

HAWKERS OF HEALTH:
AN INVESTIGATION OF THE FARADAY STREET
TRADITIONAL MEDICINE MARKET IN
JOHANNESBURG, GAUTENG

BY

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Area currently under
construction where the
traders will be relocated

Figure 1 Plan of the Faraday market and positioning of the traders (both surveyed and unsurveyed). Ninety-six (60.4%) of the approximately 159 permanent stalls selling plant medicines were surveyed. These stalls are more-or less permanent. The so-called ‘*Friday traders*’ (mainly Sotho female traders from south-western Gauteng that only sell on Fridays and/or Saturdays) tend to be located in Blocks A and I, mainly to optimise their sales to commuters and regulars at the market accustomed to their whereabouts.

KEY

Locker traders:

50	Surveyed
49	Not surveyed

Non-locker traders:

T1	Surveyed
T2	Not surveyed
CR1	Consulting room
	Likely location of the ‘Friday traders’

Other

	Shack
--	-------

Scale

1:999.3

(**Note:** This figure is meant to be viewed in colour. On B&W versions, shaded areas represent traders that were interviewed)

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1 INTRODUCTION

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1.1 Introduction

South Africa faces several challenges regarding the conservation of its natural resources. An activity that is coming increasingly under the spotlight is the use and trade in traditional medicine. For many South Africans, traditional healers are the primary choice when it comes to selecting health care options. At least 12-15 million people per annum consult healers and use the prescribed herbal preparations. A rapidly growing population, a high rate of unemployment, and a low level of formal education (especially in rural areas), have contributed to the exploitation of economically valuable plants. In addition, job opportunities in the formal business sector and the rural subsistence economy have failed to keep pace with the growing number of new job seekers [Huntley *et al.* 1989].

With the huge volume of plants being harvested annually and sold in the street markets of KwaZulu-Natal, Gauteng and Mpumalanga, and the growing number of consumers for southern Africa's floral resources, questions of whether harvesting for the medicinal plant trade is sustainable, and how one can achieve this, need to be addressed. The solution, however, is not straightforward. Sustainable utilisation in this context is a multidimensional challenge. Researchers in the field of indigenous plant use are able to make recommendations about possible solutions, for example identifying levels of threat to key species and possible cultivation alternatives. However, it is a far broader task to recognise the solutions pertaining to what motivates people to become involved in the medicinal plant trade as either consumers, traditional healers, shop traders, street traders or commercial gatherers. These factors include the affordability and accessibility of basic primary health care, education, employment opportunities and the economic climate. In other words, conservation of biodiversity is not always the sole concern of the national Minister of Environmental Affairs, or the provincial MEC for Agriculture, Conservation and Environment.

One challenge facing protected area management in South Africa is to reconcile two previously opposing and mutually exclusive activities, i.e. conservation *and* natural resource utilisation [Dzerefos & Witkowski 1999]. The declining supply of indigenous medicinal plants, however, is likely to generate significant and economic welfare losses and a loss of income-earning opportunities, especially considering the large number of people who either consume or are active in the trade of indigenous medicinal plants [Mander 1998]. With this in mind, any national and provincial policies regarding the medicinal plant trade will therefore have to consider the human costs when attempting to confine the loss of biodiversity and utilisable resources.

The Faraday Street Market '*hawkers of health*' are Johannesburg's, and the Gauteng's, largest vendors of indigenous traditional medicines. This report describes the dynamics of the market, with the aim of informing the relevant decision makers and role players. The report is also one of the most comprehensive and up-to-date market surveys and assessments for the region.

1.2 The Informal Economy

There is debate over the use of the terms 'informal economy' and 'informal sector' to describe the activities of people employed, for example, within the traditional medicine trade. It has been suggested that the terms underestimate and neglect the relationship with the wider economy and trivialises the importance of these activities to many households across the social and economic spectrum [Rogerson & Preston-Whyte 1991].

In this report, the ‘informal economy’ and ‘informal sector’ are to be interpreted in the following way:

- The process of income-generation which is unregulated by institutions within the legal and social environment;
- Income-generating activities outside of contractual relationships of production [Rogerson & Preston-Whyte 1991]
- And, flexibility in the nature of the transactions (e.g. selling ‘handfuls’ of resources at a negotiable price).

‘Formalisation’ of the trade would therefore imply a process whereby harvesting and selling for the traditional medicine trade moves from a less regulated to more regulated activity that is increasingly linked to contractual relationships in production, supply and demand. Therefore, the distinction between ‘informal’ and ‘formal’ does not hinge on the final product, but the *manner in which the product/resource is produced and exchanged* [Rogerson & Preston-Whyte 1991]. The trader’s link to the formal economy is through their expenditure on food, drink, transport costs, and to a limited extent, housing, which is subject to VAT. The more traders earn, the more they pay this consumptive tax.

The medicinal plant trade has also been appropriately labelled a ‘hidden economy’ [Cunningham 1988]. In part this has arisen because researchers have found it difficult to quantify subsistence economic activities in general, and in agriculture and resource use in particular [Friedman & Hambridge 1991]. There is often oversight in quantifying and describing the activities of women in rural areas, especially since certain income-generating activities are an extension of their household and domestic activities (e.g. gathering fuel wood and food), thereby rendering the women’s activities as invisible.

As with other informal sector activities, there are a disproportionately large number of females within the medicinal plant trade (both in Gauteng and KwaZulu-Natal) with low education levels that are clustered in a poorly paid, narrow income range. There are theories as to why this is the case, and much has been written [e.g. Preston-Whyte & Nene 1991] on why there are limited opportunities with low financial returns compared to the time and energy invested. It seems that in many rural households supported by women, money earning seldom progresses beyond a subsistence level. It is not the purpose of this report, however, to explore these relationships in detail, but to illuminate them where necessary for further insight into what challenges face the conservation of natural resources where rural communities are involved. There are social, economic and environmental costs at every level of the trade, and the challenge is to find equitable means to address current imbalances without letting the pendulum swing too far in the favour of either the communities involved or protection of the resources - the reconciliation of conservation, natural resource utilization and community empowerment.

1.3 Rationale

In 1994 the author commenced a study to examine the commercial market for medicinal plants in the *muti* shops of the Witwatersrand [Williams *et al.* 1997, 2000]. The study focussed on the formal sector traders because the informal sector was small, developing, too transient and less formalised at the time. Results indicated that there were at least 500 species in trade [Williams *et al.* 2001] mainly harvested from KwaZulu-Natal (42%) and Gauteng (15%). The Faraday Street market represented 31% of the suppliers to the *muti* shops on the Witwatersrand. This figure is likely to have increased since that time. In 1995, the author briefly investigated the Faraday market. Plant material for 20 species was purchased on 12 different days over a 6-week period. In 1995, there were approximately 120 street traders, three-quarters of whom were women.

The growth in the medicinal plant and Faraday market since that time, the increasing challenge of rural unemployment, and the growing number of species threatened by the national trade in medicinal plants justified a comprehensive investigation of the Faraday Street market and the traders. The information collected from the survey would serve to update the existing data for the Witwatersrand medicinal plant trade, and inform key medicinal plant cultivation schemes and potential law enforcement action within the province.

1.4 Objectives

The primary objective was to perform an ethnobotanical survey and assessment of the Faraday Street medicinal plant market, and the market dynamics thereof. Specific objectives included providing the Directorate of Nature Conservation with:

- A prioritised list of plant species, and the volumes traded
- An assessment of the sources/origins of the plants traded
- An assessment of the market dynamics, including price and methods of transportation to the market
- An assessment of the change in market conditions since 1994 in order to predict changes in the market over the next decade
- A trader profile, including income and language groups
- A profile of the customers purchasing the plants, including income groups, language, and purpose of plant purchase
- An assessment of the conservation status/perception of availability of the medicinal plants, as perceived by the traders
- Recommendations for the conservation of wild populations of medical species
- Ethical and cultural considerations regarding commercialisation of medicinal plants
- In-depth training and skills transfer to an ethnobotanist employed within the Directorate in order to complete other similar surveys
- A document detailing the research methodology required for market surveys.

2 METHODOLOGY

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2.1 Regional Location of the Faraday Street Market

The precinct of the Faraday Street market is located in the south of Johannesburg, underneath the M2 highway flyover in City and Suburban, at the intersection with Faraday and Stott Streets adjacent to the Faraday train station and taxi rank. The area is a significant node for transport, and at least 20 000 commuters pass through the area on a daily basis. The traders operate from the sidewalks off the main road, and from the pavements of the bus terminus (Photo 2.1). Faraday is the Witwatersrand's only informal street market for traditional medicine, similar to the Warwick Street market in Durban, KwaZulu-Natal. Although smaller than the markets in KZN, Faraday is the wholesale and retail centre for trade in indigenous medicines for the region. Ninety-seven percent of the traders are migrants to the area, of which 90% regard KZN as 'home'.



Photo 2.1 The western section of the Faraday market.

2.2 Methodology Overview

Preparation for the survey of the market commenced in November 2000, and the fieldwork was conducted in January and September 2001. The data were analysed and the report written between February 2001 to April 2002 (and finalised after a meeting in January 2003). The survey was based on semi-quantitative questionnaires and interviews with traders and customers, and was carried out primarily by Black Zulu- and Sotho-speaking student research assistants from The University of the Witwatersrand. The students were given training in ethnobotanical surveys and techniques, and several days of pre-survey time were spent becoming acquainted with the market and the traders. The questionnaires covered aspects of socio-cultural demographics, income and expenditure, perceptions of plant conservation and availability, market dynamics and an inventory of all the plants for sale at the trader's stall. Some of the questions were derived and adapted from Mander [1998] and Alexiades & Sheldon [1996]. Most of the information collected was the subject of quantitative analysis, and crosschecking and triangulation of the results were applied wherever appropriate. One-hundred-and-one traders were surveyed, and the sampling strategy was to interview as many traders who consented thereto within the time allocated to surveying a section of the market. The selection of traders was random within the consenting group. Identification of the species traded was mainly achieved by matching vernacular names to botanical names from previously published studies. In some cases, however, species were visually identifiable or were later identified after specimens had been purchased.

2.3 Pre-Survey Preparation: Preliminary Research and Consultations

Initial preparations for the survey involved sourcing existing information on the Faraday market and precinct. Discussions were held with the Inner City Office of the Greater Johannesburg Metropolitan Council (GJMC) (Mr Graham Reid), as well as the Human Resources Division for Transport and Taxis (Mr John Kelly). The plans to redevelop the precinct emerged during these discussions. Information was also obtained from Antony Philbrick, an architect previously employed by the GJMC to provide the traders with the steel lockers and consulting rooms. Mr Philbrick was responsible for introducing the author to Mr Solomon Mvubu, the Chairman of the Faraday Street traders, and the process for obtaining permission to conduct the survey and establishing a rapport with the traders and market leadership was initiated.

Pre-survey familiarity with the market and traders was necessary in designing the survey questionnaires and the sampling strategy. Several site visits were conducted to familiarise the traders with the scope of the research, and to assess the feasibility of various research methodologies. A long-lasting trust was eventually established with the traders and the chairman of the market, which is beneficial for future co-operation.

Ten students were selected to assist with the survey. All but one were Black BSc or BA students from The University of the Witwatersrand, selected because of their fluency in Zulu and Sotho¹. The tenth student was from Rhodes University and assisted with administration, photography and data synthesis. A pre-survey workshop was held with the students, the purpose of which was to explain the objectives of the research, acquaint them with the principles and methods of ethnobotanical surveys, and to discuss the proposed methodological approach with a view to designing a data questionnaire that the assistants would be comfortable using. The following notes were provided and discussed during the workshop:

- An extract from the proposal to DACEL outlining the aims and objectives of the survey;
- Chapter 3: Collecting ethnobotanical data: an introduction to basic concepts and techniques (pages 53 – 94) *from* Alexiades & Sheldon [1996].
- Chapter 3: Methodology (pages 14 – 17) *from* Mander [1998]
- An extract of the paper by Williams *et al.* [2000]
- Specially prepared survey guidelines [Williams, *unpublished*]
- Drafts of the trader and customer survey questionnaires.

¹ Most of the traders speak little or no English, hence the importance of selecting research assistants that could communicate with the traders and conduct the interviews.

Prior to the workshop, two questionnaires had been designed for the trader and customer surveys that met the requirements of the study objectives in terms of the data that would be captured. The format of the questionnaires, and the way in which certain questions were asked, was adapted from Mander [1998] and Alexiades & Sheldon [1996]. The questionnaires were discussed during the workshop and adjusted based on suggestions from the students who were culturally familiar with the research participants. The final version of the two questionnaires is in Appendix 2a and 2b.

The students visited the market on several occasions before the survey. The main purpose was orientation within the market and to familiarise the students and the traders with each other. The students spent several hours walking around Faraday, talking informally to the traders, explaining the objectives of the research, and establishing a basis for dialogue, trust and co-operation before the survey commenced. Some of the students remarked that, as a result of their repeated visibility, the traders began to recognise them and talk more freely. One fact that came to light from the pre-survey discussions with the female traders was that many of them were widows. This led to the inclusion of a question on marital status. Because of the perceived sensitivity of the matter, however, the question of widowhood was asked indirectly.

2.4 Trader Survey

2.4.1 Defining the sample universe

Pre-survey research indicated there to be approximately 164 permanent stalls in the market distributed over nine pavement islands or 'blocks' (Figure 1, page viii). Forty-five percent of traders sold traditional medicines from, or in front of, steel lockers, and the remainder traded off wooden palettes or tarpaulins. Of the 164 traders, 156 sold plant material. A group of female traders that only sell plants on Fridays and/or Saturdays (called 'Friday traders') were observed in Block A. Their numbers do not exceed 20 traders on any one week-end.

2.4.2 The semi-quantitative survey

The semi-quantitative trader survey was conducted over nine days between the 11th and 24th January 2001. One-hundred-and-one traders were interviewed, including 6 'Friday traders'. A time allowance was allocated to survey each Block, with the goal being to randomly interview as many consenting traders within the allotted time. Table 2.1 lists the reasons why certain traders were not interviewed, the main reason being that the stalls were closed during the time in which the interviews were conducted in the specific Block. Table 2.2 lists the number and percentage of categories of permanent traders surveyed. The traders sampled are representative of the gender profile of the traders in the market, and hence a stratified random sample was achieved.

Table 2.1 The number of traders interviewed, and the reasons why certain traders were not interviewed.

	Number	Percentage
Number of permanent plant traders surveyed (excl. 'Friday traders')	95	60.9%
Number of traders not surveyed because the stall was closed	45	28.3%
Number of traders not surveyed because the trader did not consent	6	3.8%
Number of traders not surveyed because of time constraints	10	6.3%

The average time taken to conduct an interview was 57 minutes. On the first day the average survey time was 1 hour and 54 minutes, this time decreased exponentially as the students became familiar with the procedure until it reached 49 minutes on Day 9.

Table 2.2 The number and percentage of permanent traders surveyed (i.e. excluding the 6 ‘Friday traders’).

	Number in the market	Percent in the market	Number surveyed	Percent Surveyed
Total number of permanent traders	164		95	57.9%
Plant traders*	156	95.1%	95	60.9%
Animal traders	8	4.9%	-	-
Locker traders	74	45.1%	44	46.3%†
Non-locker traders	90	54.9%	51	53.8%†
Female <i>plant</i> traders	106	64.6%	66	69.5%†
Male <i>plant</i> traders	43	26.2%	29	30.5%†
Unknown gender of <i>plant</i> traders	7	4.3%		

* Includes traders selling small amounts of animal matter in addition to plants

† Calculated as a fraction of n=95 permanent traders

Section A of the questionnaire included the following question fields: gender; language; age; level of schooling; monthly income and expenditure; traditional healer status; place of residence (rural areas and in Johannesburg); frequency of harvesting trips; method of plant transport to the market; competition between traders; and, attitudes towards plant conservation and cultivation. Section B of the questionnaire recorded the following information: vernacular names of the plants for sale; plant part; origin of the collected material; an approximation of when the plant was bought or harvested; opinions of plant scarcity and popularity; a measure of the bark thickness or the bulb² diameter; and an estimate of quantity based on the number of ‘checkers packets’ or sacks (or fraction thereof) for sale (See Chapter 8 for more details). The questionnaire used is in Appendix 2a

Accompanying the questionnaire was a map of the market layout with the numbered positions of the stalls. Location codes for the surveyed traders were recorded on the questionnaire, and in this way, the daily progress of the survey was efficiently tracked. Maps updated daily with the records of completed interviews were given to students to assist with the decision as to who to interview next.

2.5 Customer Survey

The semi-quantitative customer survey was conducted concurrently with the trader survey. Selection of the customers was random, but not all the customers consented to the interviews. As a result, only 38 people participated in the survey. The average time taken to interview a customer was 18 minutes, but this depended on the number of questions that the participant was prepared to answer before rushing off. Section A of the questionnaire recorded socio-demographic information, as well as the reasons for plants being purchased in Faraday and satisfaction with the service and prices. Section B recorded, whenever possible, the plants bought and the purpose of the purchase, as well as the price and quantity. The questionnaire used is in Appendix 2b.

2.6 Return visit to the market

Consequent to a meeting held with the Directorate in May 2001, it became evident that a repeat visit to Faraday was necessary to collect additional information. The need arose from a request to triangulate and crosscheck the weekly incomes reported by the traders with the prices of plants sold and the volumes traded. There was an additional requirement: to estimate with greater confidence the annual value and volume of the turnover in the market.

² **Bark** thickness was recorded in 0.5cm to 1cm intervals, with the student required to select pieces for measurement that represent the average thickness of the sample. **Bulb** diameters were recorded in 1cm intervals across the widest part of the bulb.

A third questionnaire was designed (Appendix 2c), but the fieldwork only commenced in September 2001 due to unforeseen circumstances relating to both the author and P. Matsau, the Directorate's ethnobotanist. Mr Matsau supervised the appointment of assistants (from within the Directorate) and the data collection, which took place over a period of 3 days.

The main purpose of the questionnaire was to obtain quantitative data on the price, quantity and frequency of specific plant part and species sales and purchases. In Section B of the questionnaire, the species were selected to be representative of the range of plant parts sold in the market, and the variability of risk and hence price and volume traded. The data collected were used in a variety of analyses throughout the report.

2.7 Data Synthesis

2.7.1 Plant identification and data input

Identification of the species traded was mainly achieved by matching vernacular names to botanical names from previously published studies. The primary source of information was Williams *et al.* [2001], the author's species list from a previous study of the plants traded in Witwatersrand *muti* shops. Other primary sources of information include: Watt & Breyer-Brandwijk 1932, 1962; Jacot Guillarmod 1971; Cunningham 1988; Pooley 1993; Hutchings 1996; van Wyk *et al.* 1997; Kroon 1999; Botha *et al.* 2001. In some cases, however, species were visually identifiable or were identified through specimens that were purchased.

Species identification through published records is problematic³, and errors in identification are likely to have been made. However, this was considered the most expedient mechanism for identifying the large numbers of inventoried species sold by each trader. To reduce errors in analysis based on mistaken identification, the author used the concept of analysis by 'ethnospecies' instead of genus and species. This is a change in the methodology previously used by the author in other studies. 'Ethnospecies' is a term used by Hanazaki *et al.* [2000] that takes into account the folk or common name given to 1 or several species quoted during the interviews. In Faraday, for example, the name 'iNgwavuma' can be considered an ethnospecies designating *Elaeodendron transvaalense*, whilst the ethnospecies 'iPhamba' applies to several species (mainly Orchidaceae). Wherever appropriate, the Faraday data were quantified based on the number and frequency of occurrence of 'ethnospecies' to avoid repetitions and hence any bias/inaccuracies in reporting the results.

Following species identification, the data were entered into a relational database designed in the program DATAEASE by modifying the herbarium management system of the C.E. Moss Herbarium. The data capture format was modified specifically for the entry of the survey records, and included the following fields:

- Genus and species number (Genspec No., following Arnold & De Wet 1993);
- Genus and species
- Common name (orthographic)
- Plant part
- Trader opinion of plant scarcity and/or popularity
- Supplier (e.g. gathered self, bought from other traders etc)
- Source (i.e. where harvested)
- When harvested or bought
- Quantity (i.e. the visible quantity on sale e.g. ½ sack)
- Bark thickness or bulb diameter
- Trader code (e.g. C66)

³ Problems with identifying species from the common name in a survey such as this include: 1) the use of generic and non-specific terms and names by the traders e.g. *khubalo* (bark), *impanda* (root), *intelezi* (mixtures or different individual plants); 2) incorrect information given by the traders, both deliberately and from lack of familiarity; 3) incorrect transcription of the whole name or part of it (e.g. 'vuka' instead of 'vukakwabafile'); 4) lack of familiarity with the plants by the interviewer, resulting in incomplete responses or spelling errors.

- Trader name, gender, home language and traditional healer status
- Name of interviewer.

A total of 319 orthographic ethnospecies names were identified to represent approximately 509 species. A further 158 common names remain unidentified (15 of which were cited twice or more). Little can be done to identify these species. The average number of plants (ethnospecies) sold per trader is 27.3 ± 12.0 (SD), with a minimum of 5 and a maximum of 59 ethnospecies per trader. Data were extracted from the database in various combinations so as to proceed with the compilation of the species lists and the analyses.

2.7.2 Data analysis

Statistical analysis of the data was mainly accomplished using STATISTICA 6. Corel QUATRO PRO 8 was used to capture and synthesise all other quantitative and qualitative data. Evaluation of the adequacy of the sampling effort based on a species accumulation curve was computed using the BASIC program RAREFRAC.BAS [Ludwig & Reynolds 1988]. Rarefaction computes the expected number of species $E(S_n)$ at different sample sizes, and a levelling off of the curve indicates that fewer new species are expected to be recorded as the sample size increases – hence sampling effort is adequate. The various indices for species richness, heterogeneity and evenness were computed using the BASIC program SPDIVERS.BAS [Ludwig & Reynolds 1988] and from variables computed by *EstimateS* (Colwell 2001).

3 BRIEF HISTORY OF THE MARKET, FUTURE PLANS AND POTENTIAL CUSTOMER POOL

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3.1 History of the Witwatersrand Medicinal Plant Trade

Described as the region that ‘came in from the gold’ [Beavon *c.*1992], the Witwatersrand is a large metropolitan area that emerged from a small mining town. Labour for the mines was provided by people that became entrenched in the migrant labour system. The ensuing rural-urban oscillation of black labour from around the country enhanced the introduction of activities related to black ‘rural’ culture into the city in the late 1890s [Dauskardt 1990; 1991]. Traditional herbalism was incorporated into the developing urban mine culture to meet the needs of both the black migrant labourers and the repeatedly expanding, permanent urban population for traditional medicine [Dauskardt 1991]. Most of the early herbalists and traders of traditional medicine in herbal chemists established their practises near the migrant labour force in the mines and mine hostels.

Different historical processes, working in different communities and ethnic groups, shaped the development of migrancy [Callinicos 1987]. These historical processes also shaped the preponderance of different ethnic and language groups in various sectors of the emerging South African capitalist economy. The dominance of the Zulu ethnic group in the present traditional medicine trade is the result of several historical factors. First, Zulus comprise the largest language group in South Africa, estimated at 23% [Population Census 1996, Statistics South Africa]. Second, while Zulus were not employed in large numbers in the mines (except as police), they were key cultural brokers or entrepreneurs and introduced rural traditional practices in the urbanizing areas [Prof. P. Bonner *pers. comm.*]. And third, over a period of 50 years from 1860, indentured labourers from India were brought to the province of KwaZulu/Natal to work in the sugar cane plantations. Most of the Indians were the “very working class” Tamil-speaking Hindus who would have developed a very close connection with the Zulu peasant class [Prof. P. Bonner *pers. comm.*].

When the Witwatersrand began to develop, many of the ex-indentured Indians headed to Johannesburg and found that they could fill a niche in the emerging demand for herbal medicine since they were familiar with Zulu customs and traditional practices. Because Black people were prevented from operating in ‘white areas’ or the central business district during the apartheid era, the Indian and White traders established herbal pharmacies or ‘*muti*’ shops in an increasingly formalizing trade. The traders used their knowledge of Zulu traditional medicines, which they continued to develop, and employed black staff to work in the shops (usually Zulu traditional healers). The result was the co-existence of *muti* shops (White- or Indian-owned) trading medicines primarily in the Zulu vernacular, and Black herbalists (of various language groups) who practised predominantly in the township areas [Dauskardt 1991], until deregulation of apartheid legislation occurred after the May 1994 elections.

Traders in the traditional medicine market are differentiated into two sectors, namely formal businesses and informal markets [Williams *et al.* 1997]. The formal sector is represented by herb-traders, including traditional healers, trading from premises called *muti* shops (herbal chemists). Transient commercial gatherers and traders selling plants from pavements and open-air markets, on the other hand, represent the informal sector – for example, the Faraday Street market. The Witwatersrand is South Africa’s second largest market for medicinal plants after the markets in KwaZulu-Natal, and the ethnic diversity of the region’s traders, healers and gatherers is influential in determining the floristic diversity and sources of the plants in trade [Williams *et al.* 2000].

3.2 History of the Faraday Market

The Faraday Street medicinal market was established approximately 25 years ago as a 'Fridays only market' adjacent to the transport node of the Faraday Street train station, bus terminus and taxi rank [Mr Mvubu *pers. comm.*]. The market apparently came into existence after people left the Mai Mai Bazaar when it was formalised. Fifteen years ago, the traders began selling at the market every day and convened a committee to represent the vendors. A chairman is elected by popular vote every two years, and the current chairman, Mr Solomon Mvubu, has held this office for 13 years.

In 1995 there were approximately 120 sidewalk stalls. There are currently at least 166 stalls with street traders selling plants every day of the week. In addition, there is a group of about 10-20 traders who sell plants only on a Friday morning or at the end of the month. This group of 'Friday traders' are mainly Sesotho speaking women from the Orange Farm, Vosloorus and Eikenhof areas south west of Johannesburg, whereas the main body of street traders are primarily Zulu speaking from KwaZulu-Natal, 'traditionalist', averse to 'politics', and subsist under very hard circumstances [ICDA & SPDC⁴ 2001]. According to the chairman of the market, there are at least 249 members of the traders association in Faraday [Mr Mvubu *pers. comm.*].

