be stifling. My journey takes me to Chikafa, an area directly on the border of Mozambique in the northern part of the mid-Zambezi valley. Baobab trees protrude majestically. The homesteads I pass are uniquely rural Zimbabwean—round mud structures protected by thick grass thatch roofs. Residents live and farm predominantly along the major river courses that run through this landscape of mopane trees, elephant and dusty roads. There is no obvious or well-lit sign that informs me of my arrival in Chikafa. Villages seem to meld together in this vast expanse to which electricity has not been introduced. Children smile and wave from their roadside

homesteads. Some wear T-shirts that bear popular American-style logos. Torn and faded, their clothing is most likely passed on from one sibling to the next and the next and the next.

The single road to Chikafa market and bus stop parallels the Manyame River—one of the many rivers that cascades from the hills and flows across the plains below during the rains. Scorching heat and sandy soils of the valley cause the river to dry up fairly quickly when the rains cease. The scenery to my left is usually a green riverine plateau, filled with field after field of maize, cotton and woody vegetation—most abundantly the shrub-like fruit tree, *Ziziphus mauritiana*—in Shona, the language most commonly spoken in this area, “musawu” (pronounced MA-SOU-WU). This is the tree and its management, the place and the people about which I have come to learn.

On this particular day under the blazing October sun, the dense green is gone. The fields have been plowed and nearly every musawu tree, except for the standing gnarled old musawu trees along the river’s edges, has been coppiced or cut down to an ankle-high stump—an astonishing sight for a visitor! I imagine what an unknowing and unsuspecting outsider might think—‘these people must be crazy—they’ve cut down all of their lushest vegetation in one fell swoop’. This is where the story of musawu begins. I can assure you at the outset, that far from being crazy, these mid-Zambezi Valley residents have lived and learned about ecological management cycles far beyond the knowledge I

have gleaned from undertaking my Master's thesis research on tree tenure in this tiny portion of the mid-Zambezi valley. Hopefully, however, I can paint a picture that highlights this indigenized natural resource: its characteristics, management and the institutional structures governing use of the musawu tree in Chikafa.

People live alongside the Manyame River because it provides a set of direct natural resource and environmental benefits from which their small-scale farming livelihoods are enhanced. Some of these benefits consist of access to water and riverine vegetation, which includes sites conducive to productive agricultural systems. Their effective command over these natural resources varies depending on the lens through which one chooses to examine 'effectiveness'. Musawu trees are a productive part of this system and a riverine 'crop' whose supply is largely dictated by human and animal consumption (through seed dispersion). Observation and hearsay has suggested that the value of the fruit has been increasing and that more people are collecting, consuming and selling the fruit than in the past. Local leaders and politicians appear interested in formalizing the 'system' by which these functions occur, however, they are unaware of the current level of use, rules of use or supply and demand. The underlying premise of this study has been that with increased value (or demand), the institutional structures with regard to 'ownership' and use of this natural resource would become more formal or privatized. The questions and methods employed, therefore, have been to investigate this assumption as well as provide baseline data on musawu for the Chikafa community.

This study has been an effort to tell a 'story' of musawu (*Ziziphus mauritiana*) in the mid-Zambezi Valley, Zimbabwe. More specifically, it attempts to describe the nature of local rules and regulations in the Chikafa community, where property rights are a fundamental aspect of a complex land-tree tenure system. This Master's thesis research was meant as a descriptive study on the nature of local rules and regulations, where analysis in relation to hypotheses is cast in the context of incremental adaptation of theory as opposed to full fledged hypothesis testing. It is not meant as the base from which to make sweeping generalizations about tree tenure or broad patterns of use in the Zambezi Valley. Brief observations of other communities in the valley led me to believe that each has its own unique set of social, political, biophysical and economic characteristics. These factors all help shape how one community may differ from another in their institutional structures and relative degree of use of the musawu fruit.

The following chapters delineate the research conducted as part of this the Master's thesis requirements. Chapter 2, presents a background and literature review of the nature of *Ziziphus mauritiana* and property rights systems. Chapter 3 includes materials and methods, while chapter 4 discusses patterns of musawu use and management. The fifth chapter examines local institutions, rules and patterns of change. In the final chapter, conclusions and recommendations are briefly reviewed.

CHAPTER TWO

BACKGROUND AND LITERATURE REVIEW

Wild fruit trees contribute substantially to the diet of local people, especially those trees which fruit in the dry season (winter) or prolifically in times of drought (Wilson, 1989; Campbell, 1987; Kadzere and Jackson, 1994). Perhaps equally important as a nutrient source is the commercial value of certain wild fruits such as *Ziziphus mauritiana*, (Bruce, *et al.*, 1993; Kadzere and Jackson, 1994) from whose income and/or barter trade contribute to household income. As Campbell (1987) states, there is a “significant informal trade in wild fruits, which can be found in most markets” in Zimbabwe—with *Z. mauritiana* among the more significant.

Management of musawu includes several key components. The first is the ecological description of musawu: its location and habitat. The second component includes property rights, which involves the complex economic arena in which musawu are managed. These two components will be examined here using relevant literature as background material. This section will conclude with pertinent research questions posed.

Musawu location and habitat

Ziziphus mauritiana Lam. is in the family Rhamnaceae (Buckthorn) and is believed to have originated in south and central Asia and India (von Maydell,

1986; National Academy of Sciences, 1980). Literature on the distribution and nature of *Z. mauritiana* species in Zimbabwe is sketchy. Kadzere and Jackson (1994) suggest that musawu is confined to parts of Mashonaland (northern arid Zimbabwe). Goldsmith and Carter (1981) list distribution of *Z. mauritiana* in the northeast lowveld, primarily along stretches of deep, sandy alluvium, while Brazier (n.d.) states that the species has become naturalized in the lower Zambezi Valley. Funkhouser and Lynam (1999) have plotted distribution of musawu from the eastern to mid-Zambezi Valley. While information on country wide distribution is wanting, *Z. mauritiana* is more often associated with hot dry areas and low altitudes with annual rainfall of 150-500mm (National Academy of Sciences, 1980; von Maydell, 1986; Williamson, 1975).

Musawu trees are generally found in any of three broad use land types—those associated with households, those in fields or upland common property areas and those growing amidst riverine vegetation (Funkhouser and Lynam, 1999).

Frequently growing in clumps, musawu trees often look like large shrubs or small trees with multiple stems. Single stem trees are often found in homestead areas and in maize and cotton fields. Mature trees stand 5-10 meters in height, whereas young trees are less than 3 meters high. Thorns protrude sharply on young trees. Musawu coppice extremely well—a tree coppiced in this dry season will bear fruit following the rains. Many trees are coppiced because of their innate ability to bear fruit quickly. This practice also

limits the amount of shade thrown onto a field. Lopped branches are used as building material, fuelwood and fodder (questionnaire surveys, this study).

Households in the mid- and eastern Zambezi Valley nearly universally grow musawu trees on their homesteads. The number and size class of musawu trees growing on any particular homestead can estimate the general age of a household. According to the 1999 SAFIRE “Report on Musawu in the eastern Zambezi Valley”, Funkhouser and Lynam established that younger households had several trees in smaller size classes (<2 m in height). Well-established households had 6 to 12 trees in the large to very large size classes scattered around their homesteads.

Trees associated with the fields of households also reflected the general age of the household. The longer a household had been cultivating in an area, the greater the probability of there being trees in or around their fields—and the larger and more numerous these trees were likely to be.

Two general trends occur with regard to the distribution of musawu in the Valley floor. First, the absolute numbers of trees increases from west to east. Second, the density of musawu trees increases from south to north (Funkhouser and Lynam, 1999). It might be argued that musawu is slowly spreading west.

Samples taken for the SAFIRE Report gave musawu tree density estimates of approximately 12 trees per hectare along riverine areas. The measures of density in the upland areas were more variable with generally low densities. The density of homestead groves was between 3 to 12 trees per household. (Funkhouser and Lynam, 1999)

Nature of the fruit

Musawu fruit ripens during Zimbabwe's winter or from roughly the end of May until mid-September. Fruit from trees closer to the Zambezi escarpment ripen before those further north of the escarpment, i.e. masawu in Chikafa ripened at the end of June in 1995 and the last fruit were picked in September. The small fruit looks similar to a crab apple when fresh and has a single pit. It begins green in color and drops from the tree's branches as it turns yellow to brown to reddish brown (very ripe). Flavor varies as does yield depending on the tree or its ecological location (personal observation and communication with local residents). The tree is used as fodder for goats and cattle and as breakfast food for elephants! It is also used as fuelwood and building material when coppiced. Musawu fruit remains fresh for four to seven days before it softens and begins to ferment. The fruit is used in a variety of ways: a) eaten fresh in season; b) dried for consumption throughout the year; c) dried and then distilled to make an alcohol known as "kachasu" (which is illegal to distill in Zimbabwe); d) pounded into a powder to make a thirst-quenching drink or porridge, and e) be used to make jams, candies or fruit leather.

Property rights

Property rights determine who the economic actors are in a society. They critically affect decision-making regarding resource use by defining what is and is not possible for the 'agent' (be that individual, community group, state, nation, etc.) holding the right in a particular resource.