In 1996/97, as part of a program addressing the informal trade in Johannesburg, the Greater Johannesburg Metropolitan Council (GJMC) provided the street traders with 41 large steel lockers (6m x 1.2m) that were divisible into 82 lockable units (at a cost of about R2000 per locker) [A. Philbrick, *pers. comm.*]. The consulting architects were also responsible for constructing 4 consulting rooms, three of which are still in use. The provision of the steel lockers resulted in a more permanent and less transient structure to the market, and contributed to a limited decline in the plant material thrown away when the traders returned to KwaZulu-Natal. However, growth in the market in recent years has resulted in more street traders than available lockers, and the 'non-locker' street traders occupy the pavement islands of the bus terminus. Some traders have also started to live inside the lockers.

The immediate area of the precinct houses three taxi associations, namely Faraday Taxi Association (FTA), Imazameyethu (ITYA) and Diepmeadow (with about 150 taxis between them) [ICDA & SPDC 2001]. In addition, the area is served by three bus companies, namely Putco Greater Soweto, Mgqibelo Bus Service, and Putco Comuta [ICDA & SPDC 2001].

3.3 Future Plans for the Market

Plans to redevelop the precinct of the Faraday Street market by the Inner City Office of the GJMC began in 2002, in accordance with the City Centre Development Framework and the South East Sector Framework [G. Reid *pers. comm.*]. The intention is to accommodate the informal trade in the area (from indigenous medicines to fresh produce) and a multi-modal transport system (taxi, train, bus and car). The proposed redevelopment will incorporate a range of facilities in support of the multi-modal transport interchange facility - such as an African market, an informal trade market, and housing. The consultants (Kagiso Special Places cc) contracted by the Johannesburg Development Agency to design the facilities in the Faraday Station precinct conducted their own 'needs analysis' as part of the formulation phase of the Faraday precinct [ICDA & SPDC 2001]. Plans for the precinct ('Faraday Place') were drawn up in consultation with the relevant stakeholders (taxi organisations, traditional medicine street traders, other informal traders, SARCC/Intersite, local shopkeepers and commuters) to address the various needs and opinions of appropriate structures and facilities. The new trading area of the muti traders will be located 70-100m north of their present positions, and will be built on vacant land formerly occupied by a few derelict buildings. When complete, the municipal by-laws prohibiting trading on the sidewalks will be enforced, hence confining the traders to the specially built/adapted market.

The redevelopment of the Faraday precinct is one of 5 taxi initiatives of the Central Johannesburg Partnership (CJP)⁵ [The Star 2000/02/06]. The initiatives are expected to have a major impact on the visual quality of the city, and an

⁴ ICDA & SPDC = Interfaith Community Development Association & Special Places Development Consultants

⁵ The CJP is a private Section 21 Company specifically involved in Urban Renewal Projects in the Inner City of Johannesburg with the Inner City Office of the GJMC.

impact on the trade in medicinal plants in the Faraday precinct (see Chapter 15) because the potential customer base is set to expand. The plan [ICDA & SPDC 2001; John Spiropoulos *pers. comm.*] for the area is to:

- Accommodate a taxi rank for 200 taxis and an associated taxi holding area for 1,000 taxis (with the potential for expansion). This means the merging of about 8 taxi associations that are either ranking or holding in the southeast quarter of the Business District. Forty-five taxi routes will then be served from the new precinct, amounting to 15,000 to 18,000 people per day. The Faraday Taxi Association would occupy 45-50% of this new space;
- The provision of stalls and facilities to accommodate 200 general (informal) traders (e.g. of cooked food, fresh produce, small consumables etc), the minimum number required to maintain viability of a market such as this.
- Accommodate 120 traders of medicinal plants within one of the existing sheds, space for about 100 more traders in an open but covered area adjacent to the east of the shed, consulting rooms for traditional healers, and a platform for buses to offload the gathered plants (Photo 3.1, 3.2 and 3.3).
- Potentially provide a visitor info centre and training centre.

The obvious concern for the Gauteng Directorate of Nature Conservation is that this development will be seen as condoning the trade in protected and endangered plant and animal resources, and exacerbate the current problem of over harvesting of resources with the potential increase in customers drawn to the new node. It is realistic to say, however, that this new development has as yet unforeseen benefits and disadvantages for the medicinal plant trade in the region. There were plans to accommodate a workshop and training facility within the newly developed precinct and this will enable the Directorate to conduct on site educational workshops and training. A result of this development, however, is that it will formalise an existing informal structure and the precinct could become a more formal node for health care in the city.

Photo 3.1 Enclosed trading space within the new precinct for about 120 traders

Photo 3.2 Exterior of the trading hall under construction

Photo 3.3 Offloading bay for the plants arriving on the buses.

3.4 Current Potential Customer Base

Assuming that some customers to the market are commuters that arrive via one of the existing transport networks (i.e. train, bus or taxi), then the potential destination of the customer pool, and the number of commuters passing through the market to reach the taxi rank, can be assessed from the surveys that the Transport and Taxi Division of the GJMC conducts from time to time [J. Kelly *pers. comm.*]. A 'peak-hour' passenger survey for the taxi rank on 02/02/1999 between 05:33 and 08:33 is shown in Table 3.1. The results show that the destinations are generally the southern suburbs from Southgate/Mondeor and then east across to Steeldale, Alberton, Alrode and Natalspruit. The routes also include the suburbs around Klipriviersburg Nature Reserve, including Bassonia and Mulbarton. Although not recorded in the survey, the East Rand townships of Katlehong, Thokoza and Vosloorus are part of the route serviced by the taxi associations and/or the bus services.

The study by ICDA & SPDC [2001] reports that the FTA services 8 regions, namely: Natalspruit, Steeldale, Southgate, The Hill, Thokoza, Alberton, The Glen Shopping Centre and Bassonia. Diepmeadow Taxis service Meadowlands and Diepkloof, whereas Imzamoyethu serves Orange Farm, Fine Town, Willierstown, Drieziek, Lakeside Ext. 3 and Magson Manor. Additionally to the taxis, the three bus companies operating in the precinct service Dobsonville, Silverton, Palm Springs, and Evaton North.

Table 3.1 Data from a survey of the Faraday Street Taxi Rank carried out by the Department of Transport from the Greater Johannesburg Metropolitan Council on 02/02/1999 between 05:33 and 08:33. (? = Require clarification on data).

DESTINATION: FROM FARADAY TO:	NO. TAXIS	NO. PAX ON ARRIVAL	NO. PAX ON DEPARTURE	AVERAGE NO. PAX ON DEPARTURE
Natalspruit	48	50	848	18
Natalspruit via Alrode	25	45	373	15
Natalspruit via Alberton	56	43	972	17
Steeldale	26	30	442	17
Steeldale via Reigers Park	2	0	32	16
Steeldale via Jeppe	2	0	36	18
Mulbarton	37	59	590	16
Mulbarton via Turfontein	3	0	50	17
Southgate via Mondeor	24	37	395	16
Southgate via Ridgeway	22	44	357	16
Linmeyer	46	96	780	17
Bassonia	27	29	486	18
The Glen Shopping Centre	24	35	432	18
Through Trips	210	1255	1,723	8
Arrivals Only	?	?	?	?
Total	552 taxis	1,723 pax	7,516 pax	Average pax = 16.2

Newspaper reports⁶ and personal communications depict the members of the Faraday Taxi Association (FTA) as independent mavericks who go against the conventional operating norms/procedures set up by other taxi associations. This has led to taxi related violence and suspensions of the FTA's licence by the GJMC – resulting in thousands of commuters being stranded. The FTA claim to transport a million passengers each day [*The Star* 31/03/2000], although an earlier newspaper report suggested that the FTA had 975 members who own more than 5,000 taxis that service more than 50,000 passengers daily [*The Star* 28/03/2000]. According to the results of the survey by SPDC, however, the daily number of commuters through Faraday is about 20,000, and this includes bus, train and taxi passengers [J. Spiropoulos *pers. comm.*]. Further information on the taxi rank suggests that FTA members are mainly 'rural Zulu' who appeared to speak only Zulu and who transport primarily Zulu commuters. With the redevelopment of the Faraday taxi rank, and the merger with 5 other taxi associations, however, the number and origin of the potential customer pool is set to broaden. However, it remains to be seen whether the commuters will use this facility (traditional medicine market) any more than they do now.

According to the study by ICDA & SPDC [2001], the medicinal plant market is isolated and the traders have little or no relationship with the commuters and little contact with the taxis. The report suggests that the nature of the relationship between the two is not based on customers or transport, but on language and possible family ties. This premise is based on the evidential testimonies of the surveyed commuters (by ICDA), only 3% (2 out of 69 interviewees) of whom admitted to buying muti. The interviewees repeatedly cited Faraday as unclean and dirty, and said that the muti market should be moved elsewhere. The interviewers, however, noted that the area was clean, well demarcated and the products neatly displayed. Hence the negative responses to the muti market by the commuters were thought to reflect the absence of any relationship with the sellers/healers, an urban-rural bias, and a 'possible ethnic perception' [ICDA & SPDC 2001]. These results would then suggest that besides the occasional commuter passing through the precinct, the bulk of the customers to the market are those people who specifically travel to Faraday to buy traditional medicines, whether they be traditional healers, patients or retailers.

⁶ Information available from the Independent Online (IOL) web site: <http://www.iol.co.za>

4 CUSTOMER SURVEY

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Commuters reach the Faraday market before 09:00 in the morning, and after 15:30 in the afternoon. Most of the interviews were conducted between 09:30 and 14:00, hence missing the peak in consumer traffic and the ordinary ‘*man-in-the-street*’ - therefore limiting the customer survey mainly to those people who specifically travel to Faraday to buy plants. At the request of the committee, no interviews with customers or traders were conducted on a Friday because traders felt they would be too busy attending to the needs of customers⁷. Fridays are one of the busiest days in the market for several reasons: 1) it is the weekly pay day for some customers; 2) the taxi rank is busy with people returning home; 3) it is the day that most of the commercial gatherers arrive with the buses to sell freshly harvested plant material from the harvesting sites.

Thirty-eight customers were interviewed. Most of the interviewees were self-employed traditional healers or shop owners, with a few pensioners, unemployed patients seeking treatment or non-healers (i.e. ordinary members of the public who are not trained traditional healers) just buying plants. Only 10% were commuting to full-time jobs. Except for ethnicity, which is independent of time constraints, the resulting profile of the customers interviewed is largely pertinent for the specific time period in which the interviews were conducted. However, given that most customers are not expected to be commuters randomly passing through the market on their way to their next destination, the results of this survey are assumed to be largely representative of the entire potential customer pool, and hence extrapolative (this is confirmed later by the trader survey in Section 5.8).

4.1 Customer Profiles: Demographics of the Users

The primary users of traditional medicine in Gauteng are Zulu, as confirmed by the predominance of plant names in the Zulu vernacular (Section 6.1) and the ethnicity of the traders (Figure 5.3, Chapter 5). The customers interviewed in the market between 09:30 and 14:00 were primarily self-employed Zulu traditional healers, male, and between the ages of 36 and 55. The general profile of the customers is shown in Table 4.1 and Figures 4.1 to 4.5.

The traditional healers interviewed were mostly self-employed practitioners, but a few of them also had other full-time or part-time jobs. Soweto has an estimated 20,000 traditional healers, and Faraday is a source of plants for many of these healers, as well as healers from around the Witwatersrand who don’t/can’t harvest their own medicines. The Witwatersrand also has a well developed formal sector trade in traditional medicines [Williams *et al.* 1997], and the traders from the *muti* shops in the region buy from Faraday on a regular basis. A few Black shop-owners were interviewed during the customer survey.

⁷ In addition to missing the peak in consumer traffic, customers that were interviewed were reluctant to talk for too long, hence limiting the number of respondents. As Mander [1998] points out, “*the fast nature of transactions and the general pace of activity in the market (KZN) did not make interviews (of consumers in the street market) possible*”.

Table 4.1 Employment status and type of customer buying plants at the Faraday market between 09:30 and 14:00.

	Patient seeking treatment	Non-healer buying plants	Traditional healer	Retailer / shop owner	TOTAL (%)
Unemployed	1	1			2 (5.3%)
Self-employed			23	4	27 (71.1%)
Employed: full time			3		3 (7.9%)
Employed: part-time	1		2		3 (7.9%)
Other: pensioner	1	1			2 (5.3%)
Total (%)	3 (7.9%)	2 (5.3%)	29 (76.3%)	4 (10.5%)	38 (100%)

The predominance of Zulu/Nguni consumers in the market was expected (Figure 4.1) given the nature of the work force in the Witwatersrand and patterns of indigenous plant use within the different ethnic groups. The numbers of Tswana, Sotho and Ndebele medicinal plant users in the region are smaller, and this is partly attributable to religious affiliations within these ethnic groups that often reproach the use of traditional medicines. The number of Sesotho customers to the market is expected to increase on Fridays when the mainly Sotho ‘Friday traders’ sell locally harvested plants in the Sotho vernacular names to customers, including traditional healers.

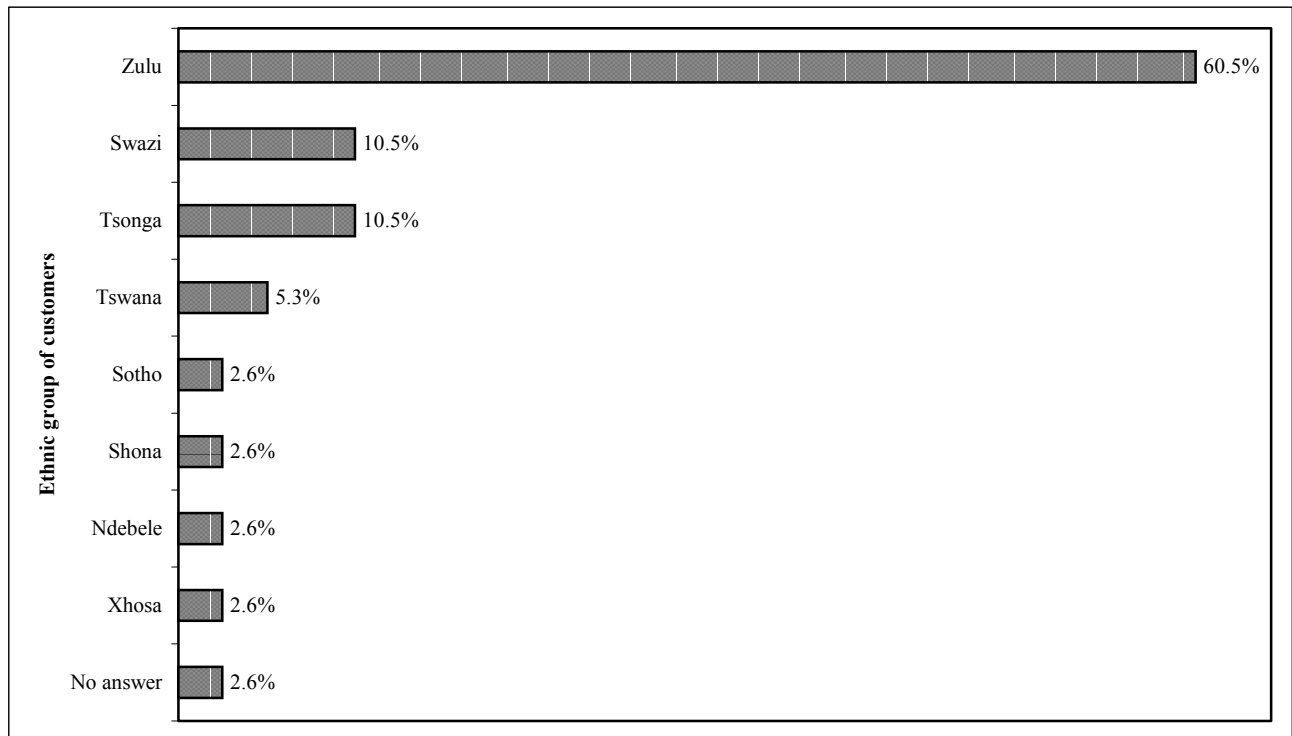


Figure 4.1 Ethnic groups of the surveyed customers

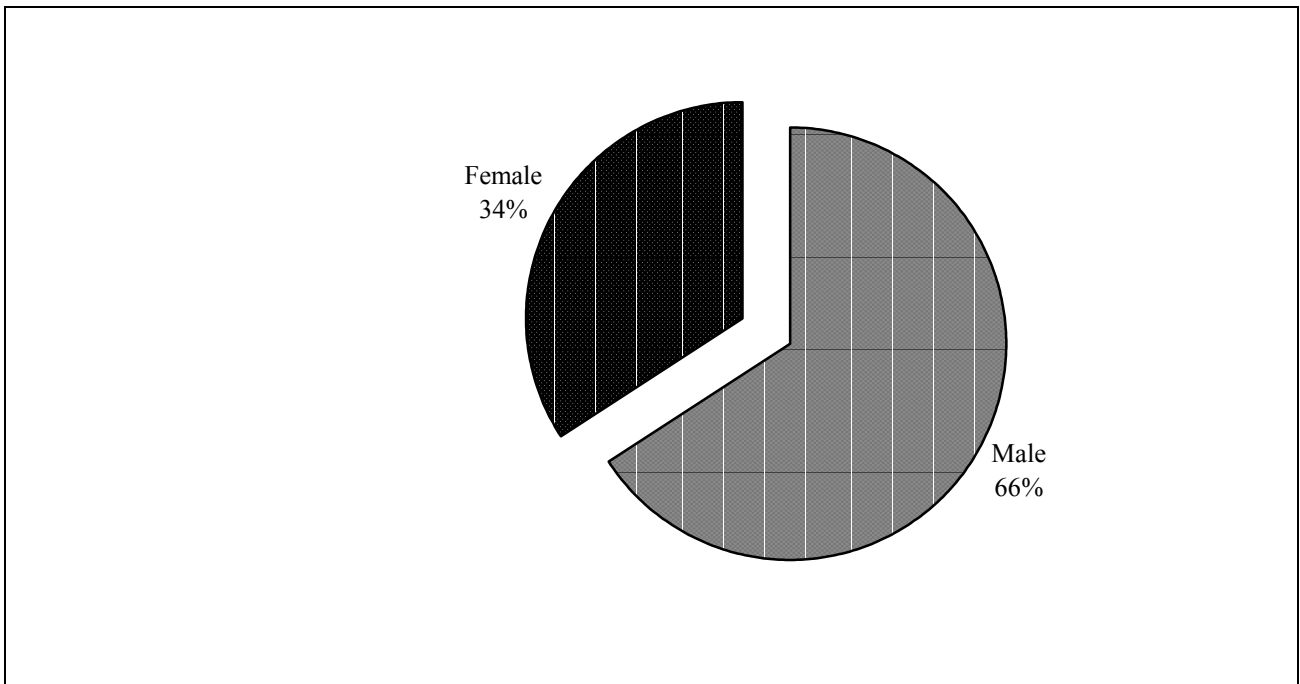


Figure 4.2 Gender of the surveyed customers

According to Mander [1998], it is to be expected that the older age classes of Black society, which are more traditional, make the most use of traditional healers. The same theory is expected to be true for traditional healers, i.e. that they are from the older age classes. The Faraday customer survey results indicate that consumers were mainly traditional healers in the older age classes (Figure 4.3).

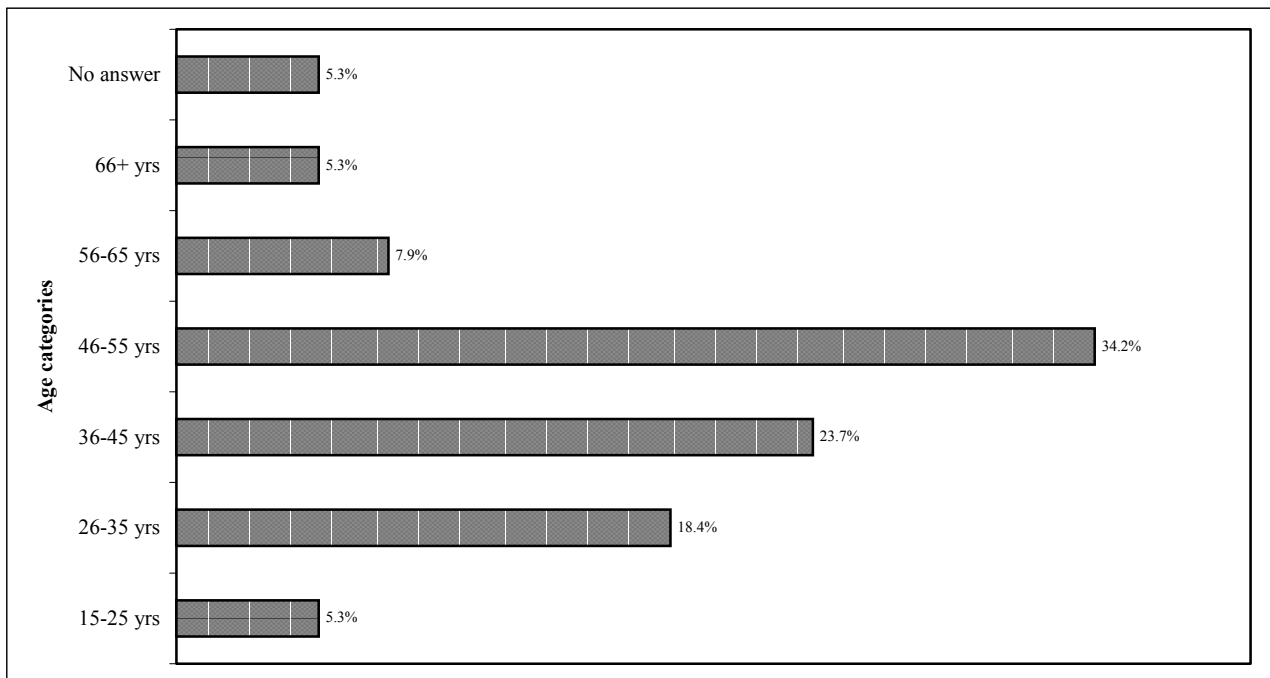


Figure 4.3 Age profiles of the surveyed customers

The cited monthly income of the customers' household (Figure 4.4) mainly reflect the lower earnings of the traditional healers, instead of the earnings of customers drawn from a wider range of occupations had the broader spectrum of consumers been surveyed. The retailers/shop owners earn the upper-income brackets, whereas the household income for pensioners and unemployed consumers is less than R400 per month.

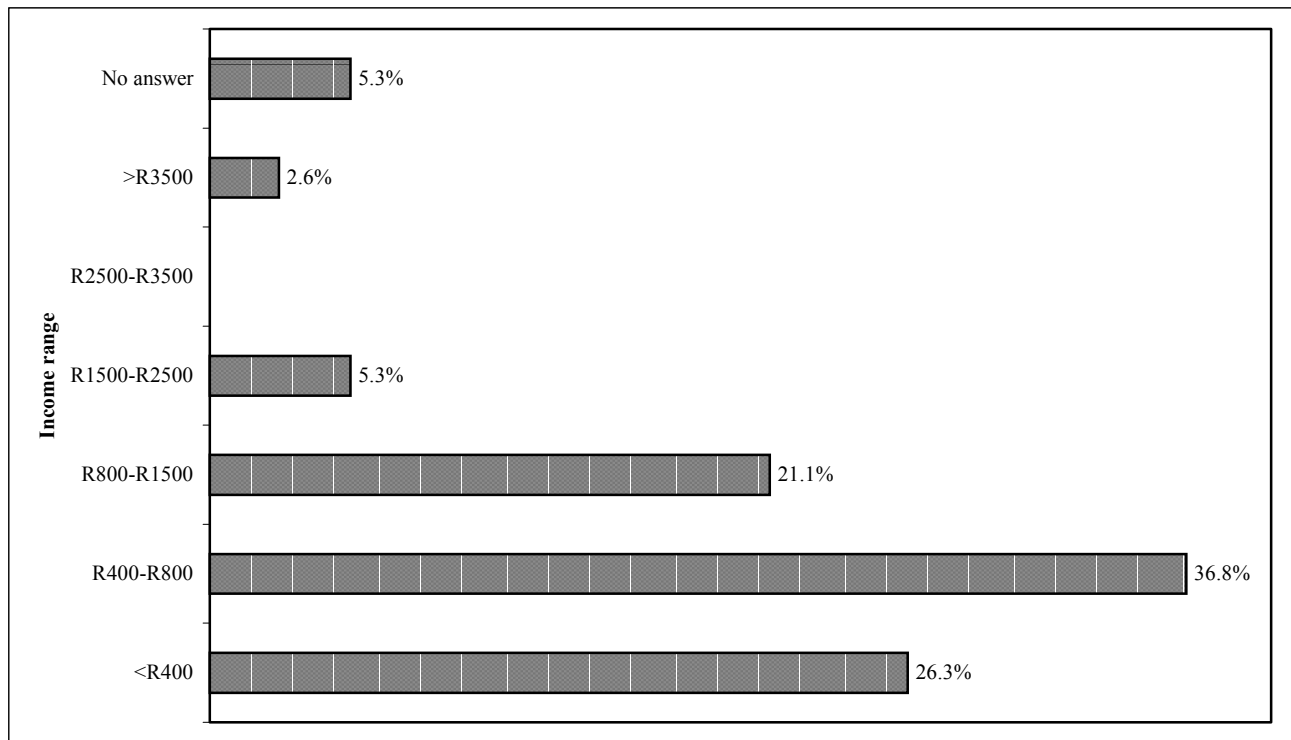


Figure 4.4 Monthly household incomes cited by the surveyed customers

Compared to the street traders (Table 5.4), the customers interviewed had a higher level of High School attendance and a lower rate of no schooling (Figure 4.5). Higher levels of education therefore don't necessarily preclude the user population from purchasing traditional medicines or becoming traditional healers. However, lower education levels may make it more likely that some traditional healers and unemployed rural people enter into the trade as commercial gatherers or hawkers/brokers of indigenous resources on the streets, as evidenced by the education profile of the street traders (Figure 5.2).

The towns and suburbs in which the surveyed customers said they lived (Table 4.2) supports earlier evidence that the customer pool is mostly drawn from the routes of the taxis and buses to and from Faraday Street. Most of the customers commuted from Soweto and the townships in the former East Rand. One patient, a pensioner, came from as far away as Rustenburg to be treated by a traditional healer in Faraday. Another customer, a healer, arrived from Soshanguve (north of Pretoria) to stock up on plants that she could not harvest from where she lived.

Table 4.2 Towns and suburbs within the Gauteng Metropolitan Sub-structures (MSS), and elsewhere, in which the customer survey participants lived.

Towns/Suburbs within Gauteng and Elsewhere	Percent
Northern MSS (Diepkloof, Pimville)	5.3%
Southern MSS (Soweto, Natalspruit, Lenasia, Orange Farm etc)	26.3%
Eastern MSS (Alexandra)	2.6%
Western MSS (Meadowlands)	2.6%
Former 'East Rand' townships (Katlhohong, Spruit View, Thokoza, Davyton, Thembisa)	28.9%
Unspecified Gauteng locations	28.9%
NW Province (Rustenburg) / northern Gauteng (Soshanguve)	5.3%

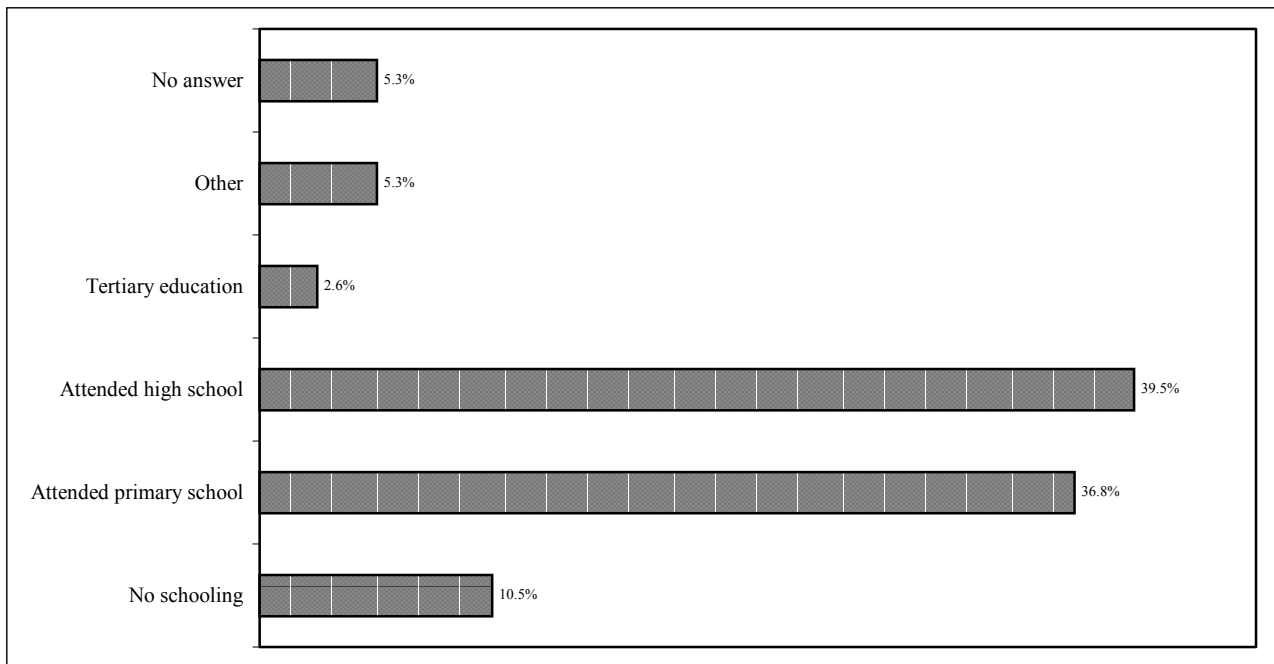


Figure 4.5 Level of school attendance by the surveyed customers

4.2 Reasons for Buying Plants at Faraday

Consumers of traditional medicine on the Witwatersrand have a wide choice of places from which to buy their medicaments. In addition to the Faraday Market and the tens of thousands of traditional healers (at least 18,000 in Soweto), there is a well-developed (albeit more expensive) formal sector network of muti shops. In 1994/95 there were more than 160 shops located within the Witwatersrand [Williams *et al.* 1997]. Because this (2001) sample mainly captured the traditional healers buying plants for their practices, the broader spectrum of reasons why non-healers and patients buy plants from the market cannot be conclusively assessed, and are merely inferential.

The reason for non-healers buying plants at the market are treatment orientated i.e. buying plants from Faraday was cheaper than buying them from a traditional healer in the townships AND the plants are fresher. To some extent, the market acts as a one-stop-shop, similar to a clinic that houses both the doctors and the pharmacy. The reasons retailers and traditional healers buy plants at the market are mainly supply orientated i.e. for the purposes of restocking their shops and practices. Traditional healers have the option of either harvesting their own plants or buying them from other muti shops or the market. According to the healers interviewed, plants were bought at Faraday because it was cheaper than purchasing them from muti shops (Figure 4.6) or going on collecting trips. The ‘Other’ reasons healers buy plants from Faraday include:

- The market has a wide variety of plants
- The market sells *muti* that works
- The plants are always available and fresh
- Faraday is closer to home
- Faraday is familiar to the respondents, and some don’t know other markets to buy plants from
- There are no places in Gauteng to “dig” the plants known to the respondent.

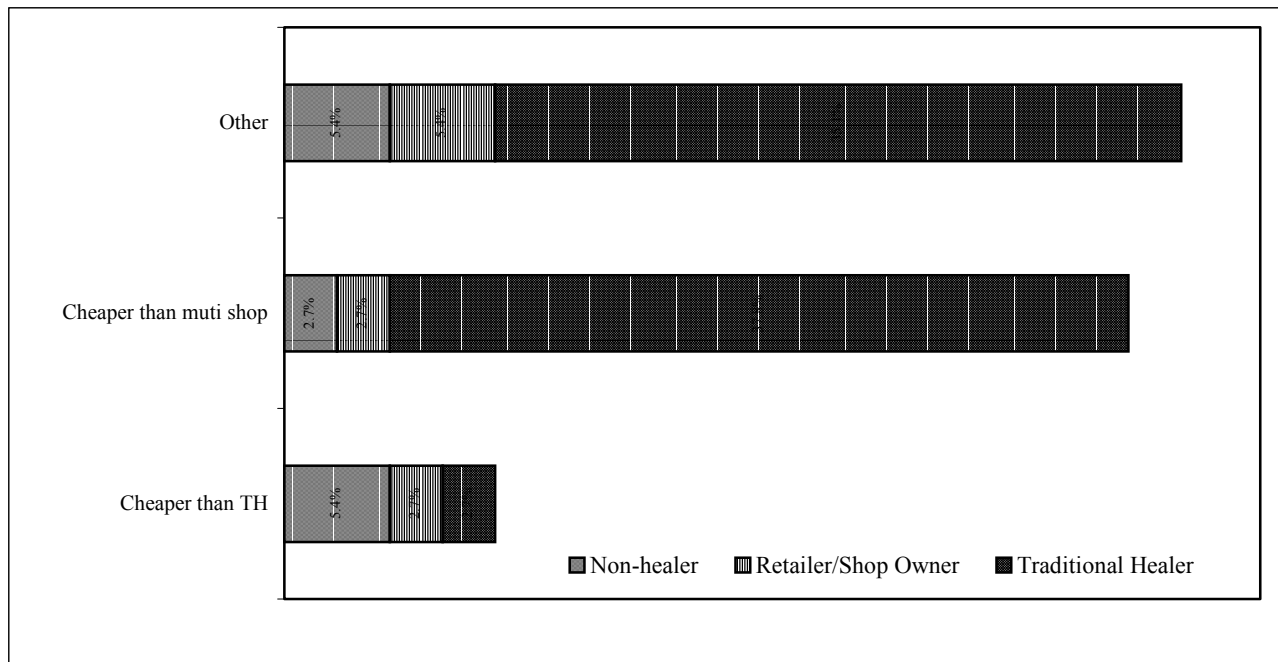


Figure 4.6 Why customers bought plants at Faraday and not elsewhere

Given a choice between the Faraday market and going to a traditional healer or clinic when seeking treatment, 55% of the respondents selected Faraday. However most of the respondents were traditional healers not patients, and therefore the answers were primarily supply and not treatment related. Eighteen percent of respondents said that the choice would depend on the treatment required. A TB patient said that a clinic was preferable, presumably for the greater success rate in treating the disease. The same patient bought plants at Faraday to relieve the symptoms of his TB, but not to cure it.

4.3 Frequency of Purchases

Most of the traditional healers responded that they visited the market 3-4 times a month, i.e. at least once a week (Figure 4.7) and generally towards the end of the week or month. Retailers generally visit the market once towards the end of the month. Patients tended to go to Faraday only when they required treatment.

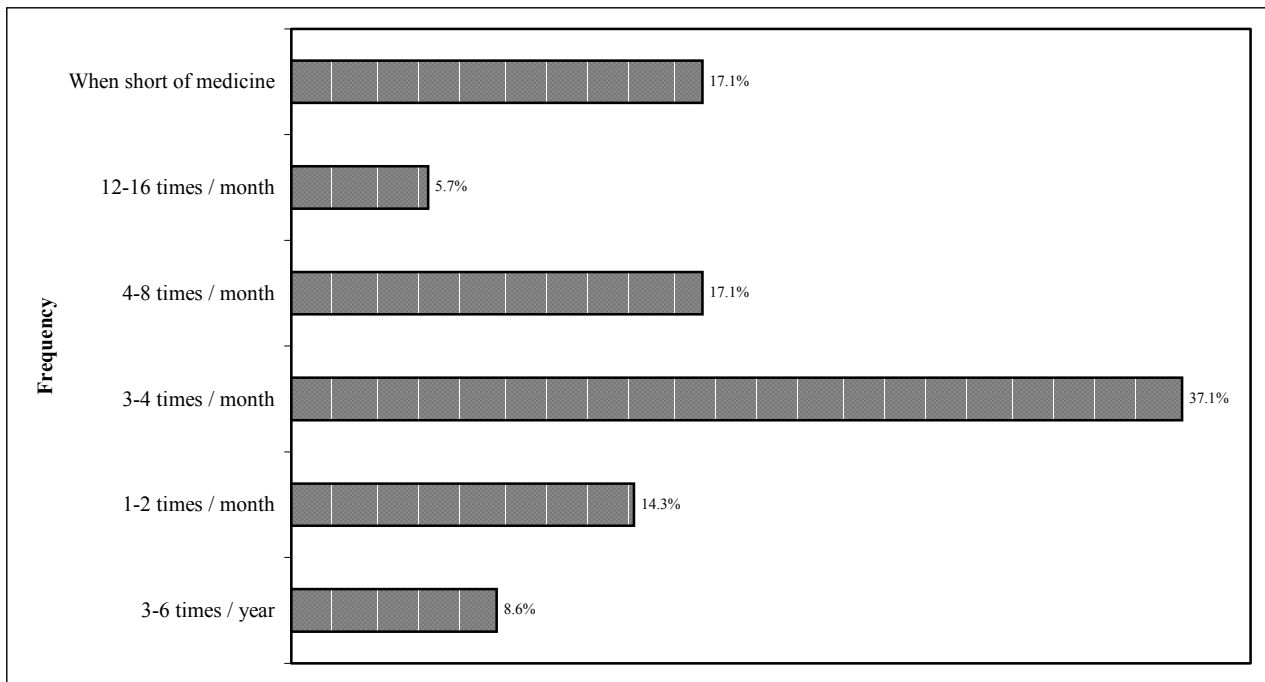


Figure 4.7 Frequency of the surveyed customers' visitations to the market

4.4 Concerns about Affordability and Quality

Given the income levels of the primary users of traditional medicines, and the free treatment offered by some clinics, the affordability of medicines in the market is important to the users. As shown in Figure 4.8, most of the healers did not consider the cost of medicine to be important and indicated that if the medicines became more expensive, they would continue to use and buy the plants the same as before because this activity IS their livelihood. A few, however, said that if prices became too expensive then they would try to cultivate the plants themselves rather than buy them. Conversely, patients were inclined to use the plant medicines less often if they became expensive, preferring instead to seek treatment at hospitals and clinics that offered a free service. However, the decision they said would depend on the treatment required. Western medical practitioners cannot administer medicines for witchcraft related illnesses, but are better at treating STDs. There will therefore always be a market for traditional medicines no matter the cost of buying them because the trade involves many people with varying reasons for their participation.

When questioned about whether they were concerned with the price of plants, most of the respondents answered "No" and said they were generally accepting of the prices. The patients seeking treatment from traditional healers in the market, however, were more concerned about the prices than the traditional healers and retailers buying plants, but tended to accept the prices rather than bargain (Figure 4.9). A few retailers and healers indicated that they would find another trader in the market if the prices quoted were too high. The traditional healers were more inclined to bargain for a better price. In general, however, the respondents felt that the prices were affordable and that they could bargain for a better price if they were unhappy.

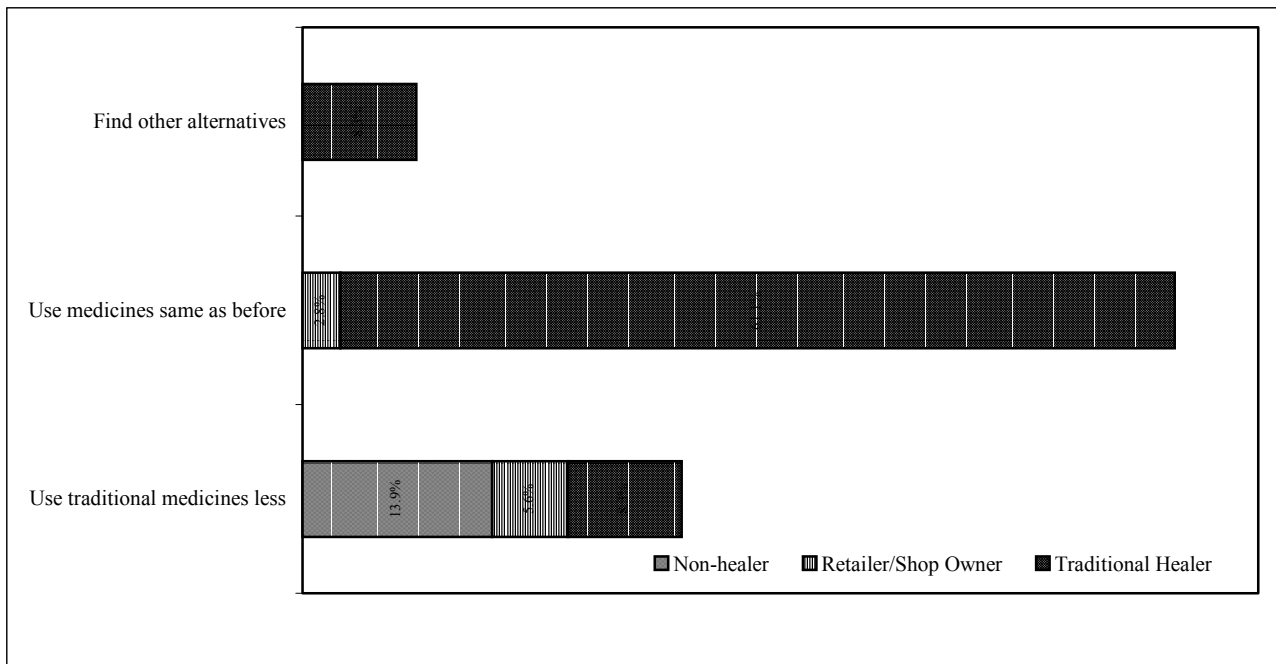


Figure 4.8 What customers would do if traditional medicines became more expensive

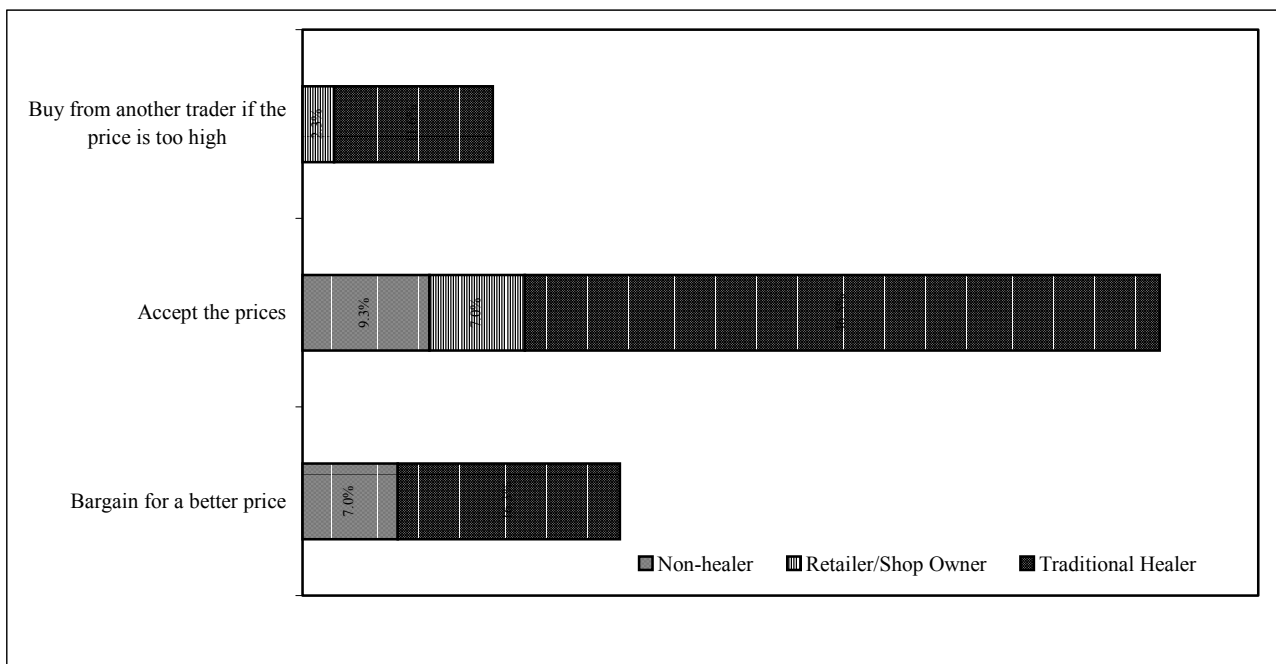


Figure 4.9 Acceptance of plant prices, and potential action taken by respondents if the price is too high

A concern to consumers and Environmental Health officials is that the market is dirty and unhygienic, and may result in a decline in plant quality that is detrimental to the user. Plant freshness, exposure to the elements (wind, sun, rain, ambient temperature variations) and exhaust emissions from passing vehicles are of concern to the users, especially the traditional healers (Figure 4.10). The patients, however, were ambivalent about plant quality and were more concerned about the efficacy of the plants they purchased.

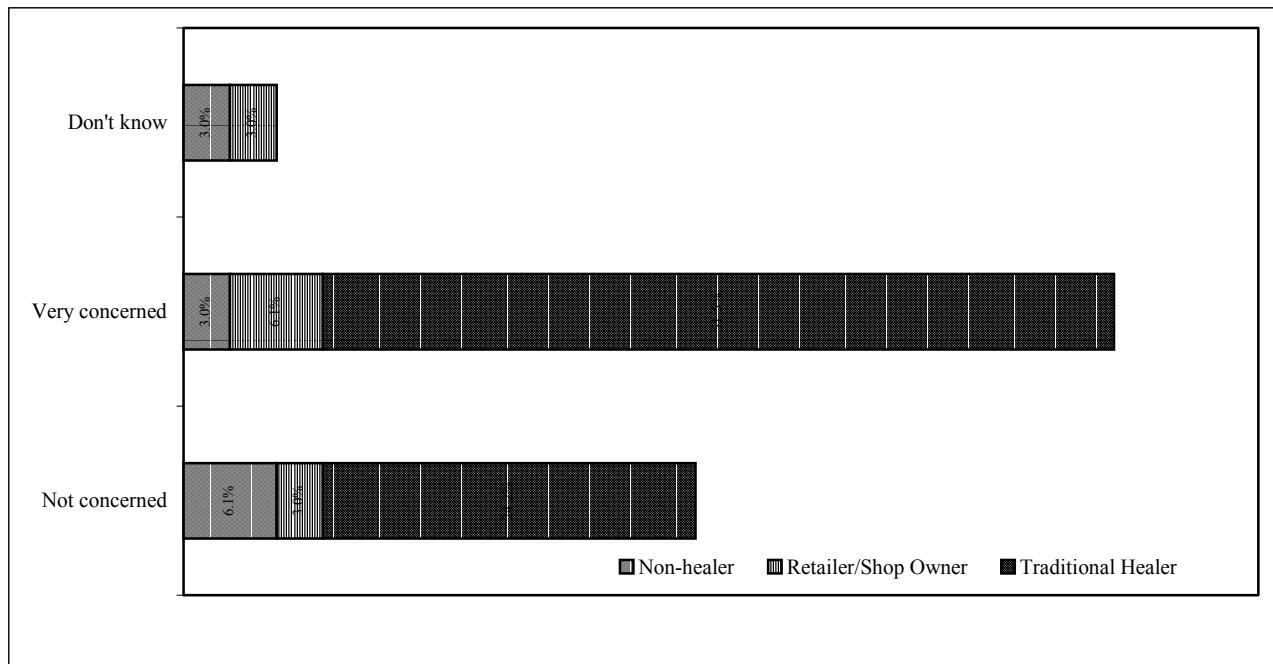


Figure 4.10 Customer concerns about plant quality

4.5 Acceptability of Cultivated Plants

The acceptability of cultivated plants to resource users is important for cultivation programs that aim to replace some of the wild collected stocks sold in the markets with plants grown under commercial schemes. For there to be a market outlet for plants grown under such schemes, users should ideally be receptive to purchasing ‘unnaturally’ grown plants. A few respondents said that they would not use cultivated plants because there would be a decrease in the healing power (Figure 4.11). Traditional healers, however, were more pragmatic – recognising that they have a job to do and plants are necessary for the healing process, no matter their origins. Many plant medicines are used in combination with other plants, thereby making it possible to counter effect any potential decline in ‘power’ by including wild collected plants to the mixture.

4.6 Opinions about Plant Unavailability

When asked what they would do if certain plants were no longer found in the wild, most respondents believed that this scenario would never happen, especially the traditional healers. The patients, however, responded that they would either ‘do nothing’ or use modern medicines instead. Listed below is the range of answers from the traditional healers regarding their actions if certain plants became unavailable in the wild:

- “Wont happen, therefore will do nothing” (7 respondents)
- “It would be the end of my job, because this is my livelihood” (6 respondents)
- Try harvesting plant from other countries, e.g. Swaziland, Malawi and Zimbabwe (3 respondents)
- Substitute the plants with other ones that are similar (3 respondents)
- “Don’t know, it would make my job very difficult” (2 respondents)
- Would try and grow them (1 respondent)
- Stop others from taking too much (1 respondent)
- Stop using the plants (1 respondent)
- Send patients elsewhere (1 respondent)
- Try and get government to restrict harvesting (1 respondent)
- Specialise in healing with water instead of plants (1 respondent)
- There is no need for preservation, nature will take its course (1 respondent)



Figure 4.11 Acceptability of cultivated plants

4.7 Loyalty to Traders

Contrary to the beliefs of the street traders, loyalty of a customer to a trader is not common (Figure 4.12). There is, therefore, more competition within the market than the traders believe. The customer's purchase plants in accordance with their needs and plant prices, and will bargain with traders if the prices are not acceptable or go elsewhere.

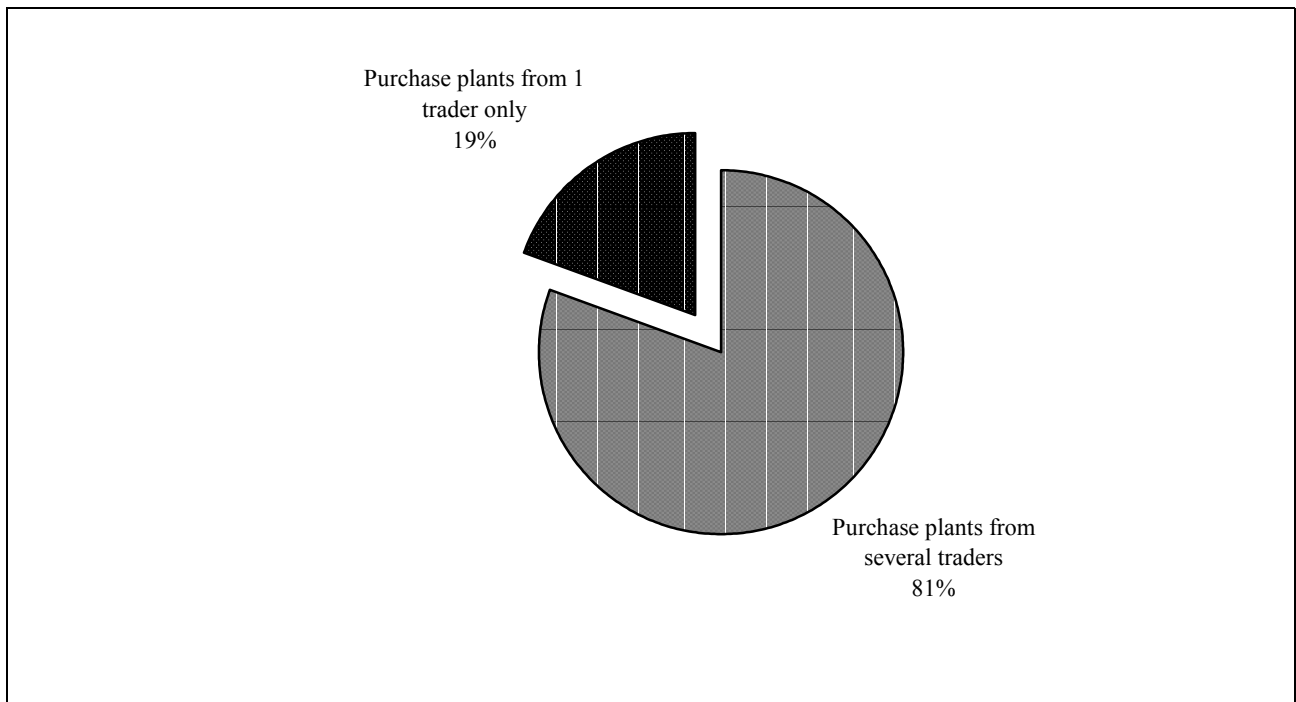


Figure 4.12 Customer loyalty towards traders.