Any discussion about benefits from a particular tree resource must include an understanding of property rights, as trees are generally found on some claimant's parcel of property. To have property is to have a right to an enforceable claim to use or benefit from a property's use. Such a right can be to an individual thing or the sharing of some common resource. Property is a claim that will be enforced by society (the State), by custom or by law.

Property rights are the product of rules, and institutional arrangements are the "rules in use by a community to determine who has access to" natural resources i.e. how much, when, and where (Ostrom, 1987). It is important to note that rules governing property and inheritance go historically into the cultural past, though they have likely been adapted to ecological conditions.

Common property is constructed when individuals agree to limit their individual claims over a resource in the expectation that other group members will do the same (Richards, 1997). Common property resources are defined by

regulation of access since individuals have the capacity to use a resource individually (and perhaps taking some of the benefit from others) or jointly as a community (in a way that assures all members benefit). Berkes (1989) gives one definition of common property resources as “a class of resources for which exclusion is difficult and joint use involves subtractability.” Put another way, common property resources make use of communal rules that exclude access to non-owners and govern use among co-owners.

Different property rights controls regulate woodland management in Zimbabwe. These range from district level by-laws to village level agreements to private household ownership of trees. Property rights therefore, assume a broad array of property rights regimes. It is common property or communal property rights, which has dominated much of the land in Zimbabwe.

Contrary to “tragedy of the commons” notion which previously formed the basis of much common property discussion, Berkes and Kislalioglu (1991) discount the historical notion that common property resources have been doomed to failure and outline a “new” consensus on common property (see also Migot-Adholla *et al*, 1989). One of their beliefs is that sustainable management is possible under not two, but three general kinds of management regimes: private property, state property and communal property—it is this combination or system of property rights that exists in the mid-Zambezi Valley.

The State of Zimbabwe grants authority to Zimbabwean inhabitants to reside and farm on individual plots of land as historically overseen by reigning Chiefs. Many inhabitants include people of Mozambican origin who have claim to the land because of their *de facto* residency status. The land (formerly known as “Tribal Trust Lands” prior to Independence) has often been transferred over generations from one family member to the next. Historically, the land was under the domain of certain chiefdoms and Chiefs, not the State, made its entitlement. Complicating current degrees of comprehensiveness of rights is the conflict between traditional appropriations of land and more recent political party rules, which continue to be formalized since Zimbabwe’s Independence in 1980. Land pressures, including residents from nearby Mozambique, all add to the complication of property rights in this area. The State holds the power to remove individuals from their land, often making the situation even more tenuous. Individuals must then make decisions about natural resource management based on this property rights situation.

Thus, while the State (rights are vested in the President) owns the property and can take rights of usage away, the *de facto* agents are individuals that often have long-established private property rights, which excludes their right to sell the land upon which they reside. The longer a household resides on a particular piece of land (duration), the more secure their interests *feel*, but insecurity and management can be critical issues especially when top-down resettlement schemes are imposed. Common property, typically defined as

resource rights that are held by a group of agents able to exert influence on rules of access and exclusion (Schalger and Ostrom, 1992; Libecap, 1989), also exists amid this private-state dichotomy in Chikafa.

Communal property management has a set of basic rules, which if followed will lead to a successful resource management situation (Clarke, 1994). Successful implies the absence of an open access situation where resources are obtained as a free for all. The rules that follow are from Clarke, 1994 and form the basis from which research questions can be asked. These rules include: 1) clearly defined property boundaries; 2) clearly defined membership; 3) rules of harvest and exclusion are delineated; 4) rules of enforcement exist; and 5) members must benefit from the resource. A final question posed asks if people's expressions of behavior are consistent with their expressed understanding of local rules governing musawu use.

Research Questions

In order to provide a baseline picture of musawu use patterns, from which local community leaders and development agencies can enhance their understanding of tree tenure, it was essential to examine several key questions. The following broad research questions were the basis from which household and community behavior could be collected and analyzed.

1. What were the patterns of ecology, management, trade and use of musawu trees in Chikafa?

2. Are the local institutions that regulated musawu tree management effective and are people's expressions of behavior consistent with their expressed understanding of local rules governing musawu use?
3. Has use and access to musawu changed over time?

It seems pertinent to note at this stage that gender plays an important role in the management of musawu trees and its fruit. Women are both laborers and benefactors of income derived from sale of masawu. It would be careless to forget that any information gleaned from this study must take into account the fact that women gain from this cash crop. Changes in policy or market forces have the potential to push women out of business. It is with utmost caution, therefore, that policy direction be changed without asking the question: who benefits and who loses previously held rights to benefits of this natural resource.

CHAPTER THREE

MATERIALS AND METHODS

Site description

Zimbabwe is an incredibly diverse country bio-physically, with approximately 12.5 million people (10.4 million at the 1992 census (Central Statistical Office, 1992)). The Zambezi River provides a natural international border in the northern part of the country, separating Zimbabwe from Zambia and Mozambique. The Zambezi Valley lies to the south of the Zambezi River, extending from Victoria Falls in the West to Kanyemba in the east. The valley is an extensive land area at an average of 300 to 600 meters above sea level and home to the Bantu language-speaking Shona, Ndebele and Tonga people. The Shona and Ndebele make up the largest and second largest socio-cultural groups in Zimbabwe, respectively. The Tonga—mainly a riverine people—are the third largest language group in Zimbabwe.

The mid-Zambezi Valley is as its name implies, in the middle of this great expanse. The lowveld, as it's often referred to, is generally flat, though occasional hills do occur. The major drainage basins in northern Zimbabwe are part of the wider catchment of the Zambezi River. The Manyame-Angwa is one such basin that drains through the study site area. The soils of this region are generally colluvial and alluvial in origin. The vegetation is linked to the

topography and rivers—with rich soils found along the river courses and escarpment and poor soils found in between.

The soils are generally deep sandy clay loams with extensive soil coverage of rounded pebbles. The vegetation of the Valley is a varied mixture of Mopane and miombo woodlands on colluvium. The dominant species of mopane woodland includes *Colophospermum mopane* mostly associated with heavier soils and *Terminalia stuhlmannii* 8-10 m high. Mopane woodlands are generally open canopy to dense deciduous woodland. Miombo woodlands are dominated by the genera *Brachystegia*, *Julbernardia* and *Isoberlinia*, and are mostly closed deciduous, non-spinescent woodland. (Campbell, 1996) *Brachystegia allenni* is dominant on stony or coarser textured soils. Other species include *Kirkia acuminata*, *Erythroxylum zambesiaceum*, *Commiphora mollis*, *Julbernardia globiflora* and *Combretum apiculatum*. Associated grass species include *Aristida*, *Eragrostis*, *Heteropogon contortus* and *Digitaria*. (Pwiti, 1996; Cunliffe, 1995; Head and Timberlake, 1993)

Chikafa is located in the low-lying region of the mid-Zambezi Valley, directly bordering Mozambique. It is a locational term of reference for those living in any one of six villages in the area overseen by a VIDCO or “village” committee. Chikafa is located within Neshangwe Ward 3 (Figure 3.1). Numerous VIDCOs are embedded within the Ward, which lies within a District (Guruve), which is in turn located in the Province of Mashonaland Central (Figure 3.2).

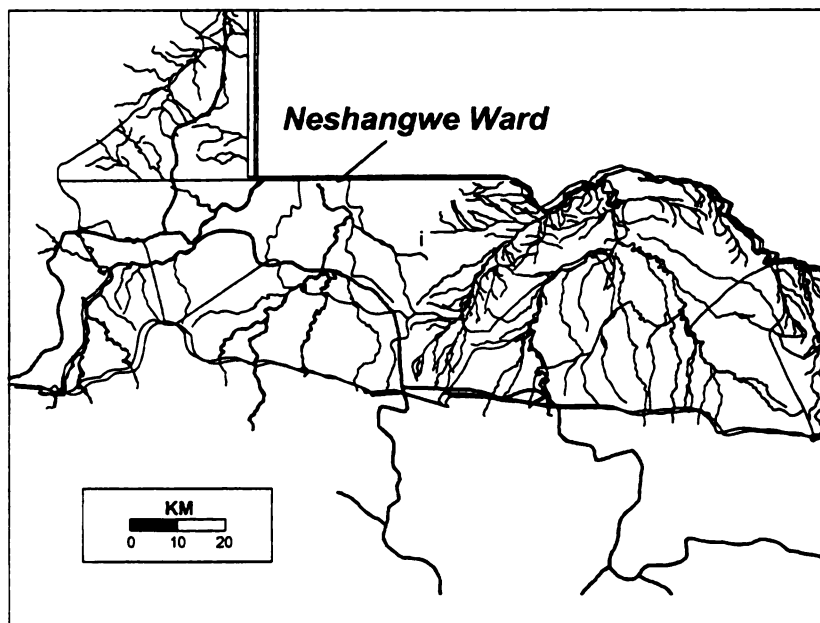
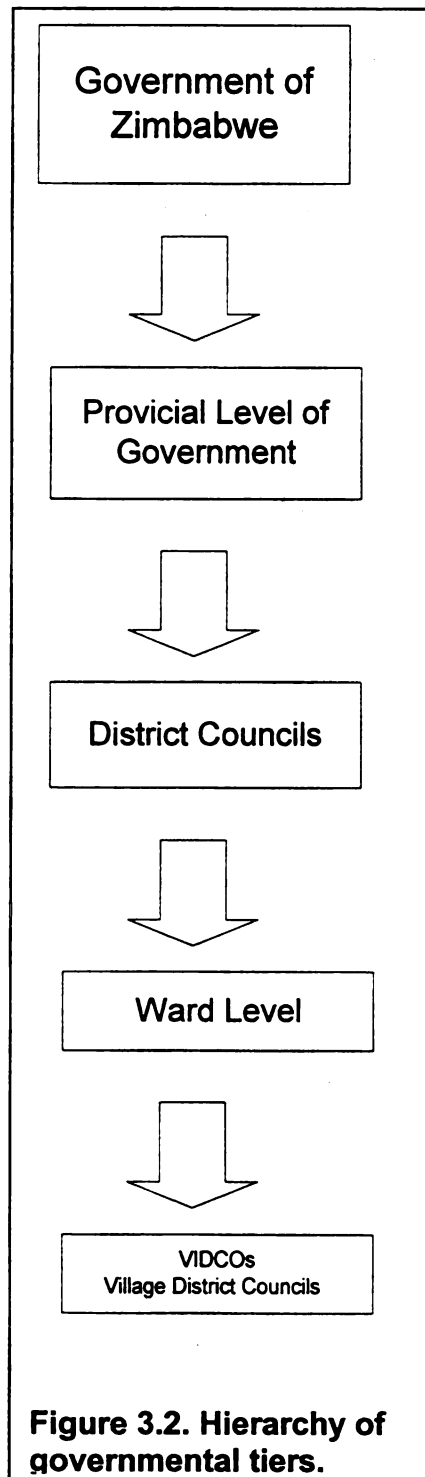