4.8 The Plants Purchased

The plants were purchased by the customers for a variety of reasons and uses. Due to intellectual property considerations for the traditional healers, and the low number of patients seeking treatment in the market, it was not possible to adequately ascertain the main reasons for the purchases, e.g. for physical ailments, or witchcraft/luck-related complaints. Most customers to the market buy between one and three different ethnospecies at a time (Figure 4.13). Traditional healers and shop owners, however, are inclined to purchase larger quantities and/or more species. The species purchased, the frequency of purchases and the total value of the sales for each species is shown in Table 4.3. From 38 customers, 68 ethnospecies were recorded for sale. Table 4.4 describes the characteristics of the purchases made by the customers in terms of the number of species bought and the value.

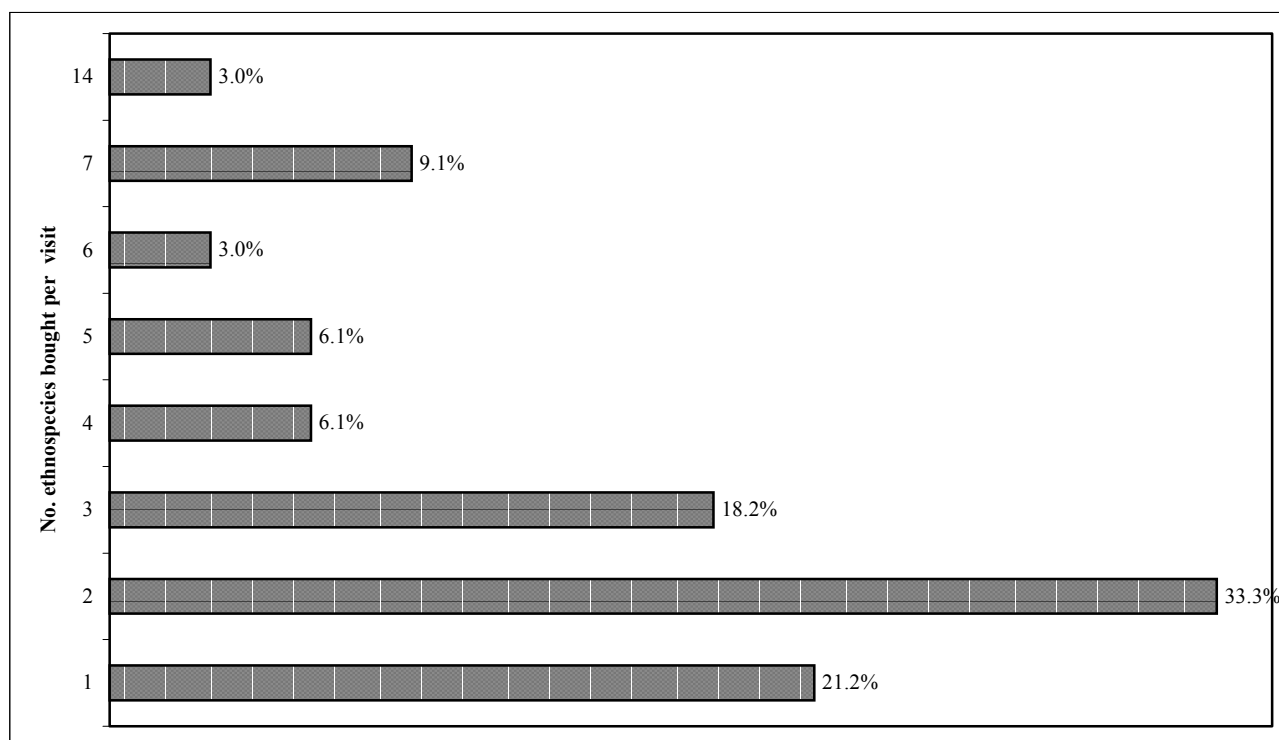


Figure 4.13 The number of ethnospecies bought per customer (mean = 3.14 ± 2.66 SD)

The customers purchased a wide range of species, including some of the most popular plants in the market and some of the higher risk species (Table 13.2, Chapter 13). The species *Neorautanenia ficifolius* was not recorded for sale during the trader survey, but was captured during the customer survey. Botha *et al.* [2001] also recorded *Neorautanenia* for sale in the Mpumalanga markets. Species like *Ocotea bullata*, *Urginea sanguinea*, *Acacia xanthophloea*, *Gunnera perpensa* and *Drimia spp.* were only purchased by the traditional healers, and not prescribed to the limited number patients (only 3) who consulted healers in the market. Too few patients and non-traditional healers were sampled to make any conclusions about the actual species bought. However, the number of species purchased and the value thereof provides reasonable presumptive evidence of trading characteristics within that group of users.

The most popular type of plant part bought in Faraday was bark, followed by roots and bulbs (Figure 4.14). This is fairly consistent with the percentage of plant parts known to be sold by traders. In terms of pricing of the species, 62.5% of the sales were for R5 quantities or units (Figure 4.15). The modal value of the plant purchases is shown in Figure 4.16, with the total value of the individual customer purchases being around R10, but ranging from R10 to R40.

Table 4.3 Frequency and value of species purchased by customers to the market (n= 36 customers).

Species	Ethnospecies	Plant Part	Frequency	Min. total value
<i>Helichrysum</i> spp.	iMphepho	leaves/stems	8	R670*
EP 2 (incl. <i>Berchemia discolor</i> ; <i>Ochna natalitia</i> etc)	uMadlozana	root	4	R515«
<i>Ocotea bullata</i>	uNukani	bark	4	R40
<i>Urginea</i> spp. (<i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	umHlabelo	bulb	4	R30
EP 10 (<i>Crotalaria globifera</i> ; <i>Helinus integrifolius</i>)	uBhubhubhu	root	3	R510†
EP 17 (incl. <i>Celosia trigyna</i> ; <i>Cyrtanthus breviflorus</i> etc)	uVelabahleka	whole plant/root	3	R30
<i>Acacia xanthophloea</i>	uKhanyakude	bark	3	R20
<i>Urginea sanguinea</i> / <i>Drimia</i> spp. (<i>D. elata</i> , <i>D. robusta</i>)	skanama	bulb	3	R20
<i>Gunnera perpensa</i>	uGobho	root	3	R15
<i>Myrothamnus flabellifolia</i>	uVukakwabaffle	leaves/stems	3	R15
<i>Rapanea melanophloeos</i>	uMaphipha	bark	2	R25
<i>Calodendrum capense</i> or <i>Cassipourea</i> spp.	uMemezi §	root	2	R20
<i>Albizia adianthifolia</i>	uGobandlovu	bark	2	R15
<i>Ekebergia capensis</i>	uMathunzi	bark	2	R15
<i>Gnidia</i> spp.	iNhlamlomhllope	root	2	R15
<i>Olea woodiana</i>	umHlwazimamba	root	2	R15
<i>Acalypha villicaulis</i>	uPhendulo	root	2	R10
EP 22 (<i>Cassine papillosa</i> ; <i>Pterocelastrus</i> spp.)	uSehlulamanye	bark	2	R10
<i>Sclerocarya birrea</i>	umGanu	bark	2	R10
<i>Zanthoxylum</i> sp.	umNungumabele	root	2	R10
<i>Dianthus mooliensis</i> ssp.	uTjanibeswe	whole plant	1	R500‡
<i>Adenia gummifera</i>	iPindamshaye	stem	1	R35
<i>Croton</i> sp.	umahlabekefeni	bark	1	R20
<i>Crinum</i> spp.	umDuze	bulb	1	R14
<i>Cinnamomum camphora</i>	uRoselina	bark	1	R10
<i>Elaeodendron transvaalense</i>	iNgwavuma	bark	1	R10
EP 12 (<i>Azelaia quanzensis</i> ; <i>Eucalyptus</i> sp.)	umDlavusa	bark	1	R10
EP 24 (incl. <i>Crocasmia</i> sp.; <i>Gladiolus</i> sp. etc)	iNdwendweni	bulb/root	1	R10
General term	intelezi	mixture	1	R10
General term	imbiza	mixture	1	R10
<i>Mimosa</i> sp.	uThunzikulu	bark	1	R10
<i>Neorautanenia ficifolius</i>	sikundla	root	1	R10
<i>Synaptolepis kirkii</i> or <i>Turrea floribunda</i>	uVuma §	root	1	R10
<i>Alepidia amatymbica</i>	iKhatazo	root	1	R5
<i>Ansellia gigantea</i>	imFeyenkawu	whole plant	1	R5
<i>Balanites maughamii</i>	iPhamba	bark	1	R5
<i>Bersama</i> spp.	unDiyaza	bark	1	R5
<i>Clivia</i> spp.	uMayime	whole plant	1	R5
<i>Crabbea hirsuta</i>	uMusa	root	1	R5
<i>Curtisia dentata</i>	umLahleni	bark	1	R5
<i>Dombeya rotundifolia</i>	iLukuluku	bark	1	R5
EP 1 (incl. <i>Croton gratissimus</i> ; <i>Gerrardina foliosa</i> etc)	iLetha	bark	1	R5
EP 15 (<i>Senecio</i> sp.; <i>Chenopodium ambrosioides</i>)	inSukumbili	leaves/stems	1	R5
EP 3 (<i>Acokanthera</i> sp.; <i>Erythrophleum</i> sp.)	umKhwangu	bark	1	R5
<i>Eucomis autumnalis</i>	uMathunga	bulb	1	R5
<i>Eucomis bicolor</i>	umBola	bulb	1	R5
<i>Glycorrhiza glabra</i>	Mlomo-mnandi	root	1	R5
<i>Hippobromus pauciflorus</i>	isiPhahluka	root	1	R5
<i>Olinia radiata</i>	umZaneno	root	1	R5
<i>Ptaeroxylon obliquum</i>	umThathe	bark	1	R5
<i>Tulbaghia</i> spp.	umWelela	bulb	1	R5
<i>Ursinia nana</i> ssp.	Selephe	root	1	R5
<i>Hypoxis</i> sp.	iLabatheka	bulb	1	?
Unidentified: 16 ethnospecies of various names			16	R180

* including single purchases of R500, R60, R45 and R40

« including a single purchase of R500

† including a single purchase of R500

‡ A single purchase of 100 bundles by a muti shop owner

§ The colour of the roots was not recorded in both cases; hence, it is not possible to distinguish between the species.

Table 4.4: Characteristics of the customer purchasing patterns.

Customer characteristics	Ethnospecies purchased	Value
<u>1. Overall (100% of sample)(n=38)</u>	<u>Mean:</u> 3.1 ± 2.7 ethnospecies <u>Mode:</u> 2 ethnospecies (Figure 4.13) <u>Range:</u> 1 to 14 ethnospecies	<u>Mean:</u> R31.63 ± R30.10 <u>Mode:</u> R10 (Figure 4.15) <u>Range:</u> R5 to R140 <u>Total value of sales:</u> R3,512
<u>2. Traditional healers (76.3%) (n=29)</u> Tendency to buy smaller quantities of many species for either prescriptive or retail purposes for their consultancies. All <i>Ocotea bullata</i> purchases by this group.	<u>Mean:</u> 3.8 ± 2.7 ethnospecies <u>Mode:</u> 2 ethnospecies <u>Range:</u> 1 to 14 ethnospecies, but mainly 2 - 4 sp.	<u>Mean:</u> R34.43 ± R33.76 <u>Mode:</u> R10 <u>Range:</u> R5 to R140, but mostly between R10 and R35 (one exception of R2,500, consisting of 5 species of 100 bundles each at R5) <u>Total value of sales:</u> R792 + R2,500 sale
<u>3. Retailers (10.5%) (n=4)</u> Purchase large quantities of fewer items for resale in either shops or on the streets; 50% of purchases were for <i>Helichrysum</i> sp.; only purchased 1 species at a time	<u>Number:</u> 1 ethnospecies at a time	<u>Mean:</u> R38.75 ± R13.15 <u>Median:</u> R42.5 <u>Range:</u> R20 to R50 <u>Total value of sales:</u> R155
<u>4. Patients seeking treatment (7.9%) (n=3)</u> Tend to spend whatever the value is of the medicines prescribed, which can vary depending on treatment; usually small quantities or 2 species at a time; uses of medicines include: a promotion at work, TB and swollen feet	<u>Mean:</u> 2 ethnospecies <u>Range:</u> 2 ethnospecies	<u>Mean:</u> R16.67 ± R11.54 <u>Mode:</u> R10 <u>Range:</u> R10 to R30 <u>Total value of sales:</u> R50
<u>5. Non-healer or non-patient customer (5.3%) (n=2)</u> Purchase non-prescriptive plants in lesser quantities and values (depends on needs); reason for purchase: cleansing and luck	<u>Mean:</u> 1.5 ethnospecies <u>Range:</u> 1 - 2 ethnospecies	<u>Mean:</u> R7.50 <u>Range:</u> R5 to R10 <u>Total value of sales:</u> R15

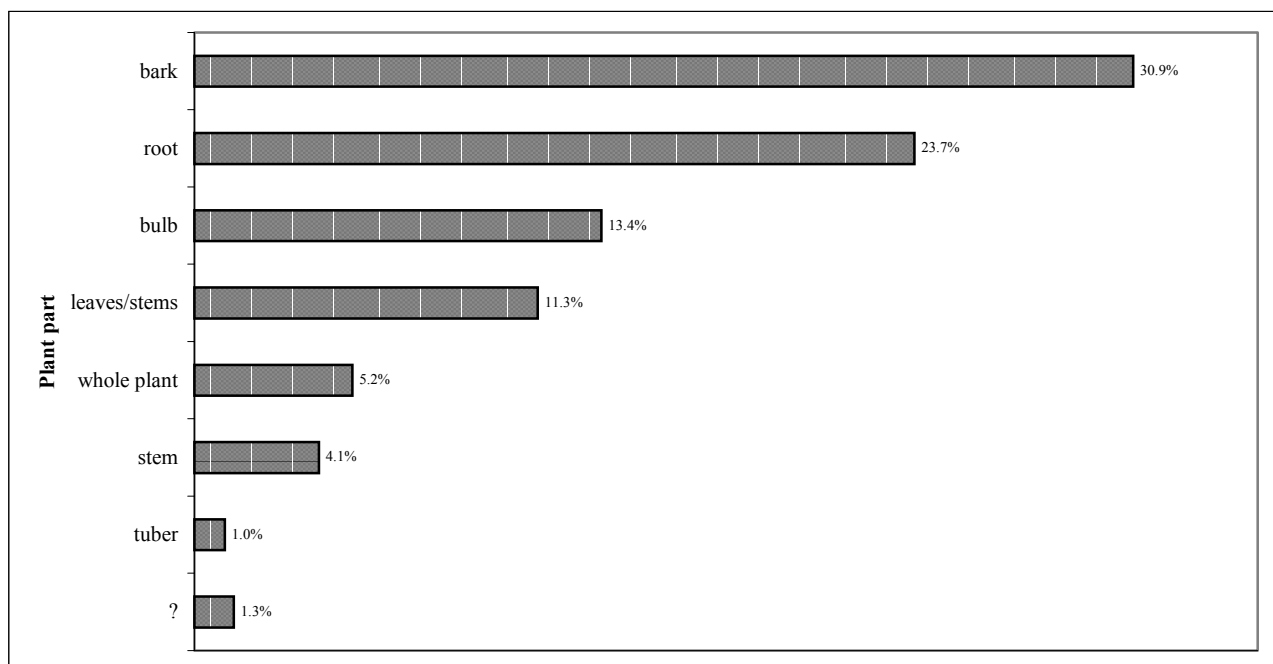


Figure 4.14 The proportion of purchases by plant part

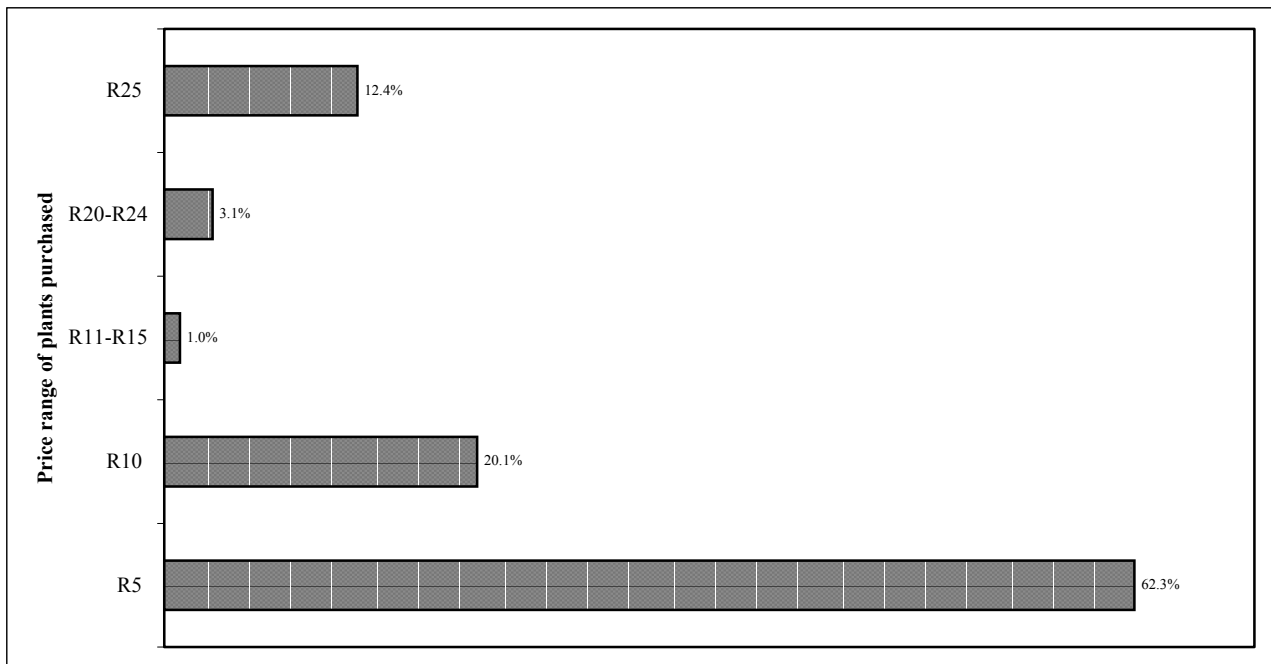


Figure 4.15 Proportion of plants bought at various unit prices. For example, 62.3% of the plants were bought as a R5 unit

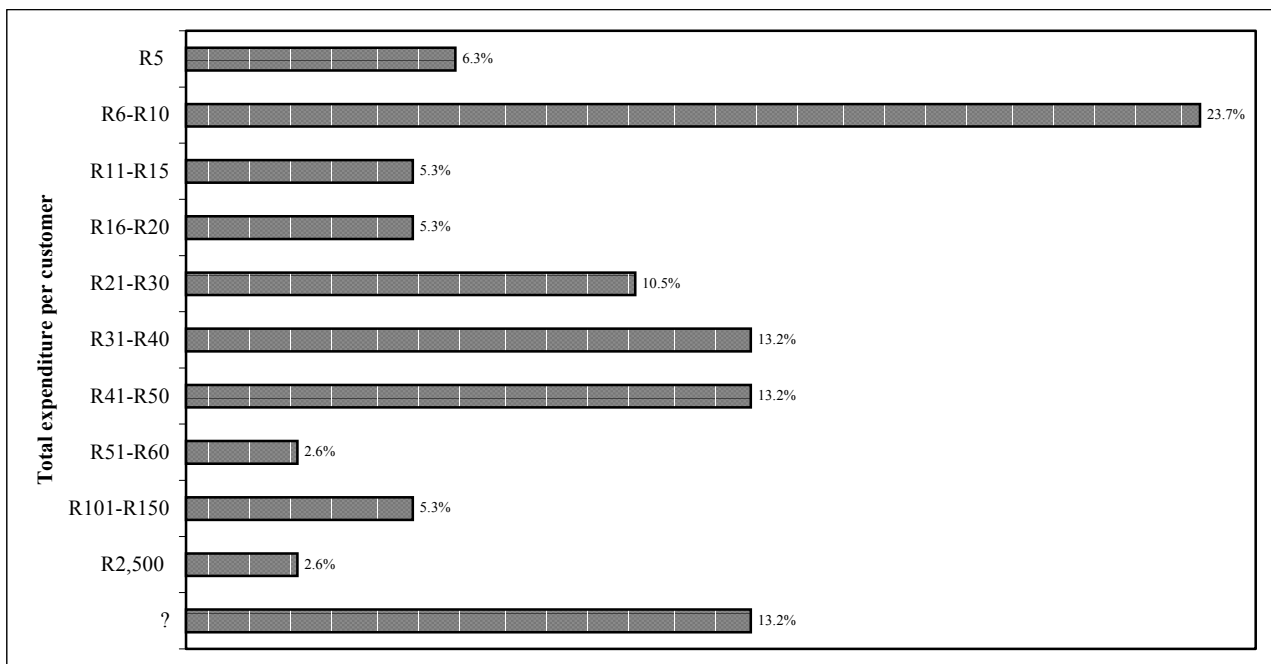


Figure 4.16 Total value of expenditure on plant purchases per customer

A general recommendation is that in order to obtain a more comprehensive profile of the Faraday customers, further customer surveys could be attempted during peak times of the day, on Fridays and Saturdays, as well as at the end of the month. The necessity for this would depend on whether further verification for the following was required:

- the results of the trader survey (in terms of species sold, for example)
- the amount that the different user groups spend (or are prepared to spend) on plant medicines
- the purpose of plant purchases
- the acceptability of cultivated plants among the different user groups

- the profiles and purchasing patterns of the traders is similar at peak commuter times to the time periods during which this survey was conducted.

It is my belief, however, that although the sample size is small the results are relatively indicative of the user trends within the market. In Section 5.8, the trader's perceptions of who their customers are verify the results of the customer survey.

5. PROFILE OF THE STREET TRADERS

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5.1 Introduction

The state of affairs for Johannesburg's street traders of traditional medicine are presented here as an alternative view that contrasts with the popular picture of gratuitously destructive 'eco-rapists'. Many female traders interviewed during the survey told of the necessity to escape from abusive domestic circumstances, where their income was used to sustain a partner's drinking habit. Paradoxically, Johannesburg was both close enough and far enough away from their rural homes in KwaZulu-Natal to be able to save their limited income to support their often extended families. While being interviewed, one woman mentioned that she would much rather be a prostitute than sell plants in Faraday, but at 60 years old she was too old and could no longer find employment as a domestic worker. Another trader, a widow, had been arrested and detained several times for collecting cycads. Interviewed just after her release for the fifth time (the fine having been paid by the Faraday committee), she vowed to continue doing her "job" despite the risks because her family were more important than the intrinsic value of an ancient gymnosperm [Williams 2001]. The same lady also threatened to "shoot" any conservation officers that interfered with her again.

Eighty-five percent of the street traders in Faraday sell medicinal plants; the remainder sell a combination of plant and/or animal matter (Table 5.1). Most of the vendors are female, and medicines are traded mainly from wooden pallets or tarpaulins on the pavement instead of from the lockers available to 45% of the sellers. Two thirds of the traders in the market were interviewed for the survey, and the profile of the primary informants is representative of the trader demographics for the entire market (see Table 2.2). The 'Friday traders' are discussed separately in Section 5.9 because the individual traders are itinerant, and their presence in the market varies both spatially and temporally.

Access to lockers appears to be hierarchical and related to the number of years a trader has been in the market. It was initially presumed that access to lockers was linked to a trader's status as a traditional healer. However, while many traditional healers do trade from lockers, access cannot be conclusively linked to traditional healer status because, for example, only 25% of the traders surveyed in Block B with lockers were traditional healers (Table 5.2).

Table 5.1 Size and trader composition of the Faraday Street market.

	Number of traders in the market	Percent in the market
Total number of permanent traders	164	100%
Plant traders	139	84.8%
Plant and animal traders	17	10.4%
Animal traders	8	4.9%
Locker traders	74	45.1%
Non-locker traders	90	54.9%
Total no. female traders	107	65.2%
Total no. male traders	50	31.7%
Total unknown gender	7	4.5%
No. of female plant traders	106	64.6%
No. of male plant traders	43	26.2%
Unknown gender of plant traders	7	4.3%
<i>'Friday traders'</i> Total number (all female)	10-15 on any Friday, total number in the market over a year is expected to be 2-3 times more	

Table 5.2 Division of traditional healer status in the survey participants between locker and non-locker traders in different parts of the market (blank cell = no lockers in the Block) (n=95).

Block	Locker traders		Non-locker traders	
	Healers	Non-healers	Healers	Non-healers
A	75.0%	25.0%	16.7%	83.3%
B	25.0%	75.0%	25.0%	75.0%
C	55.6%	44.4%	-	100%
D			44.4%	55.6%
E			77.1%	28.6%
F	42.9%	57.1%	-	100%
G			66.7%	33.3%
H			40.0%	60.0%
I			14.3%	85.7%
Total	47.7%	52.3%	36.7%	63.3%

5.2 Socio-Cultural Demographics

Seventy percent of the traders in Faraday are women (Table 5.3), usually single and/or widowed. Many of the women interviewed indicated that they were widowed during the political violence in KwaZulu-Natal, thereby making them the sole breadwinners of their families. Nearly all the traders in the market are Zulu (which is consistent with historical factors described in Chapter 3 and Section 4.1), and only 44% are traditional healers. The predominance of traders who are not healers in Faraday is potentially indicative of how there has been a shift (due to economic constraints) in the trade from the specialist activity of healers, to a multinational trade involving hundreds of harvesters and people from mainly rural areas. As will be seen further on, the non-healers in the urban markets, already marginalized in the informal economy, have less income earning-potential than their traditional healer counterparts do. Family members or friends recommended many of the 56% of traders who are not traditional healers to the trade and their knowledge of plants is sometimes limited – some are still learning the names of the plants that they sell.

The trend for women, rather than men to be involved as gatherers and sellers of traditional medicines has accompanied urbanization throughout Africa [Cunningham 1991a]. Apparently, the gender related changes took place in Durban between 1915 and 1990 as herbal medicine selling became a means of wholesaling wild collected plants, rather than dispensing medicines [Cunningham 1991a]. Initially most the sellers were men, but this changed to an activity where at

least 90% of the sellers in Durban are now women. This dynamic in the herbal medicine trade is one that is historically prevalent in other informal sector activities. Men are often initially predominant in higher-paid informal sector activities until the markets expand and the activity becomes less profitable. Thereafter, women take over the remnants of the trade at significantly lower returns and capital accumulation [Friedman & Hambridge 1991].