Figure 3.1. Land area of Neshangwe Ward 3.



The land area of Neshangwe Ward 3 is 500 km², with an average rainfall in the area of about 650 mm per annum (Cumming and Lynam, 1997; Anderson *et al.*, 1993). This area falls under Zimbabwe's land classification IV, which is characterized as a semi-extensive farming region subject to periodic seasonal droughts (region I is suitable for extensive and diversified farming while region V is classified as unsuitable for anything other than drought resistant crops).

There are approximately 1, 679 households in the Ward, with an estimated population of 7,762 people: 4,142 residents are female and 3,620 are male (Central Statistical Office, 1992). The estimated population growth for the period 1982-1992 was 5.05%. The average household size is based on central statistical office data at 4.6 people per household (Table 3.1), whereas demographic data from the musawu survey calculated an average of 5.8 people per household. In 1992, Chikafa had approximately 300 households or 18% of the Ward's population.

Table 3.1. Area and population data for Neshangwe Ward 3, 1992.

Ward	Area (km ²)	Population ¹		Growth rates (%)		Number of Households ¹
		No. 1992	Density	1969- 82	1982- 92	
Neshangwe	500	7762	4.6	5.0	5.1	1679

1. Source: Central Statistical Office, Harare, Zimbabwe. 1992.

Methods

Initial discussions were held in 1994 with local leaders at Guruve Rural District Council and professionals in natural resource management in Harare. Information about the role of musawu trees and its fruit in the mid-Zambezi Valley was seen as lacking.

Several different methods were utilized to gain insight into household behavior patterns and beliefs. These included formal questionnaire surveys and group discussions. Local retailers of musawu fruit were informally interviewed as well as local level traditional leaders and politicians.

Before any data could be collected, there was a formal process through which district level 'permission' was granted to work in the Chikafa area. First, I met with district councilors at one of their formal meetings, whereby my research proposal was outlined in Shona by my research assistant, Mr. Lazarus Zhuao. With permission from the district, I then met with the ward councilor who invited me into his home and Neshange Ward 3. Finally, I met with local traditional and political leaders in Zxiatica VIDCO where work would be conducted. During my site visits I was graciously invited to live with Mr. Zhuao and his family in Zxiatica VIDCO.

Questionnaire survey

A formal questionnaire survey was designed in English and subsequently administered in Shona in June and July, 1995 to 20% of households in three of the six villages in Chikafa (also considered Zxiatico VIDCO). Village selection was based on distance to the market area, under the assumption that distance to market and buses might influence how musawu was used and sold. Considering the single dirt road that leads into and ends at the market, the village closest to the market and bus stop was considered village number one. Subsequent villages were alternated i.e. every second village was designated to survey. The second village was roughly 3 km. away from the bus stop and the farthest chosen was approximately 10.5 km. away. Households were stratified by wealth (an independent wealth ranking exercise carried out in initial visits by three young Chikafa women) and then randomly selected from within each wealth strata along a bell curve. The curve was divided into 25% on each end, representing the poorest and wealthiest households and 50% in the middle, representing the bulk of middle income households. A wealth ranking was performed in order to ensure a more likely range of data from each segment of the sample population. While no financial compensation was paid to participants, their participation was optional (i.e. they could choose not to participate) and each family received a 5-kg bag of maize meal as a thank you.

The interview schedule included questions on the following themes: 1) household demography; 2) individual tenure or specific behavior on the use of

musawu; 3) general tenure of musawu; 4) economic contribution of masawu to household wealth, and 5) household information (which includes wealth composition questions).

The questionnaire survey was translated from English to Shona (the language of this region) and then back to English again by a separate translator in order to examine any misinterpretations in the questions. Appendix A includes a complete English translation of the survey instrument.

Group discussions

Several group meetings were held within Neshangwe Ward 3 for the purpose of gaining knowledge about historical and current musawu use practices. Two of the meetings were organized with local political and traditional leaders in the community (exclusively men) and the third was held with local women and their small children at the nursery or “crèche”. For the male groups, all local political and spiritual leaders of the area were invited to attend. There were 22 men in total. At the women’s meeting, approximately 20 women attended with their smallest children. Local female leaders were invited and they spread the word to other women who were interested in expressing their views. The meetings were semi-structured through the use of a list of open-ended questions. My research assistant translated these questions and people’s responses. The content of the meetings was then discussed subsequently with the research assistant to fill in

any missing gaps. The men's meetings were quite formal, while the women's meeting was less formal.

Observation

Information was obtained via conversations with as many people in and outside the study area as possible regarding people's experiences, history and knowledge of musawu. Over the 1994 to 1995 musawu seasons, roughly 15 roadside stops were made along my journeys to and from the Zambezi Valley where musawu fruit was being sold in an effort to more completely understand the story of musawu.

Interviews with retail and wholesalers at Mbare Musika

Eight structured but informal interviews were carried out at regular intervals during the masawu season at Mbare Musika (Mbare 'market') in Harare in 1995, where a significant volume of fruit is sold. Estimates of fruit volume at that time were difficult to obtain because questions focused on pricing structures and the system by which sellers obtained their musawu. In September 1998, at the end of peak fresh masawu production, more in-depth market surveys were carried out as part of a SAFIRE (Southern Alliance for Indigenous Resources) research project on musawu (Funkhouser and Lynam, 1999). These surveys were conducted at the following locations: Mbare Musika, Harare; Chinoyi; Glendale; Concession; Kadoma and Mutoko. Where appropriate, masawu wholesalers and retailers were informally interviewed. The surveys were structured using

questions that were formulated prior to the interviews (see Appendix B; Funkhouser and Lynam, 1999).

In subsequent interviews at Mbare Musika in 1998, five wholesalers were interviewed at length while retailers were more hesitant to speak with us, as they seemed fearful that we were trying to encroach upon their business (Funkhouser and Lynam, 1999).

It should also be noted that in Chikafa, as in the rest of Zimbabwe for the 1994-1995 growing season, drought seriously affected the area. Along with the obvious consequences of drought, some have argued that there was an increase in the number of elephants coming into the Valley looking for food and water (The Herald, 28 August, 1995). According to local residents, the increase in the elephant population affected their musawu fruit harvest for two reasons: 1) elephants eat musawu trees and fruit in abundance, therefore depriving residents of fruit, and 2) people were scared to collect fruit early in the morning because the risk of meeting elephants had increased. This may have had some impact on the data gathered.

CHAPTER FOUR

PATTERNS OF MUSAWU USE AND MANAGEMENT

Harvest and Use

Musawu trees look quite different visually depending on the age, location, or pruned status of the tree. Older trees have more trunks, a denser canopy and smaller leaves than young musawu. They also have fewer thorns as compared with their thorny young counterparts.

Musawu trees are used for their fruit, firewood, shade, roof timber and goat fodder (Tables 4.2 through 4.6). Women and children generally collect musawu fruit. Trees that are “owned” can often be spotted by the circle of thorny branches surrounding them. The owners will sweep underneath a tree in order to make harvesting a simpler process. The fruit falls to a clean dirt floor and are easily collected. When trees have not been swept, harvesters will take sticks and bang the fruit from the trees in order to collect it.