The high incidence of women's involvement in harvesting medicinal plants can reflect easier resource access and low thresholds in skills and capital [Arnold 1996]. Women also traditionally use these resources for other household needs (e.g. fuel wood), hence the extension of the gathering activity to species with commercial value on a larger scale. In economically stagnant rural regions, growth in non-farm activities arises when people who cannot find employment in agriculture (or urban activities) attempt to move into a non-farm economy, being absorbed principally in the creation of labour-intensive, low-return small-business activities [Arnold 1996]. Contrary to expectations, the reliance of rural livelihoods on the natural resource base appears to be increasing rather than decreasing [Shackleton *et al.* 2001].

Table 5.3 Socio-cultural demographics of the street traders interviewed during the survey.

		Number (n=95)	Percentage
<i>Ethnicity</i>	Zulu	91	95.8%
	Sotho	2	2.1%
	Xhosa	1	1.1%
	Tsonga	1	1.1%
<i>Gender</i>	Female	66	69.5%
	Male	29	30.5%
<i>Marital status</i> ⁸	Single	55	57.9%
	Married	31	32.6%
	Widow	6	6.3%
	No answer	3	3.2%
<i>Traditional healing status</i>	Inyanga	22	23.2%
	Sangoma	17	17.9%
	Unspecified healer	3	3.2%
	Not a healer	53	55.8%
<i>Stall ownership status</i>	Owner	77	81.1%
	Assistant	13	13.7%
	Shares with another person	2	2.1%
	No answer	3	3.2%

5.3 Age and Education Profiles

Fifty-one percent of the traders are between the ages of 26 and 45 (Figure 5.1). There are no significant gender differences in the age profiles of the traders. Unlike the customers where the modal class of users is between 46-55 years old, the modal age class for the traders is 36-45 years.

Studies in the trends of women's trading operations have shown that 'petty trading'⁹ may draw to its ranks women of a particular age, marital status and low educational standing, as well as those who are forced into migration and can find no formal sector employment [Friedman & Hambridge 1991]. The activity therefore provides a haven for older, less skilled and single or divorced women, but the returns on long hours are low and the risks of prosecution are high

⁸ During the informal, pre-survey familiarisation interviews, more female traders indicated they were widows than has been captured by this survey. Consultants for the redevelopment of the Faraday precinct confirmed that "most" of the women that they interviewed were widows. It is likely that some widows described themselves as 'single' during the interviews. Even though the author was aware that many female traders were widows before the survey took place, the question was phrased as a description of 'marital status' because a direct enquiry was deemed disrespectful and inappropriate.

⁹ Four primary types of activities are commonly undertaken by women in the informal sector, namely commercial sex work, service work, petty trading and home-based piece work [Friedman & Hambridge 1991]. Service work covers a wide range of activities, some bordering on casual labour, and can include manual labour in agriculture. Petty trading comprises the sale of either food or non-food items. Thus, women involved in the medicinal plant trade are involved in both service and petty trading activities to a greater or lesser extent, sometimes switching between the two.

[Friedman & Hambridge 1991]. This is certainly the case with the Faraday traders; whilst older women are not necessarily more prevalent in the market, single and widowed traders comprise 64.2% of the surveyed participants. In addition, more than 70% of the traders have had formal education beyond Grade 7 (Standard 5) (Figure 5.2, Table 5.4). Interestingly, fewer healers have had primary and secondary education than non-healers, but this has not restricted their earning capacity as much as the already marginalized non-healers – primarily because their occupation ensures additional revenues from consultations with patients. There is a broader spectrum of education levels within the non-healers, and many have looked for other means of employment (usually as domestic workers) before entering the trade as a ‘last resort’. This lends weight to the opinion that job opportunities in the formal business sector and the rural subsistence economy have failed to keep pace with the growing number of new job seekers [Huntley *et al.* 1989].

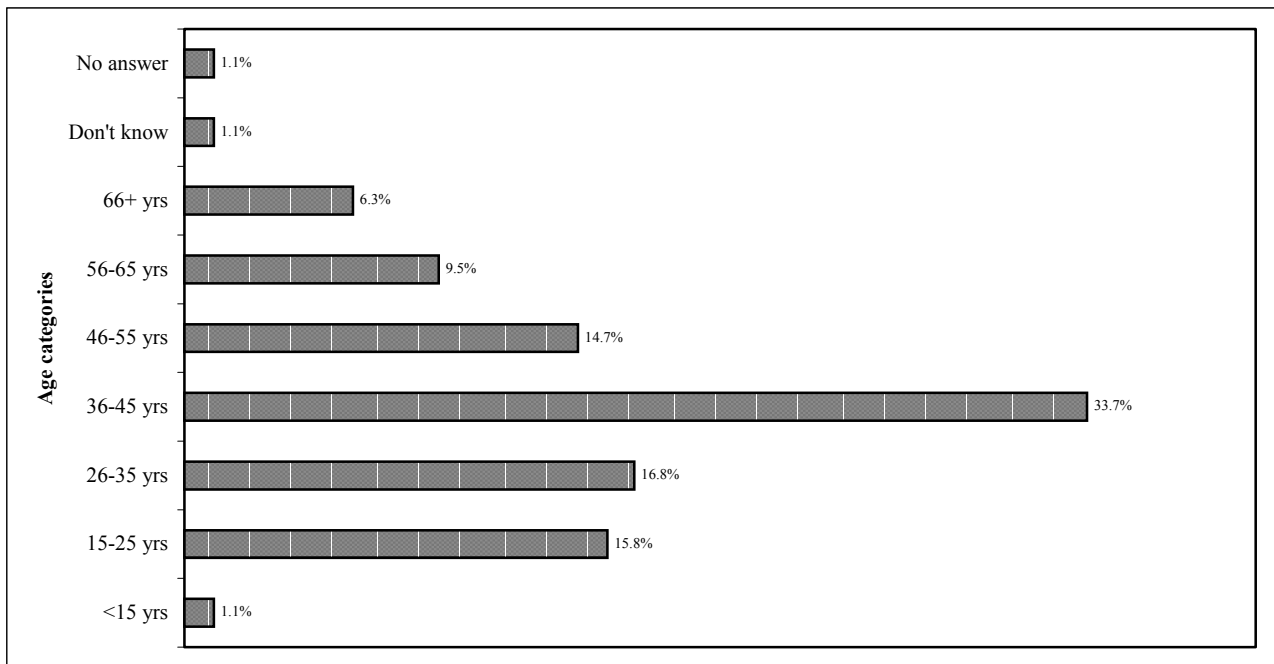


Figure 5.1 Age profiles of the street traders

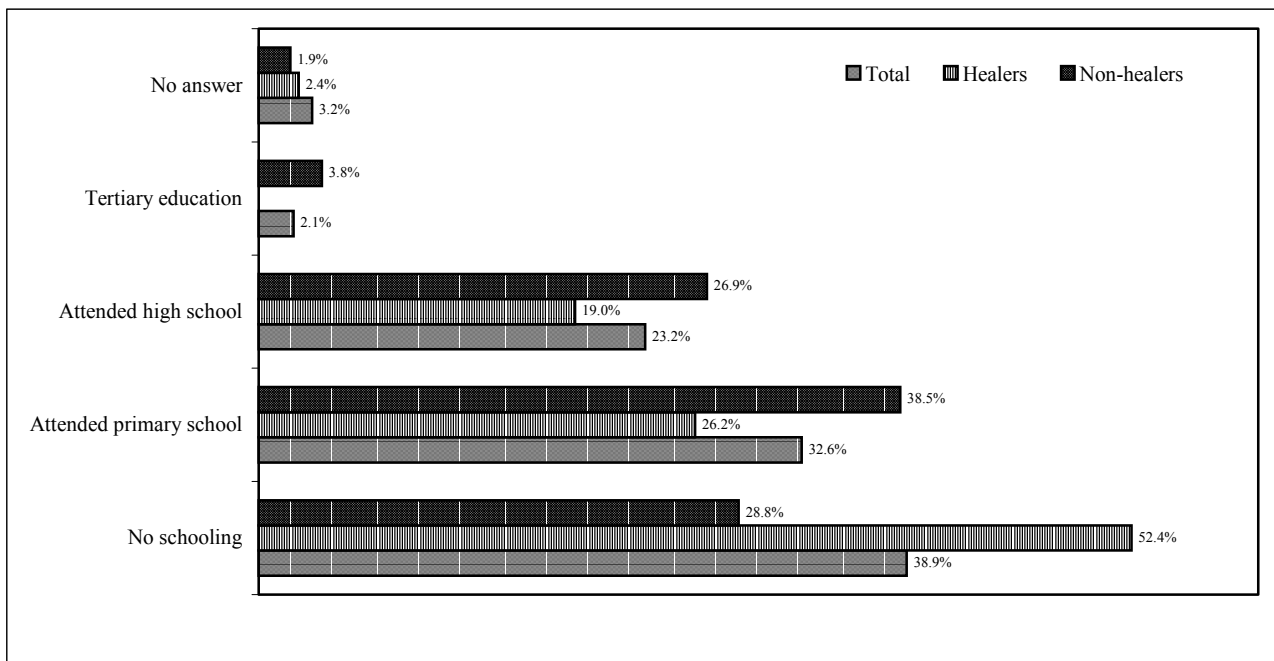


Figure 5.2 Education profiles of traders, including traditional healers and non-healers

Table 5.4 Summary of the level of school attendance by the research participants.

	Total Percentage (n=95)	Healers (n=42)	Non-Healers (n=53)
No schooling	38.9%	52.4%	28.9%
Primary school	32.6%	26.2%	38.5%
Std 1	4.2%	2.4%	5.8%
Std 2	3.2%	2.4%	3.8%
Std 3	4.2%	4.8%	3.8%
Std 4	10.5%	7.1%	13.5%
Std 5	7.4%	4.8%	9.6%
High school	23.2%	19.0%	26.9%
Std 6	5.3%	7.1%	3.8%
Std 7	3.2%	-	5.8%
Std 8	6.3%	9.5%	3.8%
Std 9	4.2%	2.4%	5.8%
Std 10	4.2%	-	7.7%
Tertiary	21.1%	-	3.8%
No answer	3.2%	2.4%	1.9%

5.4 Income and Expenditure Profiles

5.4.1 *Income profiles*¹⁰

Ninety-three percent of the Faraday traders are the sole providers of their household income, and of these, 64.2% are women and 25.3% are men. Only 7% of the traders are not from single-income households – all of whom are less than 25 years old and single. Despite being married, all the married women in the market are the only breadwinners for their usually extended families. Hence, for these income-generators, unable to rely on an additional household income from a spouse, and with few formal sector opportunities and a family to care for, gathering and trading in traditional medicine is an important means for continued economic existence. In addition, the returns are so low that they are unlikely to accumulate much capital to move beyond their current situation.

Forty-eight percent of the traders cited weekly earnings of less than R100, and a further 28% cited earnings between R100 and R200 per week (Table 5.5). In a month, 15-19% of the traders reportedly earn more than R800. As previously mentioned, non-healers have lower income-earning potentials than their traditional healer counterparts within the market (Table 5.6). Ninety percent of the non-healers cited weekly incomes of R200 or less, compared to 60% of the traditional healers. In addition, access to storage seems to correlate with higher levels of income – traders with lockers cite higher earnings within higher ranges than traders without lockers.

¹⁰ It is commonplace for people to under-report their monthly or annual incomes when being interviewed. For this reason, several methods were used to triangulate and verify the traders' cited weekly income. Three methods (A, B and C) used for verifying income are briefly described in Section 5.4.3. A fourth approach is discussed in Section 8.8 along with Method B because it dovetails with the discussion on the annual value of the trade in medicinal plants in the market.

Table 5.5 Weekly incomes cited by the research participants. Verification of the cited incomes levels is presented in Section 5.4.3.

Cited weekly income	Question 4 (Survey 1*)	Question 2 (Survey 3*)
< R100/week	48.4%	70.0%
R100-R200	28.4%	15.0%
R201-R300	8.4%	10.0%
R301-R400	2.1%	-
R401-R500	5.3%	-
R501-R600	2.1%	-
> R600	1.1%	5.0%
No answer	4.2%	

* Survey 1 was the original survey (Jan 2001); Survey 3: return survey in Sept. 2001

Table 5.6 Reported weekly incomes of the traders by traditional healer status and lockers access.

Weekly income	Question 4 (Total, n=95)	Healers	Non-healers	Locker traders	Non-locker traders
< R100/week	48.4%	38.1%	56.6%	38.6%	56.9%
R100-R200	28.4%	21.4%	34.0%	29.5%	27.4%
R201-R300	8.4%	16.7%	1.9%	11.4%	5.9%
R301-R400	2.1%	2.4%	1.9%	-	3.9%
R401-R500	5.3%	7.1%	3.8%	9.1%	2.0%
R501-R600	2.1%	4.8%	-	4.5%	-
> R600	1.1%	2.4%	-	2.4%	-
No answer	4.2%	7.1%	1.9%	4.5%	3.9%

5.4.2 Expenditure profiles

The ability to accumulate capital is a vital hedge against poverty. For many traders in Faraday, however, the high cost of living in the city erodes their earnings and hence the ability to support their families and live beyond a subsistence level. Gross incomes are very likely to be equal to expenditure with no profit or accumulation of capital.

In addition to the cost of buying plants, the street traders were asked about their monthly expenditure as it relates to travel, accommodation, assistance and food as a way of estimating minimum gross incomes (which are low), and the extent to which weekly incomes (Tables 5.5 & 5.6; survey question 4) were under-reported. Box 5.1 profiles the story of one trader, Ma Hlongwane, as an example of how some traders subsist within market.

Block 5.1 Profile of a Faraday Trader: Ma Hlongwane

Ma Hlongwane is a Zulu trader, with a husband and 3 children back home in KwaZulu-Natal. She has never been to school, and is probably between the ages of 40 and 50 – although she does not know how old she is (“*I forgot my ID at home*”, she said). She earns less than R100 per week, although that fluctuates – especially from December to February, the worst months for business in the market. Ma’s meagre income is the only income in the family. She can only afford to go home every 2 months, and when she does, she and her 3 children gather the plants in the veld that she sells at the market. A return trip home will probably cost her R160. At night, Ma sleeps at the Mai Mai Bazaar several kilometres away and pays R50 per month for a place to sleep. She walks to work every day from Monday to Saturday because she cannot afford the R6 return taxi fare or the R5 return bus fare, and spends between R5 and R15 per day on food. After all her expenses, she is lucky if she takes home R100 per month to her family, often times it is less. Her story is not the exception to the rule.

5.4.2.1 Methods used to estimate unreported monthly expenditure

The reporting of monthly expenditure by the traders for Question 20 (trader survey) was not consistent, and large gaps existed for the monthly costs of travel and accommodation. In addition, traders *either* cited travel expenditure as their daily travel costs to their flats/shacks in Johannesburg *or* the cost of monthly collecting trips to the rural areas.

During analysis of the data it became apparent that room rentals at specific localities, and daily transportation costs to these sites, were consistent. For example, room rentals at George Goch were R60/month compared to rentals of R150/month in Delvers Street. Similarly, monthly expenditure on transport to George Goch is R80/month compared to R72 per month to Delvers. Fortunately, Question 12 of the survey asks where the street traders live in Johannesburg and in this way, gaps in the data could be confidently closed, thus addressing the total cost of local travel and accommodation. It was also possible to determine the trader's expenditure on collecting trips by examining: 1) whether traders harvested plants or bought them (Question 7); 2) the frequency with which collecting/harvesting trips occurred (Question 10); 3) the mode of transport to the market (bus or taxi, Question 13), and then combining this with the known costs of a return trip on a bus/taxi.

5.4.2.2 Travel costs

The mean monthly travel expenditure is divided into two categories: *travel costs to accommodation in Johannesburg*, and the *cost of gathering trips/home visits to rural areas* (Figures 5.3 & 5.4, Table 5.7). The latter is not always a monthly expense because some traders can only afford to go once every 2 to 4 months (Section 7.4). Both domestic and national travel expenditure are higher for healers than non-healers in the market, suggesting that: 1) healers generally live further away from Faraday while in Johannesburg; 2) healers go on more plant collecting trips; or 3) healers visit 'home' in the rural areas more frequently than non-healers. The median cost of transport indicates that healers go away at least once a month, compared to once every 2 months by non-healers¹¹.

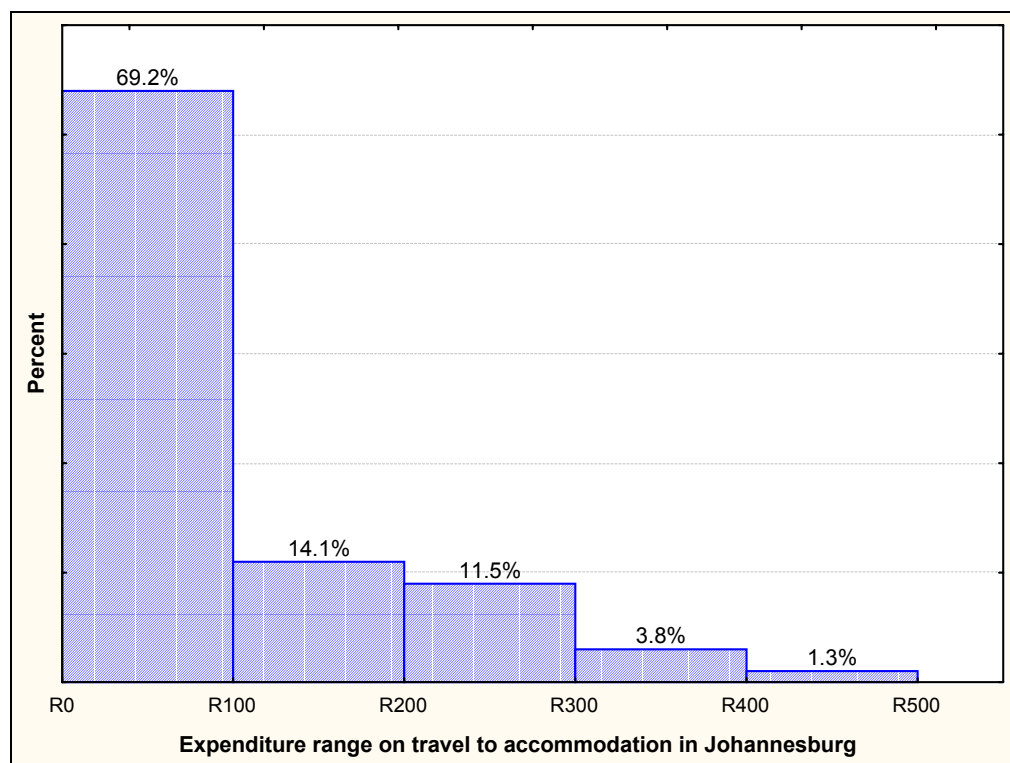


Figure 5.3 The traders' monthly travel expenditure to their accommodation in Johannesburg. This does not include travel costs for collecting trips, home visits or other personal travel costs elsewhere in Gauteng.

¹¹ A return trip to the rural areas by bus at least R220, and this includes R10 per bag of plants (Jan 2001).

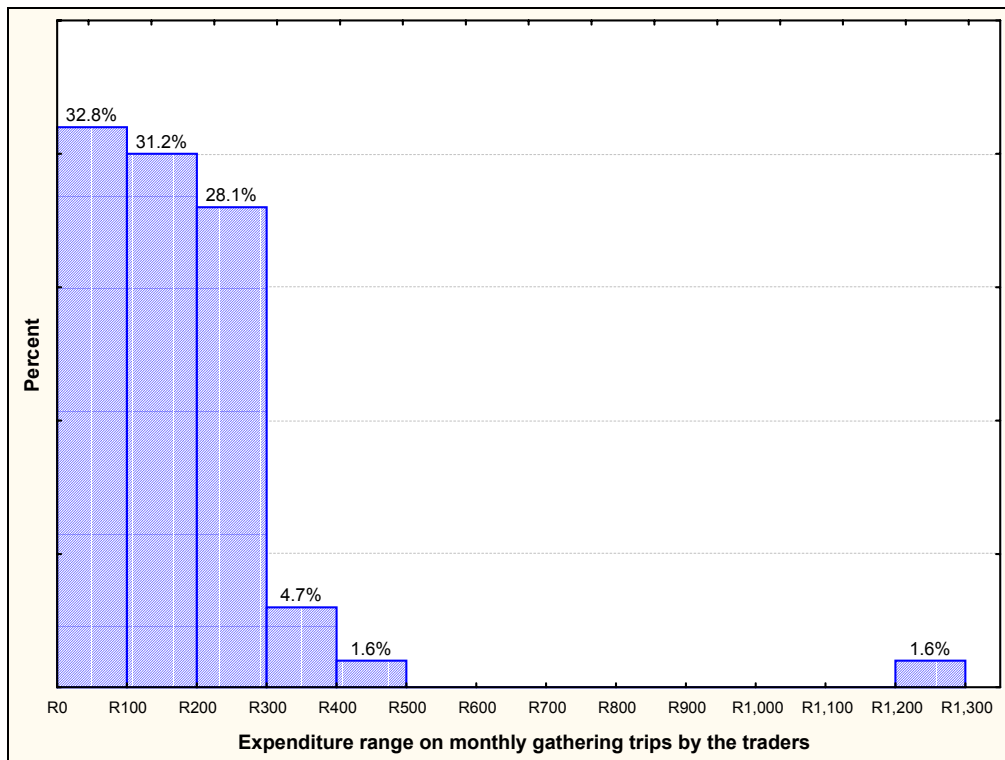


Figure 5.4 Monthly travel expenditure on gathering trips or 'home' visits.

Table 5.7 Monthly expenditure on transport to the traders' accommodation within Johannesburg, and inter-provincial plant collecting trips/'home' visits.

	All street traders	Traditional healers	Non-healers
<i>1) Monthly travel expenditure to their accommodation in Johannesburg</i>			
N	78	31	47
Mean	R127.59	R138.54	R120.37
Standard deviation	± R89.99	± R109.04	± R75.28
Median	R90	R80	R90
Mode	R80	R80	R80
<i>2) Monthly travel expenditure on plant collecting trips and/or 'home' visits</i>			
N	64	25	39
Mean	R184.44	R256.35	R138.35
Standard deviation	± R165.33	± R235.50	± R68.21
Median	R195	R220	R110
Mode	R220	R220	R220

5.4.2.3 Accommodation

Mean and modal monthly expenditure on accommodation is about R200 per month (Table 5.8, Figure 5.5). The difference in expenditure on accommodation between healers and non-healers is insignificant. There are a number of non-healers who do not pay for accommodation and live free of charge in shacks around Johannesburg; some of them live inside the lockers at Faraday.

Table 5.8 Mean monthly expenditure on accommodation by the traders.

	All street traders (n=72)	Traditional healers (n=26)	Non-healers (n=46)
Mean	R199.40	R198.35	R200.00
Standard deviation	± R124.88	± R115.65	± R131.05
Median	R200	R200	R200
Mode	R200	Multiple	R200

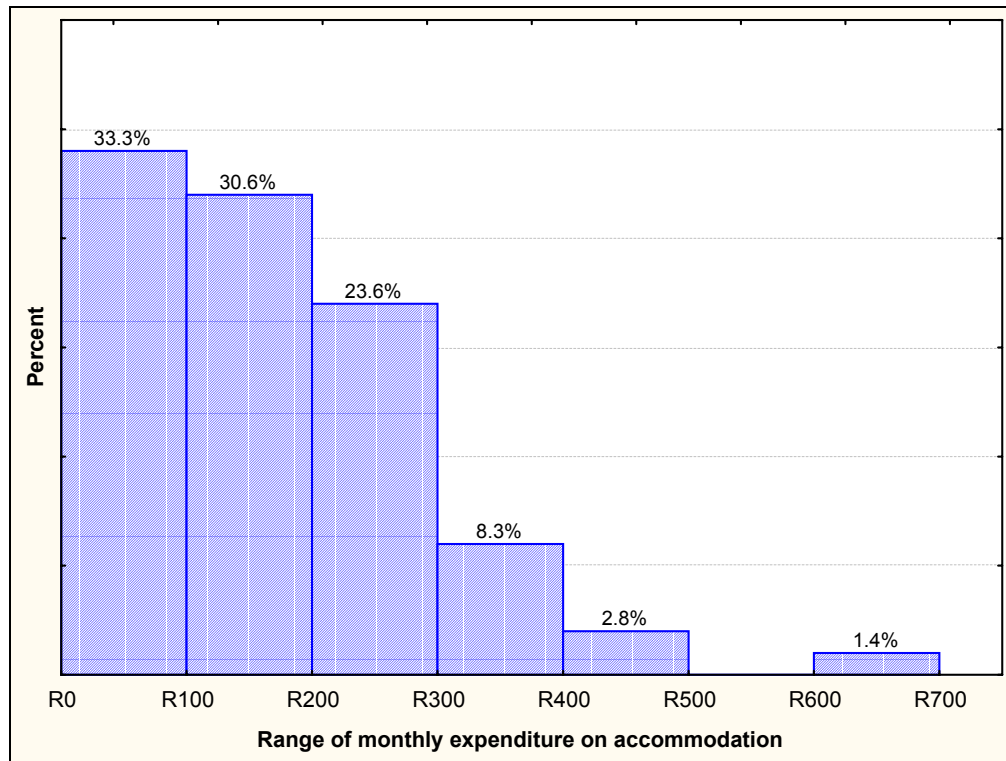


Figure 5.5 Monthly expenditure on accommodation by the street traders.

5.4.2.4 Food

Mean expenditure on food at the market per month is R361.06, or just over R12 per day (Figure 5.6, Table 5.9). There is a marked difference on expenditure between healers and non-healers, with the former spending more than twice as much on food. Healers spend on average a median of R450 and non-healers R240 per month. There were too few citations of actual expenditure on food to be confident of the differences, but R8-R15 per day spent on this is a reasonable amount.

Table 5.9 Mean monthly expenditure on food by the traders.