Table 4.2. Frequency of those who collect musawu fruit. (n=30)

		Frequency	Percent
	yes	26	86.7
	no	3	10.0
	Total	29	96.7
Missing	System	1	3.3
Total		30	100.0
Total		30	100.0

Table 4.3. Frequency of those who use musawu for roof timber. (n=30)

		Frequency	Percent
	yes	15	50.0
	no	14	46.7
	Total	29	96.7
Missing	System	1	3.3
Total		30	100.0

Table 4.4. Frequency of those who use musawu to feed livestock. (n=30)

		Frequency	Percent
	yes	11	36.7
	no	18	60.0
	Total	29	96.7
Missing	System	1	3.3
Total		30	100.0

Table 4.5. Frequency of those who use musawu for shade. (n=30)

		Frequency	Percent
	yes	26	86.7
	no	3	10.0
	Total	29	96.7
Missing	System	1	3.3
Total		30	100.0

Table 4.6. Frequency of those who use musawu for firewood. (n=30)

		Frequency	Percent
	yes	13	43.3
	yes	13	43.3
	no	16	53.3
	no	16	53.3
	Total	29	96.7
	Total	29	96.7
Missing	System	1	3.3
Missing	System	1	3.3
Total		30	100.0
Total		30	100.0

People do not cut musawu at their homesteads. Young shoots are like weeds to be pulled from fields in order to plow. Unless there is a decision or request from the female member of a household to leave them there, they are pulled. Musawu coppice very well. A musawu tree can be cut to the ground and within several months it is over 1 meter tall and will bear flowers and fruit that season. Pruning occurs and supposedly produces bigger and “better” fruit. Musawu poles are used for maize shelters and are best if treated for termites by the smoke from cooking fires.

A number of factors were seen as being critical determinants of production. Excessive rainfall or droughts were seen to result in reduced production. Competition from other trees and high winds were also seen as negative effects, while soil type and pruning had positive effects on production.

Animals such as the elephant will eat the fruit, leaves and branches of a musawu tree. They typically destroy trees on which they feed. Monkeys, baboons and birds will choose masawu fruit as part of their dietary intake.

The masawu season begins in May/June and ends roughly in October, depending on the geographic location of the musawu trees. The taste of fruit typically varies from tree to tree. It is often difficult to tell visually which fruit tastes nicer; it must be tasted. Fruit is often collected and dried in the sun, protected from insects, for 2 weeks. Dried fruits can remain available for a full

year if a household has allocated their fruit and labor accordingly. Dried fruit is stored in granaries to protect it from human and animal thieves.

Musawu fruit is measured with a 20-liter bucket before it is stored or transported in bags, which hold 5-6 buckets each. The locations of harvesting are mostly riverine fields where musawu trees are abundant, although some fruit is collected from homesteads and adjacent fields further from the river. Primarily adult women and children (boys and girls) collect the fruit, though reports are that more and more harvesting is done by men as the fruit has become more commercially valuable. In Chikafa, approximately 90% of the population harvest musawu fruit for household consumption (Table 4.7).

Table 4.7. Percentage of households collecting musawu in Chikafa. (n=30)

Yes	27	90%
No	3	10%

Institutional factors were considered the most important determinants of access to musawu resources in Chikafa—in particular, competition among pickers and between pickers and livestock. Lack of markets was also a strong determinant of access to musawu. Labor was noted as an important constraint on access to the resource.

Average annual harvest of masawu by households in Chikiafa was approximately 540 kg yr⁻¹. Total harvest from Chikafa was estimated at 1078 tons per year. This harvest would have a gross wholesale value in Harare of roughly Z\$1,670,000—equivalent to about Z\$835 per household per year (Funkhouser and Lynam, 1999).

Management

Musawu trees grow primarily on people's homesteads and in their riverine and upland fields. Musawu trees have been planted, watered, and pruned by respondents, as noted in the table below. (Table 4.8) This table shows that clearly active management of musawu is an important part of management activities, with pruning playing the most significant role. This could imply that pruning may be most critical determinant of greater fruit production.

Table 4.8. Percentage of respondents who have watered, pruned and planted musawu. (n=30)

	YES	NO
Watered musawu	20%	77%
Pruned musawu	70%	23%
Planted musawu	43%	57%

Musawu is also pulled from people's homesteads and fields. This is a management tool used mainly to clear land for maize or cotton production. Table 4.9 shows the percentage of respondents who pull musawu from their fields and

homesteads. This table shows that nearly half of all respondents pulled young musawu from their fields, while 40% pulled young musawu from their homestead. This tends to show how bothersome this tree has the potential to be.

Table 4.9. Percentage of respondents who pulled musawu from fields and homestead. (n=30)

	YES	NO
Pulled young musawu from fields	47%	53%
Pulled young musawu from homestead	40%	60%

Musawu trees are also 'claimed' by households i.e. a household can stake a claim to particular trees by clearing around the base of the tree and encircling it with thorny branches. Data calculated from the questionnaire surveyed showed that each household calls on average between 6-10 trees as its own. The range of trees each household called its own was between 1 and more than 20.

Marketing

Several authors (Campbell, 1987; Bruce *et al.*, 1993; Kadzere and Jackson, 1994) have identified in general terms the commercial value of musawu fruit sold at local markets. However none provide detailed information on the local nature of masawu harvesting or marketing ventures, i.e. who is involved and in what form?

Those people selling masawu commonly classified themselves as either retailers or wholesalers—and the volume sold made this distinction quite evident. Wholesalers seemed generally to purchase their fruit directly from the mid-Zambezi Valley, either by hiring a lorry themselves to buy fruit or purchasing in bulk from those who arrived from the Valley with large quantities of the product. Figure 4.3 shows how the marketing system often works. Producers sell to wholesalers and retailers who then pass it on to the end consumer.

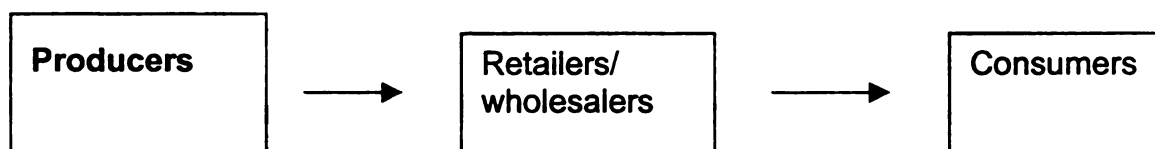


Figure 4.2. Marketing chain for masawu fruit

Producers

Household labor is the primary input required for collection of musawu fruit. Most households own the large grain bags required for transport and storage of the fruit (observation). The fruit is primarily sold fresh, though dried fruit is sold if there is household surplus at the end of the growing season. “Kachasu”, the grain alcohol distilled from the fruits, is sold on the black market at Z\$12 for a 750 ml. bottle.

Those who sell masawu are mostly women of all ages, though it is not uncommon to see children of both sexes selling alongside the roads in the mid-Zambezi valley during the growing season. Men are increasingly interested in its

sale because of the income it can generate. Masawu is sold at roadside bus stops and local markets; to lorries that come from major cities and by those who take their fruit to sell in distant markets (e.g. Harare, Chinoyi, Kadoma, etc.) The average price in 1995 was \$10 bucket.

The volume sold per household per year in Chikafa appears to vary significantly. Those who sell musawu fruit earn from Z\$25-\$400 per year. Rough estimates suggest that 5% - 35% of household income in Chikafa comes from the sale of this product—with those closest to the local market more keenly interested in selling masawu. There is a striking barter trade that must be included in any examination of income estimates. Barter trade accounts for much of the 'income' people earn, which may mean that people are worse off now and willing to accept less in goods than they would if the buyers paid cash. There is a shortage of basic goods in the Zambezi Valley. Producers, therefore, are unlikely to forego selling their fruit all together and will likely take what they can get in bartered goods at the end of the day when their musawu is going off. There appears to be a relationship between distance to market and decision to sell musawu, likely due to high transportation costs.

Retail and wholesalers

Several trips were made to the central informal market in Harare (Mbare) from May to October, 1995 in an effort to obtain prices of musawu fruit at the retail and wholesale levels. Most fruit was sold fresh, except in October, when it was sold

as dry fruit. Prices ranged from \$15 to \$20 per 20-liter bucket, depending on the date of the interview. Smaller quantities ranged in price from \$2.50 to \$5 for a 2.5-liter tin. Generally, wholesalers lowered their prices toward the end of the day, when there was an abundance of the fruit, and raised their prices toward the end of the season, when musawu fruit was more difficult to obtain. Dried fruit fetched the highest price at Z\$30 per bucket.

Sales were mainly to women and children. We did not ask directly how much profit the wholesalers made, though one gentleman told us that he makes approximately Z\$3,000 per week, minus workers' wages, leaving him a net profit of Z\$1,500. This information may be highly skewed as wholesalers try to protect their niche *or* there may be other costs and profits that have not been accounted for (See Appendix C; Funkhouser and Lynam, 1999).

The sole retailer we spoke with at Mbare Musika for the SAFIRE report told us that she sells small bags of masawu for Z\$1 and 2.5 liters for Z\$5. She travels by bus to Muzarabani and buys 20-liter tins for Z\$15 cash. (Funkhouser and Lynam, 1999)

The wholesalers at Mbare frequently referred to 'supply and demand', which determines buying and selling prices. "No masawu, and the price goes up," according to one wholesaler. All of the wholesalers at Mbare hire 7-8 ton trucks that they drive to the Eastern Zambezi Valley (EZV). Generally, it appears that

'scouts' are employed prior to a trip in order to collect, buy or barter masawu in advance. Truck hire was consistently priced at Z\$3,500-4,000 per trip (1-3 days). Most of the wholesalers take in goods with which to barter, depending on the time of the month or the point in the season. Prices for groceries ranged from Z\$6-10,000 per tip and comprised basic goods such as soap, dishes, oil, sugar and flour. Other costs associated with their business included stall rental at Mbare (Z\$450/month) and Z\$475/month to District Council for a permit to transport masawu fruit out of the Valley, though only one wholesaler mentioned paying this fee. Plastic bags utilized by wholesalers cost approximately Z\$0.15-.20 per bag (8" X 10").

Buckets were measured by heaping a bucket until the masawu fall off the apex. Wholesaler buying prices in the EZV ranged from Z\$5 to \$20 per 20-liter bucket, while bartering for goods yielded cash equivalent prices of between Z\$5 to \$20 per 20-liter bucket. One wholesaler stated that they bought at different prices in different areas of the Valley. The number of trips made per week varied depending on the time in the season, ranging from one trip per week to 2-3 times a week in the peak of the season. Most of the wholesalers stated that they sold 7-10 tons per week. Rotten masawu in Mbare was thrown out in large bins or sold very cheaply. Most wholesalers mixed green/fresh fruit with brown and dried fruit. Selling prices at Mbare were cited to range from about \$20 to \$40 per 20-litre tin and 2.5 litre tins sold for between \$6-8. (See Appendix C, Tables C1 and C2.)

Fifteen wholesalers were counted that appear to trade in Mbare Musika. Some of these stated that they also sell in Chitungwiza market (a high density suburb of Harare)—though on a considerably smaller scale. When asked how many ‘competitors’ with lorries there were, the answers ranged from 6-40 lorries that travel to the valley from the Harare area. Most wholesalers have been in the business for ten or more years. They transported and sold other fruits and vegetables on the masawu off-season.

The net profits made by wholesale masawu traders were estimated to be of the order of \$8000 per trip (Table 4.10). Based on these results and estimates of the number of traders operating from Mbare as well as the frequency of trips made per trader we estimated the total net gain to traders to be about 2.3 million dollars per season.

Table 4.10. Estimated projections of net gain by Harare wholesale traders for masawu fruit in the 12-week season.

	Costs	Profits	Net Gain
Lorry =7-8 tons (~650 tins) per trip	Avg. Z\$12,340	Approx. \$20,150	~\$7,810 per trip
Average 25 lorries from Harare per week	Approx. Z\$308,500	Approx. \$503,750	~\$195,250 in Harare/week
Average 25 lorries over 12-week season	Approx. Z\$3,702,000	Approx. \$6,045,000	~\$2,343,000 profit by Harare traders over the 12-week season

CHAPTER FIVE

LOCAL INSTITUTIONS

Woodland and grazing areas are considered communal property and have varying degrees of access and exclusion. To further complicate matters, it seems that while a distinct set of rules exists with regard to musawu use, the situation might appear to be one of “open access”. It may appear to the outsider that there are essentially no local restrictions on use or the restrictions are not enforceable, though were a group of 50 outside men and women to cut down the trees, they would have to answer to the authorities for their behavior! Such is the case in Chikafa.

The following table (5.11) highlights the various property rights situations described above in Neshangwe Ward 3 (Chikafa). This is a complex set of benefits and attributes that are granted, depending on the ‘property’ in question. This system is long standing, with varying institutional arrangements. Land has the most ingrained institution, thus perpetuating a system that has been in effect for centuries. Land, tree and woodland scarcities are, however, weakening some of these inherent structures.

Table 5.11. Three property rights situations in Chikafa, mid-Zambezi Valley, Zimbabwe.

Benefits Conferred			
3+ Situations	Land (homesteads and fields)	Musawu trees (homesteads and fields)	Woodland or grazing areas
State of Zimbabwe (authorizes usage rights)	•	•	•
<i>De facto</i> private	•	•	
Communal		•	•
Attributes	<u>State</u> can resettle any resident except for the Chief/enforceability is high. <u>De facto private</u> can transfer rights, lease to outsiders; duration is through generations; enforceability is through Chiefs and local leaders; exclusiveness is generally family relations.	<u>State</u> has the right to make laws over trees on communal land, though rarely enforces. <u>De facto private</u> allows individuals to define and enforce property rights; enforceability is low. <u>Communal</u> allows all members of community to have access and exclude; enforceability low.	<u>State</u> owns these areas but authorizes use and control to local residents; duration is through generations; enforceability is low. <u>Communal</u> allows for residential access, but no lease; community can exclude outsiders though enforceability may be low; duration is generations.

The mid-Zambezi Valley is presently designated as “communal area” land and its natural resources labeled loosely as communal resources. The property rights to the land vary from those of musawu. There are generally understood tenurial arrangements for the trees that grant exclusive rights to each household, making the situation *de facto* private in nature. Each household has usage or ‘ownership’ rights to the land on which he or she lives and farms, and subsequently the trees that grow upon that land. This private *de facto* situation allows people to transfer rights of ownership to family members, but they cannot sell these rights to outsiders. Ownership entitles an individual or household to all the benefits available from the natural resources that are accessible on their land

including their trees—this does not however, preclude the owner from upholding long standing cultural rules with regard to particular tree use and management. A land ‘owner’ may lease the land to squatters and determine rules of exclusion and enforceability with regard to management. In theory, the attributes of this *de facto* private land ownership give the owner a significant number of benefits, yet it is the issue of enforceability that weakens this system.

Musawu trees in Chikafa have a unique set of resource management rules, which include property rights of ownership, transferability, exclusiveness and enforceability. The key rules according to most Chikafa residents and as captured in the formal questionnaire surveys and group discussions of this study, include the following:

- Exclusive access is automatic for musawu trees on fields and homesteads.
- Picking fruit or cutting another’s musawu tree is unacceptable unless the owner has granted permission.
- An owner or exclusive user may clear around the tree and put thorny branches around in order to designate specific rights of access.
- An unauthorized user, if caught, must return the fruit or be taken to the police.
- Drought changes the rules with regard to access of musawu use.
- Trees are not to be cut.

Traditional social and cultural norms have been in place with regard to land cultivation for centuries in the mid-Zambezi valley. Trees on fields have had their often unique set of rules by which sustainable natural resource management has been maintained—and one of these has been that fruit trees are not to be cut, no matter where they are growing. Survey results show that local people say that musawu trees are not to be cut. These are the rules and yet any person that

drives along the Manyame River in Chikafa in October will see that such is not the case. This is an instance where there is a conflict between people's expressed understanding of the local rules and their behavior. Long standing knowledge of natural resource regeneration of this particular tree has made its yearly stumping fully acceptable in practice. Herein lies the challenge: to examine the beliefs versus practices when it comes to property rights' attributes. If property rights are binding then practice and belief will be congruent (Area C, Figure 5.5). This overarching assumption leads to the first hypothesis.

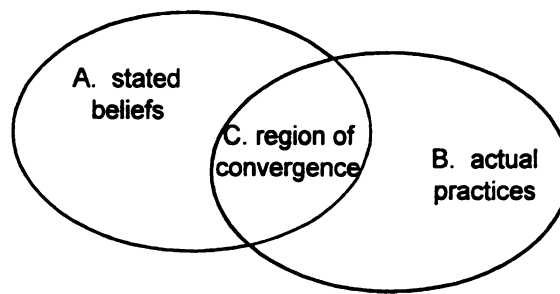


Figure 5.3. Region of convergence for property rights where stated beliefs converge with actual practices.

H_0 , therefore, states that for households with claims to use musawu trees, the frequency of use without having permission granted will equal those households without a claim to use musawu. Conversely, H_1 states that for households with a claim to use musawu trees, the frequency of use without permission will be less than for households without a claim to use musawu.

These hypotheses are made under the assumption that people make claims to a tree, which excludes others from collection and that people collect from trees that others have laid claim to. In this instance, a chi-squared test shows that people are doing what they say they are doing in that H_1 holds true. (Table 5.13.)

Table 5.12. Cross tabulation of claims to use musawu.

		Claim made in 1994 to particular musawu for sole use?		Total
		yes	no	
Others used musawu on your fields without your permission?	yes	4	7	11
	no	8	11	19
Total		12	18	30

Table 5.13. Chi-square test of claims to use musawu.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.096(b)	1	.757		

It is the enforcement of rules that is most difficult. There are no institutions that adequately mandate conformity to rules of exclusiveness of use, for example. This may be the case for any of a number of reasons: 1) the institutions have crumbled in the face of land pressures; 2) political conflict may

have eroded previously enjoyed institutions with regard to musawu access and use; 3) there may never have been institutions that have the ability to enforce musawu management because of the perceived value of the resource.

Musawu fruit is given *de jure* status to authorized users by the local government. A permit must be bought from the District Council in order to legally take musawu fruit from the District. The current sanctions for violation of either *de facto* or *de jure* rules involves returning the fruit to the 'rightful' owner or reporting the matter to the local authorities.

Local Rules

Local rules and regulations with regard to access and use of musawu trees differ between communities in the mid-Zambezi Valley. These observations are based on short visits to other areas. While residents in Chikafa describe their rules of access to musawu as "private", in the sense that they have the right to exclude access to the trees on their homestead and fields, in practice many will admit that the "early one gets the fruit". If a person from household A goes early in the morning to collect fruit from their riverine fields, they may end up collecting from household B's fields if there is nobody there to hinder them from so doing.