	All street traders (n=17)	Traditional healers (n=6)	Non-healers (n=11)
Mean	R361.06	R571.67	R246.18
Standard deviation	± 67.79	± R346.32	± R116.18
Median	R280	R450	R240

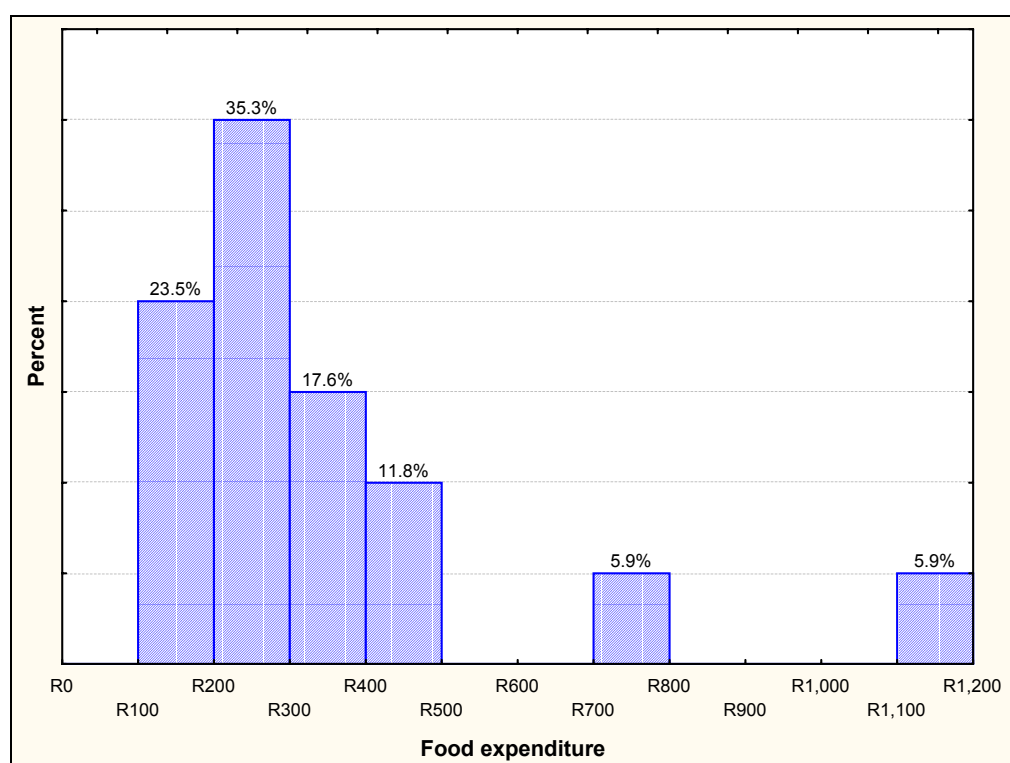


Figure 5.6 Monthly food expenditure by the traders

5.4.2.5 Assistance

Twenty of the traders interviewed (21.1%) employ assistants. Of these, only nine cited their expenditure on wages (Table 5.10). Those who have assistants spend about R150 per month, with traditional healers spending more than three times as much as non-healers do on wages. This is in line with the decreased spending capacity characteristic of the non-healers. However, there are too few observations/citations on expenditure by non-healers to be conclusive. While Table 5.10 reflects the people that are employed by the traders, many traders are assisted by family members at no cost.

Table 5.10 Number of assistants per trader, and expenditure on labour.

	All street traders (percent)	Traditional healers (cited number)	Non-healers (cited number)
No assistant	69.5%	32	34
1 assistant	14.7%	7	7
2 assistant	4.2%	2	2
3 assistants	1.1%	-	1
+3 assistants	1.1%	1	-
No answer	4.5%	-	9
Total number of traders employing assistants	20	10	10
N (only 9 out of 20 cited their expenditure)	9	6	3
Mean	R153.33	R201.67	R66.67
Standard deviation	± R182.48	± R209.99	± R28.87
Median	R100	R175	R50

The modal monthly expenditure of the traders is summarised in Figure 5.7. Most of the traders' income is spent on food and accommodation. The actual expenditure is influenced by where the traders live in Johannesburg, hence determining accommodation costs and travel expenses to the market)

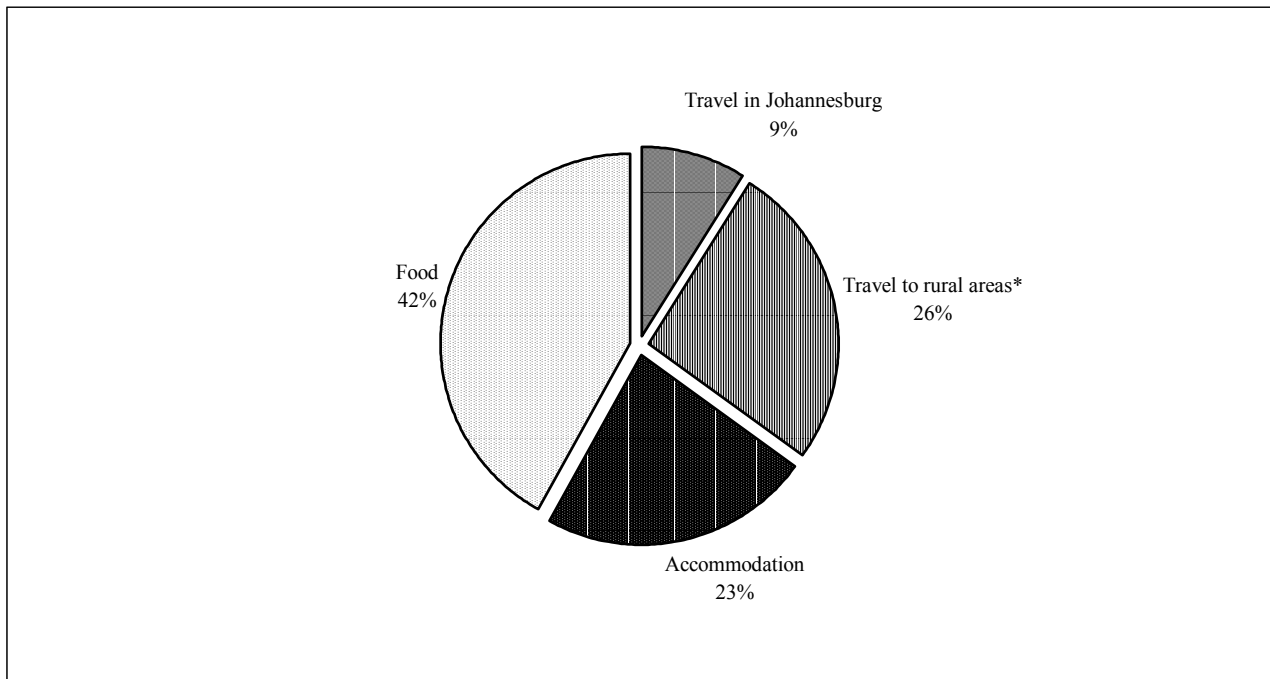


Figure 5.7 Modal monthly expenditure by the traders. * travel to rural areas includes collecting trips and 'home' visits.

5.4.3 Verification of the cited monthly income

Calculating the minimum monthly expenditure of a trader in terms of travel costs, accommodation, food and assistance can be used to calculate the minimum gross monthly income of a trader, assuming that they break even (i.e. income $\approx$ expenditure). In this way, the degree to which the traders have under-reported their weekly incomes can be evaluated, and the cited incomes verified (Method A). As described in the previous section, the minimum monthly travel and accommodation costs per trader were based on where they report to live. In addition, monthly food expenditure was calculated and based on a median of R450/month for healers and R240/month for non-healers (Table 5.9). The minimum monthly expenditure was then established as a guide to their gross income (Figure 5.8), and the frequency of the expenditure ranges was compared with what the traders cited their incomes to be. Table 5.11 shows that the projected expenditure, as a measure of gross income, is commensurate with what traders cited their monthly incomes to be. However, estimated minimum monthly expenditure does not include the cost of plant purchases, childcare or profit (if any).

Results show that 82% of the traders earn at least R200/ week, or up to R800/month, excluding plant purchase costs. If plant purchases are added to the expenditure, then it is expected that fewer traders would earn less than R100/week and most of the traders would earn up to R300/week. For the higher income brackets, the percentage for income/expenditure predictions is acceptable.

Table 5.11 Verification (Method A) of the *weekly* income cited by the traders through comparison with the estimated minimum monthly expenditure of the traders (from Figure 5.8), excluding profits and the cost of buying plants. Minimum monthly expenditure is used as an indicator of minimum gross monthly income.

Weekly income	Cited weekly income (Question 4, Survey 1)	Calculated weekly expenditure, excluding plant purchase costs
< R100/week	48.4%	45%
R100-R200	28.4%	37%
R201-R300	8.4%	5%
R301-R400	2.1%	2%
R401-R500	5.3%	1%
R501-R600	2.1%	1%
> R600	1.1%	
No answer	4.2%	

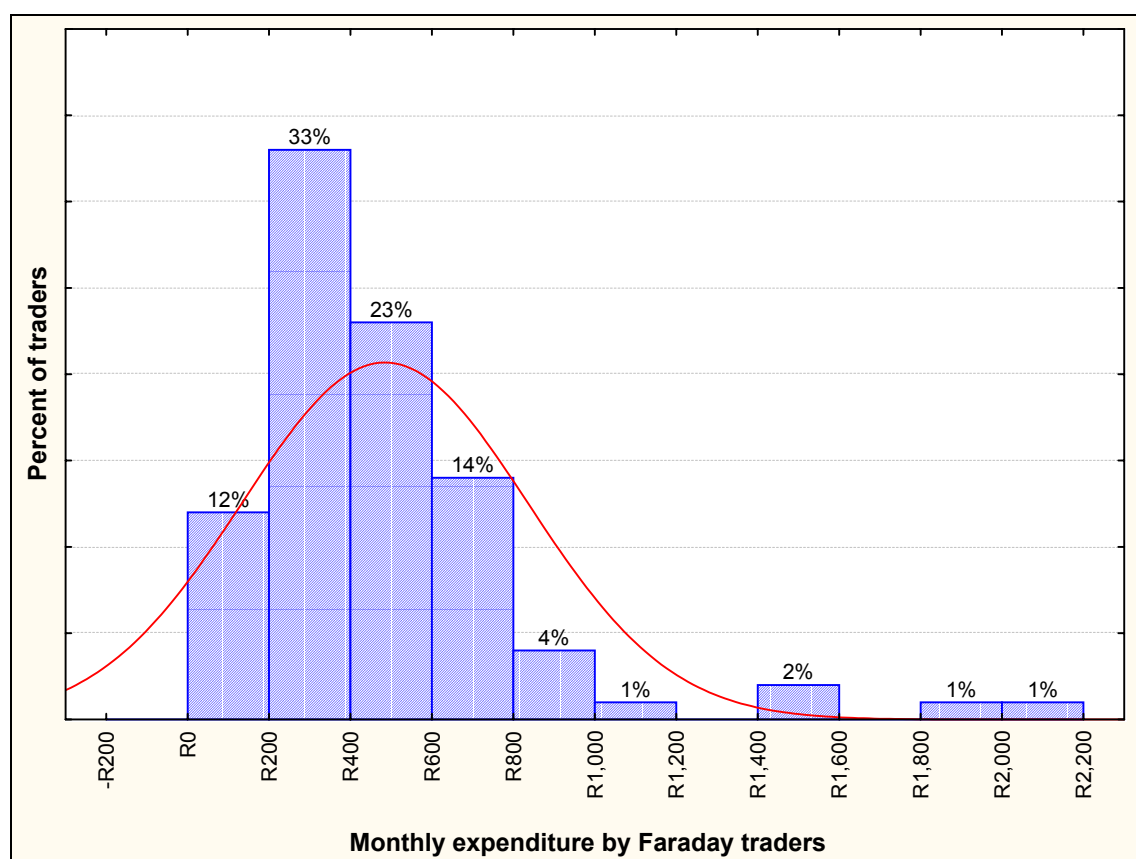


Figure 5.8 *Monthly* expenditure by the Faraday traders (excluding plant purchases) as a guide to their minimum gross income. Mean and standard deviation: R484.5 ± R351.1 (per week = R121.1 ± R175.5)

The degree to which traders under-reported their monthly income is shown in Figure 5.9. The estimated expenditure was subtracted from their reported monthly earnings. In total, 68.8% of the traders under-reported their monthly earnings (resulting in a negative gross income on the graph). Most of the under-reporting is in the region of R0 to R200 per month (35.5%), or less than R50 per week. Only 12.8% of traders under-reported earnings by more than R100 per week, or R400 per month. Given that the majority of the Faraday traders live at a subsistence level, this under-reporting of earnings is understandable and probably not as deliberate as one might initially think. It is my opinion that if plant purchase costs were added to monthly expenditure, then the under-reporting of income would be in the region of 80%, most of this in the R0 to R400 per month range. Overall, however, median weekly incomes are expected to be R150 to R250.

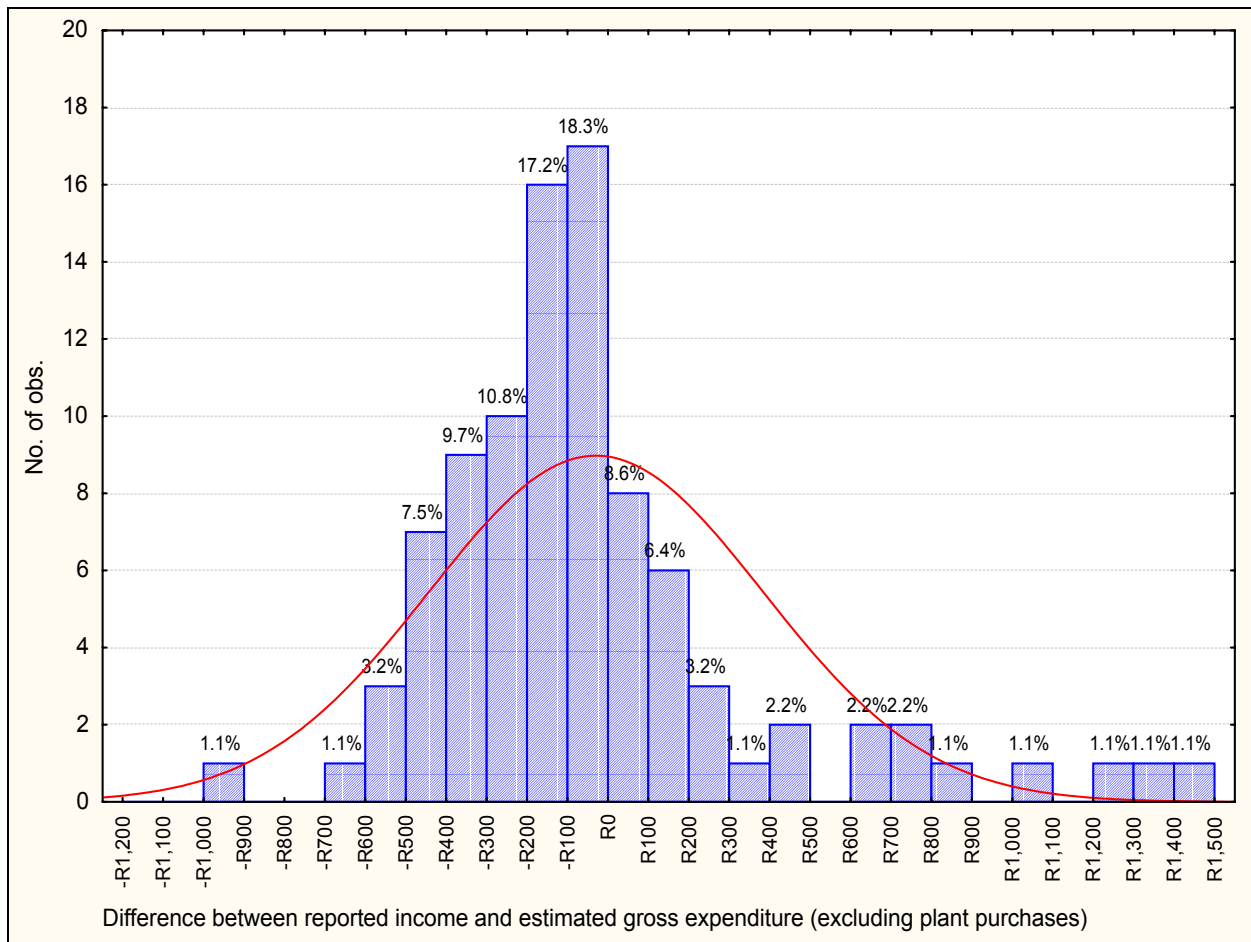


Figure 5.9 The extent to which monthly income is under-reported by traders, calculated as the difference between reported monthly earnings (Question 2), and estimated gross expenditure (Question 20).

The other methods used to verify the cited weekly incomes of the traders are summarised in Block 5.2, and the findings are presented in Table 5.12. Further verification/testing of these incomes levels are discussed in Section 8.8 with the estimation of the annual value of trade in plants in the Faraday market.

Table 5.12 Weekly incomes cited by the research participants, and a summary of the results of Methods B and C used to verify these figures.

Weekly income	Cited weekly income (Question 4, Survey 1)	Estimates of weekly income	
		Method B	Method C
< R100/week	48.4%	39.8%	60.0%
R100-R200	28.4%	26.9%	20.0%
R201-R300	8.4%	10.0%	5.0%
R301-R400	2.1%	3.2%	5.0%
R401-R500	5.3%	1.1%	5.0%
R501-R600	2.1%	1.1%	
> R600	1.1%		5.0%
No answer	4.2%		

Block 5.2: Brief summary of the methods used to verify the weekly income cited by the research participants

Method A: Based on comparing the traders' reported monthly expenditure (Question 14, street trader survey) with the cited earnings/income to examine the extent to which under-reporting of monthly income has occurred. Results shown in Figure 5.8, Figure 5.9 and Table 5.11

Method B: Based on the expected value of weekly retail sales given the number of customers per week (Question 15, street trader survey) and the frequency of plant purchases within specific price ranges (Figure 4.15 – customer survey). Results shown in Tables 5.12 and 8.10. In Table 8.10, the estimate takes into account the frequency of occasional high value plant sales.

Method C: Based on Questions 6 & 7 of the repeat survey in September 2001, and results from the customer survey. The variables include: the frequency of sale of various plant part types per week; the frequency of sale of those different plant parts within certain price ranges; frequency and value of larger than average sales; frequency of sale of scarce and/or more expensive species. Part of the calculation for bulbs for example, was based on 14.2% of customers purchasing bulbs per week, 57.6% of the those purchases valued at R5, 18.9% of the purchases valued at R10, etc

The results showed that while most traders cited earnings of less than R100 per week, **the majority probably earn up to R200 per week.** However, this figure fluctuates seasonally, monthly and weekly. Some traders cited weekly earnings of less than R50. The traders most likely to earn less than R100 per week are non-healers trading without lockers. Comparing Table 5.5 with tables 5.11 and 5.12 provides presumptive evidence that 67-85% of traders earn up to R200/week, or R800/month.

Even though the medicinal plant market is demand-driven to a degree, rural incomes are not growing in tandem as this 'hidden' economy expands in the urban areas. Harvesting medicinal plants is an activity of last resort for many of the non-healer traders. Activities of 'last-resort' are sometimes characterised by low capital or skills thresholds entry levels, and participants are likely to find themselves in over-saturated markets that offer very low returns to labour [Arnold 1996]. Consequently, opportunities become limited and these activities are likely to be abandoned if more attractive options become available – an opinion expressed by many women who were interviewed during the survey.

Clearly, a component in addressing the problem of over-harvesting is in providing attractive and alternative (and less environmentally destructive) opportunities for those involved in this trade and other informal activities within rural areas. This is not, however, a '10 green bottles solution' because there will always be another 'bottle' (i.e. trader) waiting to line up on the wall when one exits should the approach not be sustainable and 'circumambient' of the present challenges for rural unemployment in general. It is also difficult to predict whether in time, if ever, the number of people exiting the market because of new opportunities that are created, will exceed the number standing by to participate given the opportunity. This is unlikely. The extensive trade in traditional medicine is not such a 'hidden' reminder that diverse and proactive action is necessary because the participation levels in the trade (current and potential), pressure and over-exploitation of resources have consequential results to both the ecological and social environments.

5.5 Residential Profiles

The majority of the traders are migrants to Johannesburg and 'home' is in KwaZulu-Natal (Figure 5.10). Only 3% of the traders interviewed lived permanently in Gauteng. Most of the KZN traders originate from the Zululand-Maputaland district (Table 5.13), which is also the primary source of supply for more than half of the harvested plants. A Tsonga-speaking resident from Maputo was among the traders that were interviewed.

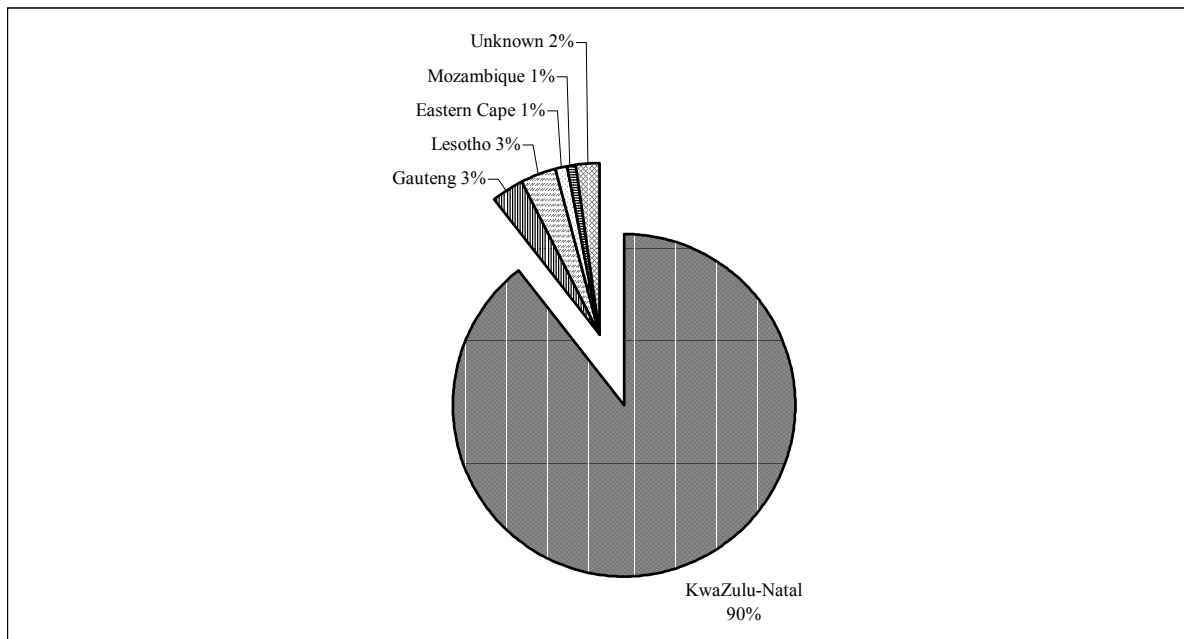


Figure 5.10 Provinces and countries within southern Africa cited as ‘home’ to the traders (excluding the ‘Friday traders’)

Table 5.13 Localities within KwaZulu-Natal that are ‘home’ to the 90% of traders from the province.

‘Home’ of the Faraday traders	Number of traders	Percentage *
Maputaland <i>Mkuze, Emanguzi, Umhlaba uYalingana, Ingwavuma, Ubombo</i>	13	13.7%
Zululand <i>Hluhluwe, Obonjeni, Ulundi, Mahlabatini, Mtubatuba, Nongoma, Hlabisa, Empangeni</i>	19	20.0%
Southern Natal <i>Umkhomazi, Umzinto, Umlazi, Mbumbululu, Mazakhele, Durban, Port Shepstone, Mtwalume</i>	11	11.6%
Northern Natal <i>Nqutu, Utrecht, Newcastle</i>	4	4.2%
Natal Drakensberg <i>Bergville</i>	4	4.2%
Unspecified areas of KwaZulu-Natal	34	35.8%
Total from KwaZulu-Natal	85	89.6%

* based on n=95 traders

While in Johannesburg, most of Faraday’s traders stay in flats or rooms within a 3-kilometre radius of the market (Table 5.14). In total, 72.6% of the traders live in or close to town and 8.4% in the townships. There are decreasing percentages of people living at increasing distances from the market. These patterns are related to levels of affordability for accommodation and travel costs. Like many migrants who find employment within lower income brackets, their ‘disposable income’ for housing is low and hence their access to more ‘comfortable’ quarters is limited. Many of the traders share their residential space with several people in one flat. There are a number of traders in the market living in the lockers or at the shack at the end of Block B.

Table 5.14 Where the Faraday traders stay while working in Johannesburg.

	Radius from the Faraday market	Percentage of traders
<u>Johannesburg</u>		72.6%
In the lockers or the shed at the market	0 km	6.3%
Flats/rooms/hostels/shacks	0-3 km	50.5%
George Goch	3-4 km	10.5%
Johannesburg suburbs	4-7 km	5.3%
<u>Townships</u>		8.4%
Soweto	15-25 km	4.2%
East Rand townships in the southeast	20-25 km	4.2%
<u>West Rand</u>	>35 km	2.1%
Unspecified residence	-	3.2%
No answer	-	13.7%

5.6 Why Traders Sell Plants in Faraday

Even though the traders sell traditional medicines at Faraday to earn a living, they feel a sense of duty towards their customers. They view themselves as important service providers, and their job is to supply customers with medicinal plants that will “*heal and prevent diseases*”. When asked why they sold plants at Faraday and not elsewhere, the majority of responses were that Faraday was the first place that they started selling plants at, and they weren’t familiar with other markets (24.4%) (Table 5.15). The next most frequent response was that Faraday is a busy market that has many customers and is well known to traditional healers and other customers (20.2%).

Table 5.15 The most common reasons why traders sell plants at Faraday and not elsewhere (Question 16). The full responses of all traders are in Supplement 1.