The rules are described by community residents as a private rights system, whereby they have the ability to exclude other fruit tree users and can

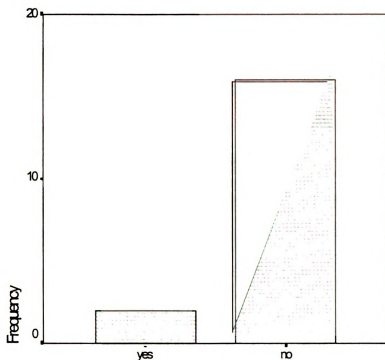


Figure 5.4. Responses to the question: “Is it lawful to cut down musawu trees?”

transfer rights of use to other people as well—though sale of the land or trees is not permissible. Enforcement of exclusion is minimal. Punishment is said to be

the return of the fruit to its owner or police involvement—though seldom is the ‘thief’ caught, hence access has the appearance of being open to anyone who is willing to take these seemingly minor risks. Elephants are likely seen as a greater risk than enforcement of local rules. Local residents believe that most people know and understand these rules, yet practice is loose. For example,

while there is the belief that a musawu tree growing on my field is my own, others will seize the opportunity to pick its fruit if there is no one watching over it. People say that it is not lawful to cut down musawu trees (Figure 5.5) and yet each year hundreds of trees are cut.

A second hypothesis states that for H_0 , the frequency of those households that state that it is lawful to cut down musawu trees will equal those households that do cut down trees. Conversely, H_1 states that for those who claim that it is not lawful to cut, the frequency will be less for those households that do cut down musawu trees.

Table 5.14 shows a crosstabulation of lawfulness to cut down musawu with actual practice of cutting down musawu trees. In this instance, a chi-square test (table 5.15) reveals that people are not abiding by their own stated rules, hence property rights are not binding and H_1 holds.

Table 5.14. Crosstabulation of lawfulness in cutting down musawu with actual practice.

		Is it lawful to cut down musawu trees?		Total
		yes	no	
Cut down musawu on your fields or homestead?	y e s	2	8	10
	n o		9	9
Total		2	17	19

Table 5.15. Chi-squared test of lawfulness to cut down musawu trees.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.012(b)	1	.156		

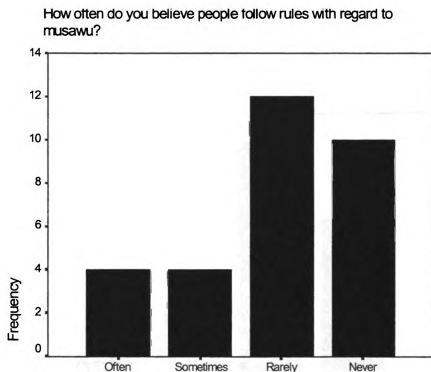


Figure 5.5. Responses to question: "How often do people follow rules with regards to musawu?"

There is a belief that most people rarely follow rules with regard to musawu. Seventy percent of respondents said that people rarely or never follow such rules. There is also the belief that non-residents or strangers follow the same pattern (Figures 5.6 and 5.7).

Enforcement of rules with regard to harvesting and collection of musawu seems strong if there is a high degree of management. Intense management involves two key factors: 1) the owner conscientiously sweeps underneath their tree(s) to show interest in harvesting and to enhance their ability to collect, and 2) the owner sleeps in temporary shelters on their fields during the season in an effort to keep elephants and invaders at bay.

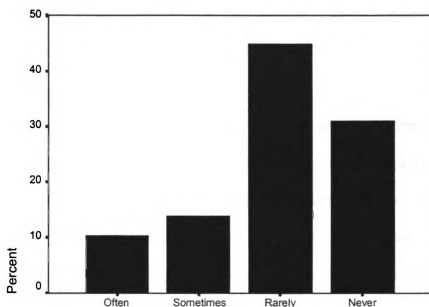


Figure 6. Response to the question: "How often are rules observed by non-residents/strangers?"

Both the questionnaire surveys and group discussions demonstrated some of the following results with respect to musawu tree management in Chikafa. First, residents and leaders believe that the management of musawu has changed because of an increase in the perceived value of the fruit, drought and loose institutional structures with regard to land and tree tenure. Secondly, there appears to be an eagerness for more formal structures to be put in place. These include: musawu fruit selling points; a formal marketing structure or marketing board; stronger sanctions for those who fail to comply with the rules; plantation or agro-forestry research, and new technologies for adding value to musawu fruit.

Local governance

Each tier of governance in Zimbabwe has laws pertaining to natural resource harvesting. Many rules/laws regarding the harvesting, collection and sale of masawu are location or community dependent.

The local level or VIDCO in Chikafa attempted to set a sale price at \$7 per bucket in 1993 (Zimbabwe dollars; ~7:1 US\$ at the time). This tactic failed because Mozambicans would walk long distances across the border to sell their fruit at the market in Chikafa and “a person would not want to walk back without selling”, even if an unreasonably low price was fetched (Zhuwao, pers. comm., 8 June 1995). Those people who came to buy their musawu at the market were *supposed* to pay \$10 per month. The VIDCO made about \$200 in 1994 from this

policy (Chidongo, pers. comm., 9 June 1995), however, enforcement was only moderate.

In Chidodo, a similar musawu growing community approximately 50 kilometers to the east of Chikafa, over \$500 had been earned from receipts issued to outside buyers in 1995—the first year the policy was in force. (Zonde, pers. comm., 31 August 1995).

In Neshangwe Ward, in which Chikafa is located, there are no specific policies with regard to the sale of masawu, however, there is a desire on the part of local and traditional leaders to see the Ward involved and profiting from the business of masawu in their area.

At the district level, buyers of musawu fruit (or any other product taken from the District) are required to purchase a “license for hawkers and street vendors” at the Guruve District Council. This license costs \$20 per month and entitles its holder to do business within the District and transport products out of the district. There is sporadic enforcement of this council by-law because enforcement requires labor to check vehicles coming in and out of the valley.

Patterns of change

The perception of change with regard to musawu use was quite strong. These perceptions came through primarily in the group discussions.

Group discussions

Elder participants in the group discussions recounted when they first recalled musawu sales in the mid-Zambezi valley. It was the 1960s when the first bus company ventured into this remote area. General consensus was that in those days musawu was not as plentiful as it was today. People enjoyed its fruit and even sold small quantities, but there was no formal market and very few people sold. It has been the increase in numbers of musawu trees and drought which has affected the increase in the number of users and uses. Drought has affected other cash crops, thus making musawu a viable and profitable option in times of maize or cotton failure. Elders claim that in the past people respected the rules of musawu use and harvest whereas today they do not. There are also more elephants coming into the area now than in the past. This could be due to an increase in the number of elephants in the area or the number of musawu trees to which they have access.

Summary of results

In this complex arena of multiple property rights regimes, ownership of land entitles owners to the benefits of that land and the trees upon which they grow. While the State has the right to make laws over trees on communal land, rarely does it utilize such right and a *de facto* private system falls into place. While rules include exclusive access to musawu trees on a person's homestead and fields, in practice these rules are not always followed and the behavior that

occurs can differ. For example, where people state that it is not lawful to cut down musawu trees, practice shows that in fact people do cut them down. Property rights are not binding in this instance. There is also a belief that people rarely follow the rules with regard to musawu. Enforcement of rules appears to be strong if there is a high degree of management. Finally, in this “private” arena of musawu tree management, rights to exclude people from use of their fruit trees only works if there is adequate enforcement and as one resident so aptly put it, “the early one gets the fruit”.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to ascertain management and use practices of musawu (*Ziziphus mauritiana*) in one area of the mid-Zambezi Valley, Zimbabwe. Questionnaire surveys, group meetings and observation were the means to provide a baseline picture and analyses of musawu use patterns from which local 'community leaders and development organizations could enhance their understanding of tree tenure in Chikafa. Research questions included the following:

What are the patterns of management and use of musawu trees in Chikafa?

What are the local institutions that regulate musawu tree management?

Has use and access to musawu changed over time?

Are people's expressions of behavior consistent with their expressed understanding of local rules governing musawu use?

Conclusions

Property rights in the mid-Zambezi Valley are an interwoven set of property rights regimes ranging from State ownership to authorized *de facto* private. Customary management practices are breaking down as a result of changing conditions. People still remember the customary taboos and restrictions but they no longer follow them. Where customary practices still do exist, it is important to find ways

of legitimizing them by incorporating them into local by-laws. Building local capacity and incentives for good management will be more effective than policing and fining. While it is sometimes said that private ownership is the only way to ensure sustainable harvesting, communally owned resources can be used sustainably through communal controls over woodlands. Group or communal ownership includes clear definition of the resources and must be agreed upon by all members of the 'group'. Membership of the group must be clearly defined e.g. all residents of Chikafa including Mozambican settlers. There must be a set of rules that governs what each household is entitled to harvest and subsequently sell locally or in distant markets. Penalties must be laid out as well as a mechanism for enforcing these penalties. Finally, the members of the group must benefit from the resource. In Chikafa, members of the group do seem to be benefiting from this resource all though some more than others and this may have to do with their distance to market more than access to the resource. It is the set of rules and subsequent enforcement policies that are lacking in Chikafa. Local institutions could be utilized to set up the controls needed to adopt community level policies that would enforce musawu harvest compliance.

Property rights change depending on the asset in question and/or changes in the 'system'. In Chikafa, musawu tree management is believed to have changed because of an increase in the perceived value of the fruit, drought and loose institutional structures. There appears to be an eagerness for more formal structures to be put in place which include: musawu fruit selling points; a

formal marketing structure or marketing board; stronger sanctions for those who fail to comply with the rules; plantation or agro-forestry research, and new technologies for adding value to musawu fruit.

...“unless we are to increase significantly the value of the output, it is unlikely that we will reduce poverty. It has become imperative to consider seriously the hypothesis that a high-return production system is possible on a sustainable basis in marginal lands if unconventional indigenous flora and fauna are included.” (Muir, 1989)

Kay Muir has aptly summarized the significance of utilizing the musawu industry in a communally responsible way as a means to addressing recurrent poverty in an extremely rain deprived region. If the cost/benefit could be assessed for households to plant, harvest and sell musawu as opposed to cotton, would it not make more sense sustainably to do so? The inputs are significantly less and it seems that the returns would be substantial. Naturally the demand for this valuable resource would need to be assessed over the long term, but given its increased value in the market place, it seems a reasonable local alternative to cotton production.

Recommendations for further study

Comparative Community Study

What are the factors influencing why some communities will choose to harvest and sell masawu, while others do not? Community organization and leadership seem to play critical roles in providing the institutions that make musawu fruit harvest and sale a profitable economic development venture. Drought, elephants, relative wealth and distance to markets are all likely factors affecting a community's choices.

In-depth economic analysis

An in-depth economic analysis on household wealth and various types of income generation might prove further insight into the choices that households make with regard to harvest and sale of musawu. Perceptions about pricing locally and regionally would also provide baseline data on what people believe versus reality in regional market situations. This could serve as the basis for formalizing or creating pricing structures that adequately account for labor inputs.

Musawu production and consumption is at the heart of a relatively little known, but thriving industry. It is consumed both fresh and dried by men, women, children and animals of all sizes. Customary rules serve as the basis by which human use is dictated, however, rules do not always equate to practices. In Chikafa, the rules of musawu use are clearly delineated yet the practices are loose in nature making enforcement equally difficult to use as a management

tool. At the core of this community is the desire to more clearly formalize use and selling practices of musawu in order to capture all of this unique tree's benefits.

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APPENDIX A

**Interview schedule: Musawu Trees
May 1995**

Sarah Funkhouser

Introductions –*Will be presented verbally in Shona by the enumerator and will include my status as a student doing research on the tenure of the musawu tree and the marketing of its fruit (masawu). Explicit in the introductions are the following:* Participation in answering this questionnaire survey is voluntary. If you choose to participate, you may discontinue at any time during the questionnaire. All of your responses are strictly confidential.

SECTION 1: Demographic Information

- A] Interview no. _____ B] Date: _____
C] Interviewer _____
D] VIDCO _____ E] Village _____
F] Plot no. _____ if none, why? _____
G] Name of head of household _____
H] Place of origin _____
I] Name of respondent _____
J] Relationship to head of household (if not the same) _____

SECTION 2: Individual tenure/specific behavior on use of musawu

In this first section of the questionnaire I will ask questions that related to how you and members of your household use musawu. For some of the questions you can simply answer yes or no; some questions will have a set of possible answer from which to choose; other questions will need explanation. Please answer all questions to the best of your knowledge.

1. In your household, who collects masawu? (*List household member and relationship to head of household*)

- | | | |
|----|-------|--------------------|
| a. | _____ | relationship _____ |
| b. | _____ | relationship _____ |
| c. | _____ | relationship _____ |
| d. | _____ | relationship _____ |
| e. | _____ | relationship _____ |
| f. | _____ | relationship _____ |
| g. | _____ | relationship _____ |
| h. | _____ | relationship _____ |
| i. | _____ | relationship _____ |

2. For what purposes within your household is musawu used? (*check if apply*)

- ☐ Collection of masawu fruit
- ☐ roof timber
- ☐ feed livestock
- ☐ firewood
- ☐ shade
- ☐ other

3. Have you or any member of your household ever:

- a. planted musawu? 1=yes; 2=no; 3=don't know
- b. watered musawu? 1=yes; 2=no; 3=don't know
- c. pruned musawu? 1=yes; 2=no; 3=don't know
- d. pulled up young musawu in your homestead? 1=yes; 2=no; 3=don't know
- e. pulled up young musawu in you homestead? 1=yes; 2=no; 3=don't know
- f. cut down musawu on your fields or homestead? 1=yes; 2=no; 3=don't know
- g. cut down musawu on someone else's fields? 1=yes; 2=no; 3=don't know

4. From which of the following places do you or any other household members use musawu? (*Check if apply*)

- ☐ your homestead
- ☐ your upland field(s)
- ☐ your riverain field(s)
- ☐ trees along the river, but not in riverain fields
- ☐ trees in common (open) areas which are not in upland fields
- ☐ other people's homesteads
- ☐ other people's fields

5. Have other people in the village used musawu trees on your homestead with your permission?

- 1=yes
- 2=no
- 3=don't know

6. Have other people in the village used musawu trees on your homestead without your permission?

- 1=yes
- 2=no
- 3=don't know

7. Have other people in the village used musawu trees on your upland or riverain fields with you permission?

- 1=yes
- 2=no
- 3=don't know

8. Have other people in the village used musawu tress on your upland or riverain fields without your permission?

1=yes

2=no

3=don't know

9. Are there certain musawu trees that only you or other members of your household have exclusive access to?

1=yes

2=no

3=don't know

9a. If yes to #9, where are those musawu trees located?

10. In 1994, did you or any member of your household make an individual claim to particular musawu trees for your sole use?

1=yes

2=no

3=don't know

10a. If yes to #10, how was that claim made?

11. Did your household make a claim to particular musawu trees five years ago?

1=yes

2=no

3=don't know

12. At the moment, approximately how many musawu trees does your household call its own?

1=none

2=1-5

3=6-10

4=11-20

5=more than 20

13. Approximately how many musawu do you or all household members use that are not claimed by anyone else?

1=none

2=1-5

3=6-10

4=11-20

5=more than 20

14. How do you control people so that they do not:

- a. use your musawu trees on your upland or riverain fields?
- b. use musawu trees that you have claimed which are not in your upland or riverain fields?

15a. Have you or any member of your household ever found an outsider taking masawu fruit from the trees on your homestead?

1=yes

2=no

15b. Taking masawu fruit from your upland or riverain fields?

1=yes

2=no

15c. Cutting down your musawu?

1=yes

2=no

16. If you found someone doing any of the above, what did you (or another member of the household) do?

SECTION 3: General tenure of musawu

This next section contains questions related to the general rules for using musawu. Once again, for some of the questions you will have to choose from a set of possible answers, others will need explanation. For many of the questions, you can simply answer yes or no.

17. Do people in the village claim personal ownership of musawu tree/s?

1=Yes

2=No

3=Don't know

18. If a person claims ownership of a musawu tree, is it because the tree/s are in their field?

1=Yes

2=No

3=Don't know

19. Can a person claim ownership of a musawu tree although its in someone else's field?

1=Yes

2=No

3=Don't know

20. Do people claim musawu trees more often than they did five years ago?

1=Yes

2=No

3=Don't know

21. Do people cut down musawu trees?

1=Yes

2=No

3=Don't know

22. Is it lawful to cut down musawu trees?

1=Yes

2=No

3=Don't know

23. Are there any laws against any of the following with regard to musawu trees:

(check if yes)

_____collecting masawu fruit

_____pulling up musawu in fields

_____selling masawu fruit

_____pruning musawu trees

_____cutting down musawu trees

_____burning musawu trees

_____other (explain)

24. If there are laws against any of the above, what are they?

25. What is done to enforce these laws?

26. Are there any punishments meted out to law breakers?

1=Yes

2=No

3=Don't know

If yes to #26,

27. What punishments are meted out to law breakers?

28. Do you know of anyone who has been punished?

1=Yes

2=No

3=Don't know

29. In general, how often do you believe people follow the rules with regard to musawu?

1=Always

2=Often

3=Sometimes

4=Rarely

5=Never

30. In general, how often are rules with regard to musawu observed by non-residents/strangers?

1= Always

2=Often

3=Sometimes

4=Rarely

5=Never

31. Of the following circumstances, are there any that would change the rules of access to use musawu trees: *(check if yes)*

_____ the season or time of the year

_____ increase in selling price of masawu fruit

_____ drought

_____ marriage

_____ divorce

_____ other (explain)

32. For what reasons do people leave musawu trees standing in their fields

33. Has the number of musawu trees left standing in fields increased over the past 5 years?

1=Yes

2=No

3=Don't know

34. Are there people in your village who collect masawu fruit as a group?

1=Yes

2=No

3=Don't know

If yes to #34,

35. Who are those groups of people? _____

36a. Do you believe that people in your village are gathering more masawu fruit than they were 10 years ago?

1=more

2=less

3=same

4=don't know

36b. Why?

SECTION 4: Economic contribution of masawu fruit to household wealth

In this next section, I will ask questions about the sale of masawu in your household as well as the amount of income that your household earns from its sale.