Reason	Percent of traders
This is the first place I started selling plants, and I am not familiar with other markets	24.4%
Faraday is a busy, well known market with more customers than anywhere else	20.2%
Knows the traders in the market / has family or ‘people’ here / was recommended to the market by a friend or family member	16.0%
There is space to sell plants here compared to elsewhere	11.8%
Customers pass through because the market is close to the taxi rank and train station	7.6%
The Durban markets are too full and overcrowded, and there is less money and business	5.9%
I like selling in Faraday	2.5%
I was unemployed/retrenched and needed a job so I came to Faraday to sell plants	2.5%
I was chased away from other markets or selling sites (e.g. Mai Mai; other streets)	1.7%
Faraday is close to home and I don’t have to pay for transport	1.7%
Other responses	6.7%

A few traders remarked that the markets in Durban were too full and overcrowded, and hence there was comparatively more business in Johannesburg. In addition, two traders said that: “*in Natal, most plants are available in the mountains so nobody needs to buy the plants there if they can harvest it themselves*”; and “*in Durban, there are mountains where inyangas and people who are looking for treatment go and dig the plants for themselves. The plants are more easily accessible there (in KZN) and there are no customers*”. These statements define one of the important functions of Faraday to the urban population in Gauteng – the customers are not close to the source of supply for nearly all the plants that they use, and hence the market is an important supplier of medicinal plants to thousands of users of these resources in this part of the country. The traders are important brokers of this resource, earning a living through selling plants that they use to support their families in KZN.

5.7 Competition in the Market

By and large, the Faraday traders are a peaceful, trusting community that look out for each other – even looking after an adjacent stall and selling plants on the stall owners behalf if they away and a customer wants to buy plants. Given their economic circumstances, it is surprising that three-quarters of the traders do not believe that there is competition between them, or any need for it either. The only day the traders admit to quarrelling is when the buses bringing fresh supplies to the market on a Friday. The traders then compete to buy the freshly harvested resources.

The 75.2% of respondents who cited that there was no competition between the traders gave the following reasons:

- Traders help each other, and there is peace, harmony and co-operation. When necessary, we look after each other stalls (33.3%)
- Traders keep complimentary plants, so if one trader does not have what the customer is looking for they are sent to the neighbouring trader (20.0%)
- It is up to the customers who they buy from, so there is no competition (11.1%)
- It all depends on your luck in making money (8.8%)
- There is no point in competing or fighting because there is nothing you can do about it (4.4%)
- There is agreement on prices (2.2%).

The 17.8% of respondents who cited that there was competition in the market made the following comments:

- Traders are loyal to their customers and need to make money. They have to serve the customer
- There is competition between the traders to sell plants to the regular customers
- There is competition, but it doesn't bother them as long as they make money
- Competition is fair
- *"I don't feel good when I don't sell plants"*
- There is competition, but *"I wouldn't say anything about it"*
- Traders with bigger stalls get more customers.

Even though the traders do not believe there is much competition between them, the reality is that customers are not as loyal as the traders think and will buy plants from the cheapest trader with the freshest plants.

5.8 Rankings of Customers by the Traders

Trader perceptions are important in interpreting the dynamics and characteristics of the market. In Question 19 of the survey, the research participants were asked to rank the customers they sold plants most often to. Traditional healers buying plants are regarded as their most frequent customers, followed by non-patient customers buying plants (this would include commuters through the market), muti shop traders and finally patients seeking treatment (Figures 5.11 & 5.12). These results show that Faraday has more of a wholesale/retail function rather than a service to patients seeking treatment – the most infrequent customers to the market. The results are commensurate with the proportion of customer types interviewed during the customer survey (Table 4.1), in which 76.3% of the customers were traditional healers.

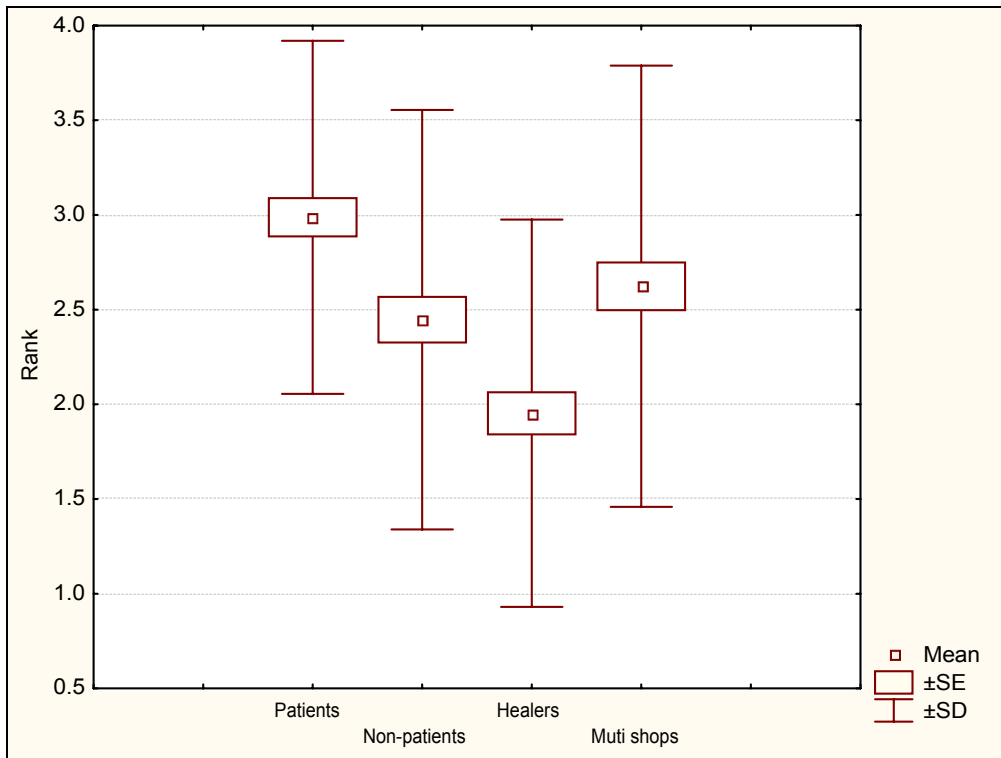


Figure 5.11 Box and whisker plots showing the mean central tendency of the rank of customers in terms of their frequency as a customer to the traders. Customers are ranked from 1 (higher frequency) to 4 (lower frequency). Healers, for example, have a mean rank of 1.95, compared to a mean rank of 2.42, 2.62 and 2.98 for non-healer customers, muti shops and patients respectively.

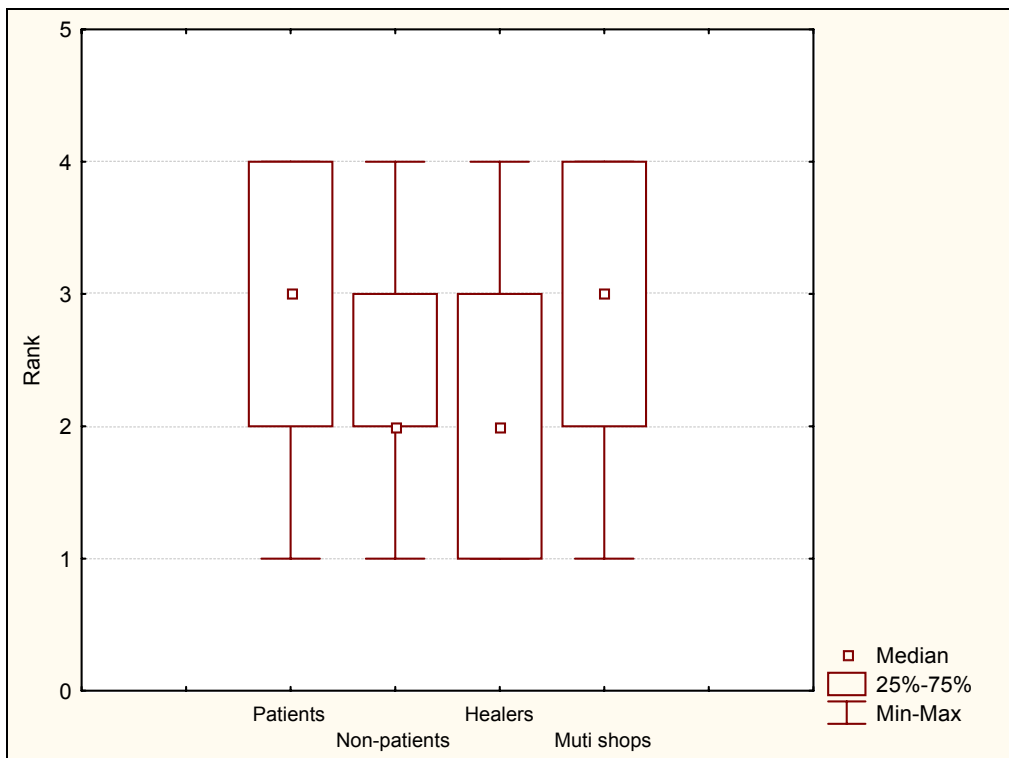


Figure 5.12 Box and whisker plots showing the median central tendency of the rank of customers in the market. In other words, patients were generally ranked by traders between 2 and 4, non-patient customers were ranked between 2 and 3, healers between 1 and 3, and muti shops between 2 and 4.

5.9 Friday Traders

The 'Friday Traders' are a group of traders who sell plants in the market once a week on a Friday or Saturday, or at month end. There are 10 to 15 traders in the market on a Friday at any one time (7 were interviewed, but plant data was recorded for 6), but there are probably up to 30 or 40 of them selling in the market over a period of a year. The profiles of these traders are presented separately because they form a unique group; the socio-cultural demographics and income/expenditure profiles are different to the other traders who have permanent stalls within the market.

5.9.1 Profile summary

The Friday Traders are usually single, Sotho-speaking women in the older age groups with little or no formal education and who are not traditional healers (Tables 5.16 & 5.17). They reside permanently in south and western Gauteng, usually farms, and harvest the plants they sell from the area in which they live. Consultants involved in research towards the redevelopment of the Faraday precinct reported that some of the Friday traders were from Lesotho. Compared to the permanent Faraday traders, their reported monthly expenditure is lower, mainly because they do not have daily transport costs to the market and they stay rent-free on the farms. They also have a tendency to not under-report their monthly incomes, and a higher percentage of them reported incomes of between R101 and R200 per week. The quantities they sell are smaller, and they usually sell all of what they bring to the market – if not to the customers, then to other traders in Faraday before they leave the market in the afternoon.

Their tendency is to harvest grassland geophytes and whole plants (80.9%), especially species like *Eucomis autumnalis*, *Eriospermum* spp., *Urginea sanguinea* / *Drimia* spp., *Hypoxis* spp. and ground orchids such as *Eulophia* sp. The plant names were often sold using the Sotho rather than Zulu vernacular names, although they had adapted to this primarily Zulu-speaking market by: a) knowing the alternative name, and b) collecting and plants known to be popular in the market that are sold under the Zulu vernacular. It is the authors' opinion that more Sotho consumers would visit the market on a Friday or Saturday knowing that these ladies are going to present. When not in the market, the Friday traders are in the veld proximate to their homes harvesting plants 3-4 days a week prior to coming to the market.

Table 5.16 Socio-cultural demographics of the Friday Traders interviewed during the survey

		Number (n=7)
<i>Ethnicity</i>	Zulu	3
	Sotho	3
	Tsonga	1
<i>Gender</i>	Female	7
	Male	0
<i>Marital status</i>	Single	3
	Married	2
	Widow	1
<i>Traditional healing status</i>	Inyanga	1
	Not a healer	6

Table 5.17 Age group and education level of the Friday traders.

Age profile	Number (n=7)	Education level	Number (n=7)
26-35	1	No schooling	5
36-45	3	Primary school	1 (up to std 1)
46-55	1	High school	1 (up to std 7)
66+	2		

5.9.2 Residential and plant gathering profile

All the Friday traders collect the plants they sell in the market themselves in areas proximate to their residences (Table 5.18), usually southern Gauteng, Free State and Lesotho. The days not spent in the market from Monday to Thursday are usually days they spend collecting what they sell. The plants are transported to the market by taxi or private vehicle. The total quantity that they each sell varies from several 'checkers' packets, to at least one sack of *Urginea sanguinea* / *Drimys* spp. The plants are sold to mainly non-healer customers and muti shops owners. The inyanga that was interviewed said that her clients were mainly patients.

Table 5.18 Where the Friday traders live and harvest the plants they sell, and how it reaches the market.

Trader # (marital status* & age in parentheses)	Where is 'home'?	Where they stay at night	Where they gather plants	How plants reach the market	No. of people helping them gather
1 (S; 36-45)	Bergville	Johannesburg	Bergville	Taxi or bus	0
2 (M; 46-55)	Alwynspoort	Alwynspoort	Eikenhof	Taxi	0
3 (S; 26-35)	Vosloorus	Vosloorus	Heidelberg	Private car	0
4 (S; 36-45)	Heidelberg	Heidelberg	Heidelberg	Van	0
5 (W; 66+)	Eikenhof	Eikenhof	Eikenhof, Pretoria	Bakkie	0
6 (M; 66+)	Orange Farm	Orange Farm	Orange Farm	Taxi	1
7 (W; 36-45)	Vosloorus	Vosloorus	Vosloorus	Taxi	0

* (S = single, M = married; W = widowed)

5.9.3 Income and expenditure

The minimum gross incomes of the Friday traders *seem* slightly higher than that of the permanent Faraday traders (Table 5.19). Factors that make a significant difference to their monthly expenditure are: 1) Friday traders live permanently in Gauteng and do not have to make costly trips to KwaZulu-Natal to gather plants; 2) they are exempt from paying high monthly rentals to live in town; and 3) they only travel to the market once a week, therefore do not have the same daily transport costs.

Table 5.19 Minimum monthly income and expenditure for the Friday traders. There are no additional costs to the traders of buying plants.

Trader #	Monthly Expenditure				Minimum Monthly Income/Expenditure		
	Travel	Rent	Food	Assistance	Cited income	Expenditure	Min. gross income
1	R240	R100	R360	0	<R400	R700	-R300
2	R160	n/a	R315	0	<R400	R475	-R75
3	R152	R200	R360	0	R400-R800	R712	R88
4	R200	n/a	R360	0	R400-R800	R560	R240
5	R25.60	n/a	R360	0	R400-R800	R285.60	R515
6	R60	R38	R360	R100	<R400	R558	-R158
7	R76	R50	R480	0	R400-R800	R606	R194

5.9.4 Perceptions of plant conservation, cultivation and availability

The perceptions of the Friday traders on plant conservation and cultivation issues are similar to the broad spectrum of opinions expressed by the permanent traders in the market (see Chapter 10). Answers to some of these questions show how much of a necessary income-generating activity gathering plants is. When asked what they would do if plants couldn't be collected in the wild any more, most replied that they would buy the plants from other traders instead of harvesting them just so that they could sell plants at the market on a Friday. Regarding the acceptability of cultivated

plants, all but one of the Friday trader said that they would buy plants from such a source. Table 5.20 a-f lists the individual responses of the traders to Questions 22-27 from the survey questionnaire.

Table 5.20 a-f Individual responses of the Friday traders to Questions 22-27 on issues relating to plant conservation, cultivation and availability.

a)

Trader #	Question 22: What do you do to ensure that there are plants for the future?
1	Nothing
2	Nothing, plants are always available since they are from God
3	Place orders from gatherers instead
4	Go to different places (farmers)
5	Try to gather more plants
6	Dig plants and store them under the ground/soil
7	Select plants that last a long time and do not rot easily.

b)

Trader #		Question 23: Would you buy plants if farmers grew them?
1	Y	
2	Y	But only if they became extinct
3	Y	There isn't much of a difference
4	N	It would be expensive taking into account that some would have to be 'dug'
5	Y	If I could make a profit with them
6	Depends	Would buy them if I didn't have them
7	Y	Because I need them

c)

Trader #		Question 24: Would you recognise the difference between wild collected and cultivated plants
1		No difference
2	Y	Wild collected are better quality and less polluted
3	N	I cannot differentiate between them. They would look the same to me
4	-	-
5	N	I cannot differentiate, they look the same
6	N	
7	Y	The soil is different

d)

Trader #	Question 25: Why do you think that some plants are becoming scarce?
1	Over-harvesting
2	People harvest them who are not familiar with the techniques
3	Some plants become scarce because of drought
4	Occurs when farmers allow too many people to dig out plants on their farm
5	They are not scarce. There are plenty of plants available
6	I don't have the transport to go to places to look for scarce plants
7	Sometimes people burn grass and trees, and it affects the plants

e)

Trader #	Question 26: Why should plants be grown?
1	For healing purposes
2	Must not grow them. Plants belong in the wild where they grow by themselves
3	Good for healing purposes
4	I don't grow them; I ask farmers if I can dig them on their farms
5	For healing purposes
6	If you grow them, you can have them any time you want
7	Some plants do not grow if you plant them

f)

Trader #	Question 27: What would you do if wild plants were no longer found in the wild?
1	Go back home to Bergville
2	I would buy the plants from other traders and sell them to get a profit
3	I would struggle and buy them from other traders with the particular plants
4	Nothing, there is no choice or alternative
5	Buy them from other traders
6	Nothing I can do
7	Go to some places where I definitely know that I will find them

6 SPECIES DIVERSITY OF THE PLANTS TRADED IN FARADAY

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6.1 Taxa Traded

Three hundred and nineteen identified 'ethnospecies'¹² were recorded for sale in the Faraday market. A further 158 names of ethnospecies remain unidentified¹³ (of these, 143 were cited only once). Of the common names identified, 95.4% are in the Zulu vernacular and 4.4% in Sotho. The ethnospecies correspond to approximately 509 species from 294 genera and 111 families (Appendix 1a, 1d). The most commonly traded families in terms of the number of genera (in parentheses) are: Fabaceae (23), Compositae (22), Liliaceae *sensu lato* (20), Euphorbiaceae (14) and Rubiaceae (10) (Table 1). The largest families traded in terms of number of species and infraspecific taxa are: Liliaceae *sensu lato* (71), Compositae (42), Fabaceae (36), Euphorbiaceae (24), Orchidaceae (19), Celastraceae (16) and Amaryllidaceae (13) (Table 6.1, Figure 6.1). A broad floristic analysis of the taxa in trade is presented in Table 6.1.

Twelve species (2.4%) from eleven families represent alien plants species harvested and traded in Faraday. The most 'popular' of those species is *Cinnamomum camphora*. When the muti shops were surveyed in 1994/5, this was amongst the most frequently occurring species in the shops and often cited as scarce [Williams *et al.* 2000], however this was more than likely because *C. camphora* found on private land, and hence the harvesting risks are higher and accessibility is lower. *C. camphora* is no longer found as frequently as it was, suggesting that access is more constrained, or the demand is lower.

6.2 Frequency of Species Occurrence

A mean of 27.3 ± 12.0 (SD) ethnospecies was recorded per trader, ranging from a minimum of 5 to a maximum of 59 ethnospecies. This differs significantly from the muti shops, where a mean of 126 ± 65.9 (SD) species was recorded [Williams *et al.* 2000]. Reasons for this difference include the size of the trading space available, economic limitations that restrict plant sales to economically competitive (higher value) species, competition between traders to sell these species, and knowledge of plants. Traditional healer traders in the market sell slightly more ethnospecies than non-healers (Table 6.2), emphasizing their broader knowledge and economic freedom, and also the necessity to keep a range of plants for patient-prescription reasons in addition to the more popular plants. Non-healer traders generally sell those plants that they know to be more commercially competitive, hence restricting speculative plant sales and items that would not sell unless prescribed by a healer. The reason for non-healers entering the trade is job- rather than service-based; some people are still learning the names of the plants, and they do not have the training to earn more from prescribing plants to patients. The mean number of species sold by the traders corresponds with N_{∞} (see Table 6.4, Hill's diversity number), a number that calculates and estimates the number of 'very abundant' ethnospecies sold in the market.

¹² 'Ethnospecies' is a term used by Hanazaki *et al.* [2000] that takes into account the folk or common name given to 1 or several species quoted during the interviews. In Faraday, for example, the name 'iNgwavuma' can be considered an ethnospecies designating *Elaeodendron transvaalense*, whilst the name 'imphepho' applies to several species. Where appropriate, the Faraday data were quantified based on the number and frequency of occurrence of 'ethnospecies' to avoid repetitions and hence any bias/inaccuracies in reporting the results.

¹³ The mean percentage of unidentified ethnospecies per trader ($n = 92$) is $11.4\% \pm 7.9\%$ (SD), and ranging between 0 and 26.9% for the sample (this figure excludes the Friday traders)

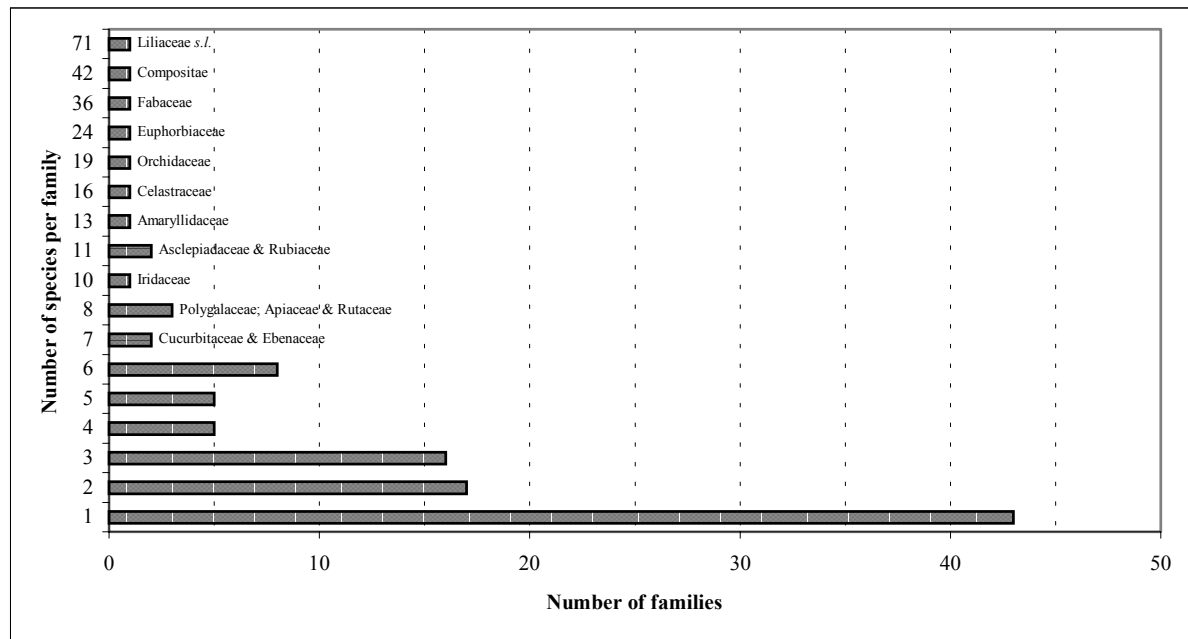


Figure 6.1 The number of species per family traded in the Faraday market

Table 6.1 Broad floristic analysis of the taxa traded in Faraday.

Major families and groups	No. families	No. genera‡	No. taxa*
<u>Monocotyledonae</u>	12	49	135
<i>Iridaceae</i>		5	10
<i>Amaryllidaceae</i>		6	13
<i>Orchidaceae</i>		7	19
<i>Liliaceae s.l.</i>		20	71
<u>Dicotyledonae</u>	91	237	364
<i>Rhamnaceae</i>		5	6
<i>Anacardiaceae</i>		5	6
<i>Umbelliferae (Apiaceae)</i>		6	8
<i>Rutaceae</i>		7	8
<i>Asclepiadaceae</i>		7	11
<i>Celastraceae</i>		7	16
<i>Rubiaceae</i>		10	11
<i>Euphorbiaceae</i>		14	24
<i>Compositae (Asteraceae)</i>		22	42
<i>Fabaceae (Leguminosae)</i>		23	36
Angiospermae	103	286	499
Gymnospermae	4	4	4
Pteridophyta	3	4	6
TOTAL	110	294	509

‡ Only families with ≥ 5 genera are included in the table

* Including species, subspecies and varieties

Interestingly, there is no significant difference in the number of species sold by traders with or without lockers (Table 6.2). There is also very little difference between the number of species sold in different parts of the market (Table 6.2). Block B keeps slightly more than the average number of species (there is more space to do so), as does Block H, which is along the main road opposite the shops. Block I also has the smallest trading space available, and traders sell fewer species on average. The only significant difference in the number of species sold is for the ‘Friday traders’ – ladies who

come to the market on a Friday or Saturday with a few species that they sell in a day before returning home to either western Gauteng or parts of the Free State and Lesotho. The Friday traders sell 6.9 ± 3.1 ethnosppecies, ranging from a minimum of 4 to a maximum of 13 species.

While the number of ethnosppecies sold per trader can be loosely linked to whether or not the traders are traditional healers (with healers keeping slightly more species than non-healers), this is not an explanation for why Block B traders sell more plants than average. Block B has comparatively fewer healers (Table 5.2) than Blocks A, C and E but has more space, hence the diversity of plants traded commercially is also linked to the *physical floor space available*, and not the space created by having a locker. In Table 6.2, Blocks that have lockers are marked with an asterisk (*), and in 2 out of the 4 cases the number of species sold is lower than the average. In summary, the number of species sold by a trader is related to the floor space available **and/or** their qualification as a healer or not. The presence of lockers only seems to determine the amount of storage available, and the predominant longevity of the plant parts that they sell – non-locker traders tend to sell more geophytes with a shorter shelf life, and they have a tendency to process the plant parts more (i.e. making mixtures). Access to lockers appears to be hierarchical and related to the number of years a trader has been in the market. The access to lockers cannot be conclusively linked to traditional healer status, because only 25% of the traders in Block B with lockers that were surveyed were traditional healers.

Table 6.2 Comparison of the mean number of ethnosppecies sold by traders - healers and non-healers, locker traders and non-locker traders, Friday traders and different sections of the market (consult Figure 1 for Block localities).