37. Do you or any members of your household sell masawu?

1=Yes

2=No

If no to #37,

38. Is there any particular reason you or any member of your household does not engage in selling masawu fruit?

39. Approximately how many bags of masawu are collected in one season for your household consumption?

of bags: _____

40. Approximately how many bags of masawu that your household collects are dried for use later in the year?

of bags: _____

If household DOES NOT engage in sale of masawu, proceed to section 5!

41. Which members of your household sell and what is their relationship to the head of the household?

- a. _____ relationship _____
- b. _____ relationship _____
- c. _____ relationship _____
- d. _____ relationship _____
- e. _____ relationship _____
- f. _____ relationship _____
- g. _____ relationship _____

42. For how many years have you been selling fruit?

_____ years

43. Approximately how much cash income was earned by each member of your household from sale of masawu fruit in 1994? (*list name/\$ amount*)

a. _____ \$ _____
b. _____ \$ _____
c. _____ \$ _____
d. _____ \$ _____
e. _____ \$ _____
f. _____ \$ _____

44. Approximately how much was earned in terms of goods by each member of your household from sale of masawu in 1994? (*list name/goods earned*)

a. _____ goods: _____
b. _____ goods: _____
c. _____ goods: _____
d. _____ goods: _____
e. _____ goods: _____
f. _____ goods: _____

45. Is the money earned in 1994 the same as that earned in previous years?

1=more

2=less

3=same

4=don't know

46. What was the average price paid for a bucket of masawu in:

a. 1994 \$ _____/bucket
b. 1993 \$ _____/bucket
c. 1990 \$ _____/bucket
d. 1985 \$ _____/bucket

47. In 1994, how many dollars were earned in your household for each of the following?

a. Maize \$ _____
b. Cotton \$ _____
c. Tobacco \$ _____
d. Vegetables \$ _____
e. Other (list) \$ _____

48a. Is masawu fruit collected for sale different from that for family use?

1=Yes

2=No

3=Don't know

48b. *If yes, what is the difference?*

49. Do you or any members of your household hire labor to collect masawu fruit that will be sold?

1=Yes

2=No

3=Don't know

50a. *If yes to #49, How much do you pay them?*

50b. *If yes to #49, How long do you employ them?*

50c. *If yes to #49, Why do you hire labor?*

51. Have you or any member of your household ever been employed to collect masawu fruit for somebody else?

1=Yes

2=No

3=Don't know

52. Why are you willing to be employed by somebody else?

53. At which location (s) do you or any member of your household sell masawu fruit?

54. To which of the following people do you or any member of your household sell masawu fruit? (*Circle those that apply*)

1=neighbors

2=people who live in your village

3=people with trucks from the cities

4=people who come by bus from the cities

5=people who come from mozambique

6=other (please specify)

55. Who fixes the price for masawu fruit? (*Choose the one that best applies*)

1= the buyer

2=the seller

3=negotiated between the two

4=fixed price known to all

5=other _____

56. In your household, how many buckets of masawu fruit do you think were sold in 1994:

of buckets sold: _____

57a. Do you or any member of your household travel by bus to sell masawu fruit?

1=Yes

2=No

57b. *If yes to #57a, In 1994, where did you (or household members) travel to sell masawu fruit? (list locations)*

57c. How many trips were made?

57d. For how much did you sell your masawu? _____

SECTION 5: Household Information

In this final section, questions will be asked about the composition of your household. Please remember that this information will be strictly confidential.

58. How many people reside on you homestead? _____

59. In what year was the head of household married? _____

60. How many children does the head of household have? _____

61. What is the age of the youngest child? _____

62. What is the age of the first born child? _____

63. How many of the children attend school presently? _____

64. How many goats does your household have? _____

65. Does your household have any donkeys? Y / N

66. Does your household have: a) a wheelbarrow? Y / N

b) a bicycle? Y / N

67. How many acres were ploughed in 1994? _____

68. What did you use to plough the land? _____

APPENDIX B

INFORMAL MARKET SURVEY

Location: _____
Name: _____

Stand #: _____
Residence: _____
Date: _____

Wholesalers—Informal questions:

1. What is the *selling* price at the market, e.g. per bag, bucket, etc.? Does it change with time of the season? Time of day? Dried or fresh?
2. What is the *buying* price of masawu? How much masawu do they buy per week? At what costs? (per bag, bucket, etc.) From where is it purchased? From whom?
3. If transporting from outside city center areas, what are transportation methods and costs? Number of trips per week, etc.
4. Do they barter? What money is laid out for these goods? E.g. what goods and from where do they purchase them?
5. How much is masawu sold for in the production areas, i.e. Mt. Darwin, etc.?
6. In what quantities do they purchase masawu from lorry transporters? Do they buy 'per bag' from people coming in from the Zambezi Valley area?
7. How much time in the season do they spend committed to selling masawu? (for example June-October...) Are they selling other fruits/vegetables as well? What do they do in the non-peak masawu season?
8. Do they have a rough estimate of how many tons (or bags) they sell per week? Over how many months?
9. What happens to the fruit once it gets too old to consume?

Retailers—Informal questions:

1. Where do they purchase their masawu? How often? In what quantities?
2. How much do they pay when buying masawu? How much can it then be sold for?
3. Where do they get the small plastic bags to package? How much (\$)?
4. For how much must they rent a stall?
5. Is selling masawu profitable in their opinion? (Even though the 'wholesalers' seem to be the major suppliers?)
6. Do they know of women or men who come by bus from Tafara (for example) to buy masawu? From whom do they buy?

APPENDIX C

MARKET SURVEY DATA SUMMARIES

Mbare Musika

Table C1. Selling price of masawu at Mbare market by stand number.

Wholesalers	Stand #103	Stand # 105	Stand # 79	Stand # 88	Stand # 74	Stand # 149 (retailer)	Average selling price
Fresh: 20 litre bucket	\$40	\$40	\$20	\$25	\$30	---	\$31
Fresh: 5 litre tin	\$4-5	---	---	---	---	---	---
Fresh: 2.5 litre tin	---	---	\$6	\$8	\$7	\$5	\$6.50
Fresh: small bag	---	---	---	---	---	\$1	---
Dried	\$40	unclear	---	unclear	unclear	unclear	---

TableC2. Buying price for masawu in the mid- and eastern Zambezi Valley.

Wholesalers	Stand # 103	Stand # 105	Stand # 79	Stand # 88	Stand # 74	Average buying price
Fresh: cash price-20 l.	\$20	\$25-30	\$5	\$8-15	\$15	\$15.80
Fresh: barter trade	sugar, flour	sugar, flour	basic goods	soap, dishes, oil, sugar	groceries	---
Dried	---	---	---	---	---	---

TableC3. Purchase points for masawu in the mid- and eastern Zambezi Valley.

Wholesalers	Stand # 103	Stand # 105	Stand # 79	Stand # 88	Stand # 74
Location	Dande, Mt. Darwin, Mukumbura	Chikafa, Hoya, Mukumbura, Chidodo	Mukumbura, Muzarabani, Chidodo	Muzarabani, Chidodo, Chikafa, Gunduza	Hoya, Kapemberi
Fresh: barter trade	sugar, flour	sugar, flour	basic goods	soap, dishes, oil, sugar	groceries
Dried	---	---	---	---	---

Table C4. Local sale prices for retailers outside Harare.

	<i>Mutoko</i>	Kadoma	Glendale	Concession	Chinoyi
20-litre tin	\$40	\$25-\$50	\$35	\$35	\$40
2.5 l tin	---	\$6-\$6.50	---	---	---
Cup (16 oz.)	\$2	\$50	\$1 (x 2000 cups / day)	---	---
Small packets	---	---	\$2	\$2 and \$1	\$2
Kachasu	---	\$12 (750 ml)	---	---	---

Table C5. Potential costs for wholesalers and retailers of masawu.

	Mbare Musika (wholesaler)	Mutoko (retailer)	Kadoma (both)	Glendale (Wholesaler)	Concession (retailer)	Chinoyi (both)
Stall rental	\$450/month	\$22.50/month		R O A D	S I D E	
Transport costs (X 10 trips/month)	~\$3,750 Lorry rental	~\$20 bus fare to Tsutsukve	\$91-126 r.t. bus fare to the Valley (3/week) or \$5-\$7000 truck hire	\$100-\$156 r.t. bus fare to Valley	(buy from Glendale)	\$75 plus \$3 per sack
Per bag bus transport costs	---		\$6 bag	\$9 for 50-kg on bus		
District Council permit	\$475/month					
Groceries or Cash to buy	~\$8,000			\$25-30 per 20-ltr to buy off lorries	\$35 per 20-ltr	\$15 per bucket
Add'l labor costs	~\$4,000/month					
Plastic bags	\$60/400 bags			\$10/100 bags		\$15/100 bags
TOTAL (known) COSTS	~\$12,165 per trip	Must know	number	of tins	bought per	trip

Table C6. Estimated projections of net gain by Harare wholesale traders for masawu fruit in 12-week season.

	Costs	Profits	Net Gain
Lorry =7-8 tons (~650 tins) per trip	Avg. \$12,150	Approx. \$19,500	~\$7,350 per trip
Average 25 lorries from Harare per week	Approx. \$303,750	Approx. \$487,500	~\$183,750 in Harare/week
Average 25 lorries over 12- week season	Approx. \$3,645,000	Approx. \$5,850,000	~\$2,205,000 profit by Harare traders over the 12-week season

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