Trader type	Mean and SD of ethnosppecies recorded for sale	Range of ethnosppecies per trader
1) All traders (n=92) (excludes Friday traders)	27.3 ± 12.0 ethnosppecies	5 to 59
2) Locker vs. non-locker traders Locker traders (n=42) Non-locker traders (n=50)	27.8 ± 11.8 ethnosppecies 26.8 ± 12.2 ethnosppecies	8 to 59 5 to 58
3) Healers vs. non-healers Healer traders (n=39) Non-healer traders (n=53)	30.3 ± 14.2 ethnosppecies 25.0 ± 9.5 ethnosppecies	8 to 59 5 to 47
4) 'Friday traders' (n=7)	6.9 ± 3.1 ethnosppecies	4 to 13
5) Different trading areas ('Blocks') Block A (n=18)* Block B (n=23)* Block C (n=10)* Block D (n=9) Block E (n=7) Block F (n=10)* Block G (n=3) Block H (n=5) Block I (n=7)	27.0 ± 14.4 ethnosppecies 32.3 ± 11.6 ethnosppecies 23.9 ± 10.1 ethnosppecies 25.4 ± 7.4 ethnosppecies 25.9 ± 14.8 ethnosppecies 23.3 ± 9.9 ethnosppecies 27.0 ± 10.5 ethnosppecies 30.8 ± 15.7 ethnosppecies 23.1 ± 11.2 ethnosppecies	7 to 59 13 to 56 13 to 46 13 to 39 16 to 58 12 to 46 17 to 38 9 to 47 5 to 36

(Please note: Block A is the central trading area. It is closest to the taxi rank and where the chairman of the market is located. Block A is also where the 'Friday traders' sell once a week)

* Indicates the presence of lockers in the Block

Table 6.3 lists the most frequently occurring species sold by the street traders. Of the traders surveyed, no species was recorded in more than 61 stalls (i.e. 63.5%). *Urginea sanguinea* / *Drimia* spp. had the highest frequency of occurrence in the market, followed by *Sarcophyte sanguinea*, *Elaeodendron transvaalense* and *Albizia adianthifolia*. The figures on frequency of plant occurrence in the market and the number of species found to be traded is consistent with previous results of the Witwatersrand [Williams *et al.* 2000]. However, spatial and economic limitations reduce the diversity of

plants sold in Faraday and restrict the species to those most likely to have commercial value – compared to *muti* shops that sell an extensive range of prescriptive plants. The *muti* shops are herbal pharmacies that prescribe a range of herbal medicines, and are not necessarily wholesalers of plants like most of the Faraday traders are.

Table 6.3 The thirteen most frequently available species in the Faraday market (*cf.* with Table 8.1, the most voluminous species in trade)

Species	Family	Plant Part	% of traders with the species
<i>Urginea sanguinea</i> / <i>Drimis</i> spp.	Liliaceae <i>s.l.</i>	Bulb	61
<i>Sarcophyte sanguinea</i>	Balanophoraceae	Root	49
<i>Elaeodendron transvaalense</i>	Celastraceae	Bark	48
<i>Albizia adianthifolia</i>	Fabaceae	Bark	42
<i>Hypoxis</i> sp.	Hypoxidaceae	Bulb	40
<i>Acacia xanthophloea</i>	Fabaceae	Bark	38
<i>Sclerocarya birrea</i>	Anacardiaceae	Bark	32
<i>Schotia brachypetala</i>	Fabaceae	Bark	32
<i>Urginea</i> sp. (<i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	Liliaceae <i>s.l.</i>	Bulb	31
<i>Adenia gummifera</i>	Passifloraceae	Stem	29
<i>Dioscorea sylvatica</i>	Dioscoreaceae	Tuber	29
<i>Rapanea melanophleas</i>	Myrsinaceae	Bark.	27
<i>Scilla natalensis</i>	Liliaceae <i>s.l.</i>	Bulb	27

6.3 Trade in Plant Parts

The degree of disturbance to a plant population and the impact of harvesting are related to the part of the plant that is harvested. The removal of whole plants, bulbs, roots and bark is more immediate and damaging than the removal of leaves and fruit [Cunningham 1988]. Harvesting whole plants and roots usually results in plant mortality, and limits the future regrowth and regeneration of the individual plant and/or the plant population. The degree to which *species* are destructively harvested in terms of their plant part is shown in Figure 6.2. Thirty four percent of the ethnospecies ($n=319$) sold in Faraday are used for their roots, followed by bark, leaves/stems and whole plants. However, when assessed according to the preponderance of plant parts in evidence at trader's stalls (i.e. as a percentage of the total records/citations and not as a percentage of species), then the bulk of the plants parts sold are bark, followed by roots, bulbs and whole plants (Figure 6.3). In other words, roots are 34% of the *species* sold (Figure 6.2) but only 32% of the *plant parts* visibly on display in the market (Figure 6.3). These figures are consistent with previous results for the Witwatersrand [Williams *et al.* 2000].

6.4 Grassland vs. Forest and Woodland Taxa

Woodland and forest resources account for approximately 63% of the species traded, with 10% of those species being shared with the grassland biome [Williams *in press*]. Woodland and forest species account for 74% of the traded volume, and 68% of the total mass. At least 5.2% of the mass is shared with grassland species. In other words, for every tonne sold, 630 kg are harvested from woodland and forest, 320 kg are harvested from grassland, and 50 kg are common to both woodland and grassland [Williams *in press*]. Additionally, woodland and forest species sold in Faraday account for 73% of the total wholesale and retail value, of which 6% is shared with grassland species. Therefore, for every R100 spent or earned, approximately R67 is derived from woodland/forest taxa only, R26 from grassland taxa only, and R6 from taxa that are both woodland and grassland [Williams *in press*].

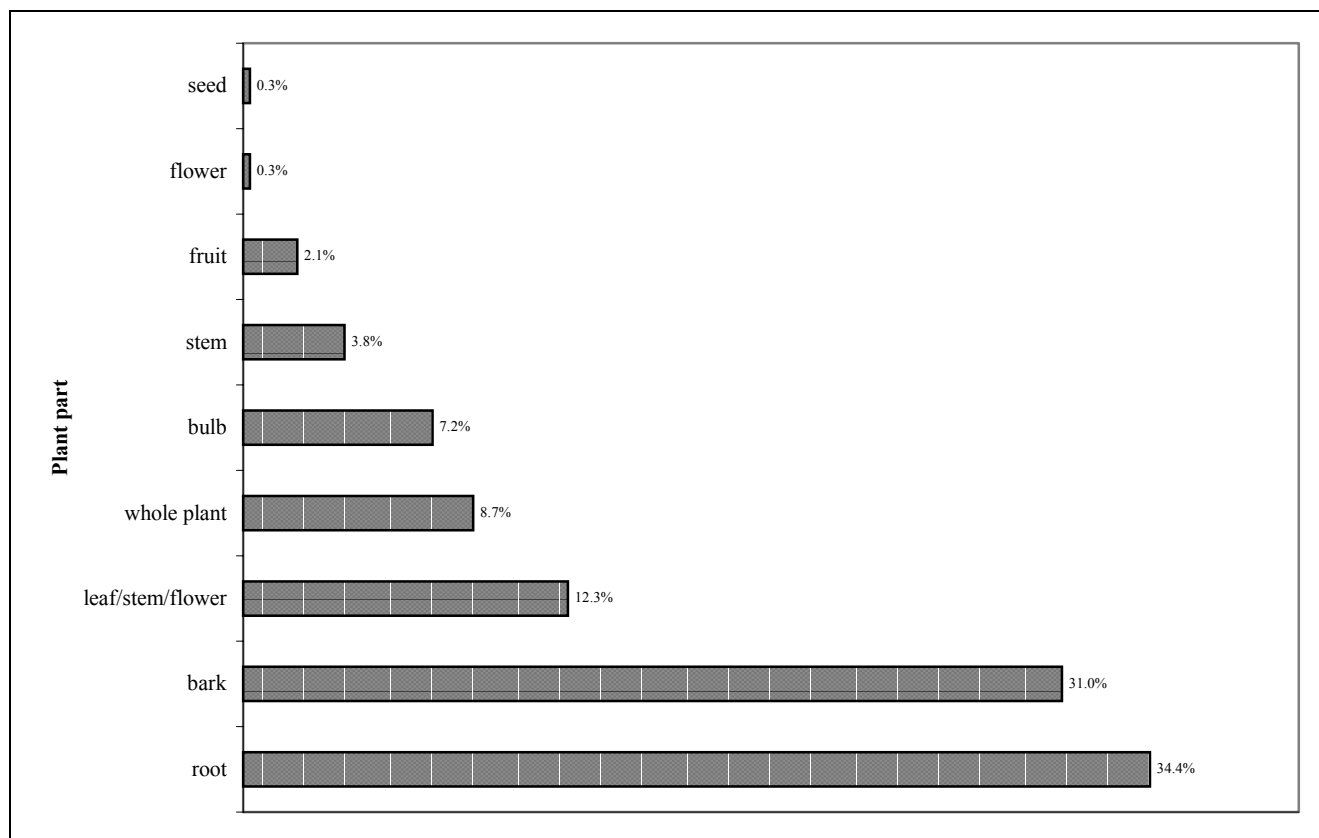


Figure 6.2 Percentage of ethnospecies sold by plant part used (n=319 ethnospecies)

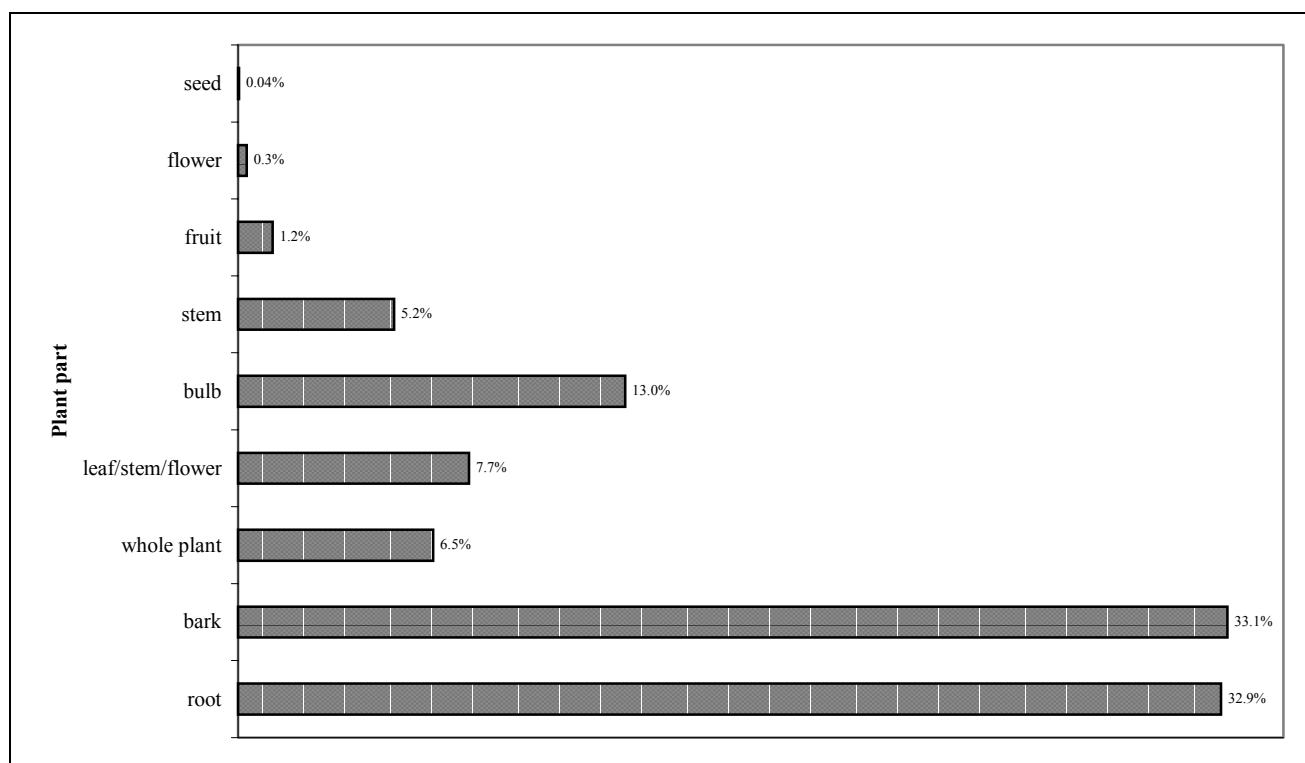


Figure 6.3 Percentage of plant parts in evidence at the market (n=2753 records¹⁴)

¹⁴ * Total number of records includes the unidentified plants

6.5 Species Richness, Diversity/Heterogeneity and Evenness

A tool that has recently been applied to the quantification and description of ethnobotanical data is the use of indices of species diversity/heterogeneity, richness and evenness. The use of the indices permits comparisons between species used by different communities in different or similar environments [Begossi 1996] and of different sample sizes. The calculation of an index of diversity relies on information regarding the *number and frequency of occurrence* of species in a sampled community. Translated in terms of an ethnobotanical survey: *the number and frequency of species traded, cited or used* by a sample of traditional medicinal practitioners, street traders and/or commercial gatherers.

Diversity measures take into account two factors: species richness (i.e. the number of species) and evenness/equitability (i.e. how equally abundant the species are in the sample) [Magurran 1988]. An 'index' of species diversity (also called an index of heterogeneity) incorporates both richness and evenness into a single value and calculates the probability that two species drawn at random from a sample belong to the same species. These concepts can be translated into ethnobotanical terms, and have been applied to answer the following questions: 1) is the sample size sufficient; 2) what is the species richness of the sample; 3) what is the diversity of the sample; and 4) is there dominance in the trade of certain species within the Faraday market?

These methods have been used to analyse the Faraday market data, and were previously used by the author to analyse the species abundance data for the Witwatersrand muti shops [Williams *et al.* 2000]. However, no comparison has been made between the two samples in this report (but is further described by the author in a paper in preparation), because of slight differences in the approach to defining one of the parameters. For the muti shops [Williams *et al.* 2000], calculation of the indices was based on the frequency of occurrence of *species*, whilst Faraday uses the frequency of occurrence of *ethnospecies* (i.e. the frequency of occurrence of the common names, hence eliminating the potential for repetitious bias in the results)

6.5.1 Sample size

Rarefaction curves are used to evaluate sampling effort [Begossi 1996] and species richness where samples sizes are not equal. Rarefying a sample computes the expected number of species, $E(S_n)$, at a sample size of n citations/records/samples. When more individuals are added to the sample and the expected number of species, $E(S_n)$, does not increase, then sampling effort is said to be sufficient [Begossi 1996] - this is indicated by a leveling off of $E(S_n)$ on a rarefaction curve. In other words, as sampling and the number of citations increases (and more traders are surveyed, for example), one expects fewer new species to be recorded and hence the curve starts to level out.

The rarefaction curve for the Faraday sample is shown in Figure 6.4. The curve has been computed on the basis of the frequency of occurrence of identified ethnospecies. As can be seen, the rate of new ethnospecies expected to be recorded as more traders are surveyed has decreased and the curve has begun to level off, hence indicating that the sampling effort was sufficient. The rate has decreased to 3-4 new ethnospecies for every 100 new records, or 0.9 new ethnospecies for every trader surveyed. The customer survey verified this expectation: 4.6 new ethnospecies were recorded for every 100 plants bought by the customers. One of the new species to have been identified is *Neorautanenia ficifolius* ('sikuntla'). The common name for this species was not recorded during the trader survey but was captured during the customer survey. This plant has been recorded for sale in the Mpumalanga markets [Botha *et al.* 2001]. One would not expect the rarefaction curve to level off completely because it is not possible to capture every species sold. Also, commercially sold species represent a 'short-list' of medicinal plants used nationally, because not every species used has a commercial value in the urban markets [Cunningham 1997].

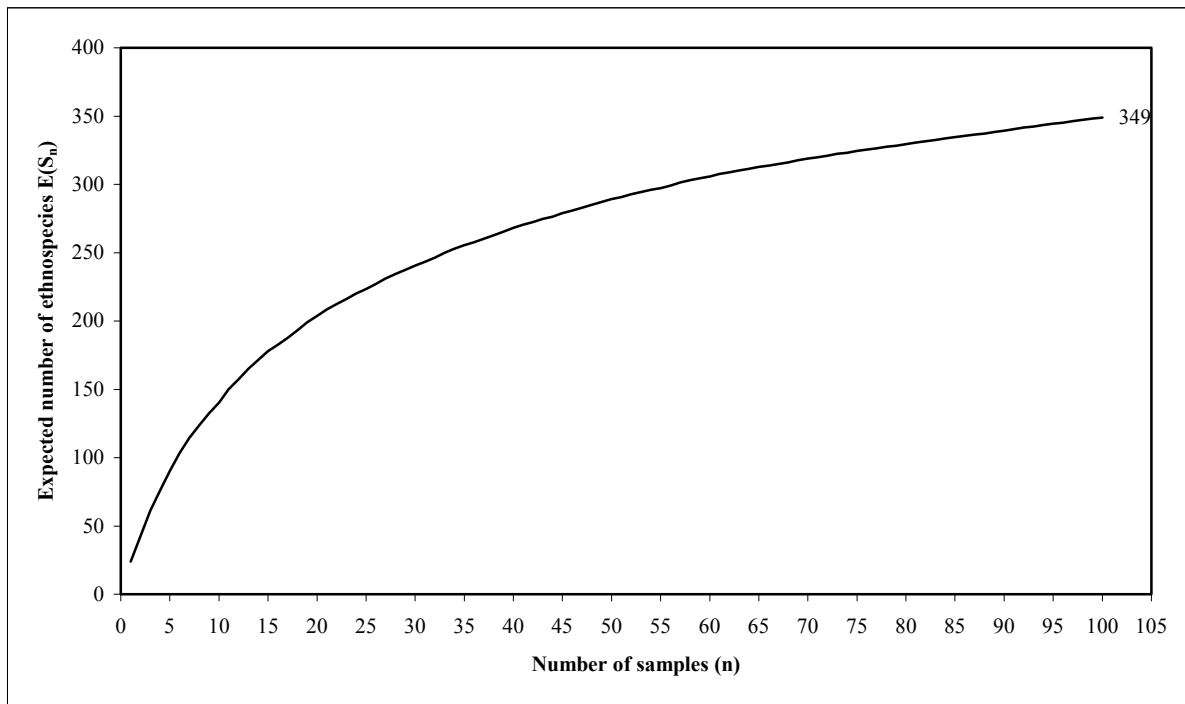


Figure 6.4 Rarefaction curve for the Faraday survey showing adequacy of the sampling effort from the levelling off of the curve, and the number of ethnospecies expected from the sample.

6.5.2 Species richness

Species richness is an indicator of the number of species recorded in the survey. As discussed in Section 6.1, there are at least 509 species in trade at the Faraday market. The number of species recorded depended on the sample size and the level of collecting effort, as indicated by the rarefaction curve. New species are expected to be recorded in future visits to the market, and there are several species that ‘missed’ being captured during the survey but have subsequently been seen to be for sale, these include:

- *Lithops lesliei* (Mesembryanthemaceae) (whole plant): a protected species
- *Adenia digitata* (Passifloraceae) (tuber)
- Several species of *Acacia*, including *A. karroo* (Fabaceae) (bark): gatherers were apprehended at Klipriviersburg Nature Reserve with several bags of this species that were destined for Faraday
- Several species of *Aloe*, including *A. aristata*
- *Berula erecta* (Apiaceae) (rhizome)
- *Cotyledon orbiculata* (Crassulaceae) (whole plant)
- *Embelia ruminata* (Myrsinaceae) (root)
- *Leonotis leonurus* (Lamiaceae) (leaves/stems)
- *Adiantum sp.* (Adiantaceae) (leaves/stems)
- *Rumex crispus / lanceolatus* (Polygonaceae) (root)
- *Tarchonanthus camphoratus* (Asteraceae) (leaves/stems)
- Various species within the family Asclepiadaceae, including *Orbea sp.* and/or *Huernia sp.*, *Gomphocarpus sp.* and other species of *Stapelia*.

Other species that are likely to be traded in Faraday to a greater or lesser extent (depending on the commercial value and extent of national use) are those species identified by Dzerefos and Witkowski [1999, 2001] as being used medicinally within the Abe Bailey and Roodeplaat Nature Reserves in Gauteng. It is also likely that some of the species recorded for trade in Mpumalanga and Limpopo Provinces by Botha *et al.* [2001] and in the Eastern Cape by Dold & Cocks [2002] are present in the Faraday market from time to time.

6.5.3 Species diversity or ‘heterogeneity’

An index of species diversity calculates how heterogeneous the sample is. In other words, how difficult would it be to predict correctly the species of the next plant recorded during a survey. If the probability is high that two plants recorded consecutively are of the same species, then the diversity of the sample is said to be low. Results for Faraday show that the probability of two plants being the same species is low, and hence the diversity of the plants in trade is high. This diversity is represented in two ways (Table 6.4): 1) Shannon-Wiener index (H'), which is comparatively high hence indicating a high diversity of species in trade (maximum possible value of the Shannon index for the Faraday sample is 5.86); and 2) Simpson’s Index (λ), showing a low probability (λ approaching zero) of plants in the sample being the same, and hence a higher diversity.

A third way of describing species diversity is through ‘Hill’s diversity numbers’ (which give a measure of the effective number of species in a sample) [Ludwig & Reynolds 1988]. Hill’s numbers N_1 , N_2 and N_∞ describe the number of abundant, very abundant and most abundant ethnospecies respectively in the sample. From Table 6.4 it can be seen that of the 319 ethnospecies found to be traded in Faraday there is a core group of about 207 (65%) that are ‘abundant’ in the sample, 151 (47%) that are ‘very abundant’ and 40 (13%) that are ‘most abundant’. (*Please note: there are overlaps in species numbers of each category; hence, the total of these numbers is more than 319.*) This would seem to indicate that more than half of the species traded have a higher commercial value by virtue of their frequency of occurrence in the data set of traded species. Except for a few species (13%) that are traded more than others, there appears to be a high evenness in the distribution of ethnospecies and therefore a low dominance.

Table 6.4 Measures of diversity for ethnospecies traded in Faraday

Index/measure		Value
<i>Number of informants and citations</i>	N	100 traders (including ‘Friday traders’) 2753 citations/records
<i>Species richness</i>	S or N_0	319 ethnospecies
<i>Index of diversity/heterogeneity</i>		
Shannon-Wiener	H'	5.33
Simpson’s Index	λ	0.066
<i>Hill’s Diversity numbers</i>		
# Abundant ethnospecies	N_1	206.5 ethnospecies
# Very abundant ethnospecies	N_2	150.9 ethnospecies
# Most abundant ethnospecies	N_∞	40.0 ethnospecies
<i>Measure of evenness/equitability</i>		
Shannon	J'	0.91

6.5.4 Evenness of use

Measures of evenness (or equitability) refer to how equally abundant the ethnospecies are in the sample. Evenness is at a maximum when all species in a sample are equally abundant. A low evenness (value close to 0) means a high dominance in the trade of a few species. A value close to 1 represents a high evenness and low dominance. The Shannon index of evenness (J') has been calculated for the ethnospecies traded in Faraday (Table 6.4). The high value ($J'=0.91$) indicates that there is a high evenness in the distribution of the ethnospecies traded, i.e. there is a low dominance of trade in only a few species.

A low dominance indicates that gatherers, traders and customers do not necessarily narrowly favour a certain set of resources even though some species are more popular and prevalent in the market than others are and scarcities of popular species have arisen. It is plausible, however, that were scarcity not a limiting factor for certain popular, and therefore under-reported species, that the overall evenness of the sample could be lower hence indicating a greater dominance in the use of these species. There are, however, other factors mitigating plant scarcities besides the collection for medicinal purposes, hence scarcity is not necessarily always a function of high demand by the medicinal plant trade.

7 SOURCES AND SUPPLIERS OF THE PLANTS TRADED IN FARADAY

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7.1 Trade Structure

The trade linkages for indigenous medicinal plants sold in markets like Faraday can vary from species to species, and trader to trader. Networks of gatherers that harvest plants from around southern Africa supply the urban markets – either directly to the traders or to other dealers. Some supplier-gatherers are the Faraday street traders themselves, whilst other traders prefer to buy from the gatherers that arrive at the market on a weekly basis.

To a certain extent, the rural-urban supply chain of plants and the network of commercial gatherers and traders within the medicinal plant trade has created a new class of migrant labourers that are active within the informal economy. In Johannesburg, the demand for plant medicines by patients and healers (at least 18,000 in Soweto) sustains an employment chain that starts with the healers who buy from the street traders in Faraday, who are in turn supplied by the network of gatherers from South Africa, Mozambique, Swaziland and Lesotho.

As far as could be ascertained, all plants sold in Faraday are wild collected, although one trader, when asked whether she would buy plants grown by local farmers replied, “*Yes, they still do come on Fridays... The farmers from Lesotho do sell the plants to us*”. Apart from this brief mention, and is not known to which plants the trader was referring, the only ‘cultivated’ sources to the Faraday market are likely to be those species that are grown privately in gardens and parks, such as exotic ornamentals like *Cinnamomum camphora*, which is not an indigenous species and is hence not wild-collected in the traditional meaning of the word. Supplies of plants that are commercially cultivated to a limited extent tend to primarily meet the needs of the local users, and not the urban markets. Several conservation agencies and organisations (e.g. Silverglen Medicinal Nursery in Durban; South African Medicinal Flora Co-Operative in White River) are promoting the cultivation of medicinal plants by farmers and other commercial enterprises [Mander 1998].

As demonstrated in Chapter 5, social and economic constraints within rural areas are often the primary motivation for involvement in the supply and demand chain for medicinal plant resources in southern Africa, and the reason why many traders in Faraday are part of this multinational network. The South African situation is comparable to that of some European countries like Albania, where wild collection of medicinal and aromatic plants is considered an especially useful means of generating an income in remote areas, with poor agricultural land, and which are far from the nearest market [Lange 1998]. In terms of volume, almost 100% of the plants are wild collected. In one such area of Albania, it was reported that collection of medicinal and aromatic plants provides the second-most important means of earning money. In a region bordering the Adriatic Sea, wages from collection of such plants was found to be a component of every rural household’s income [Lange 1998]. In Europe, collectors of medicinal and aromatic plants from the wild are, in the main, rural people, stock-herders, villagers, retired people, or often women and children, for whom it provides in most cases a supplementary income. Collecting is done either with or without prior contractual agreement with traders. Where prior agreement exists, lists of plants and amounts to be collected are usually prepared [Lange 1998]. From the 1200-1300 European plant species detected in trade, at least 90% are still wild collected.

Like KwaZulu-Natal (the primary source of supply for species in the Faraday market), the majority of plants are harvested from wild populations on communal land [Mander 1998]. Popular species, which are no longer available in these communal areas, may be harvested on forestry estates (exotic plantations with natural areas), commercial farms and protected areas, with or without the consent of the landowners or local authority [Mander 1998].

7.2 Suppliers

The Faraday street traders are resource brokers and the most visible in the supply chain. Only 18.3% of the traders harvest their own plants; the remainder either buy plants from the commercial harvesters (36.6%) or they gather small quantities *and* buy the rest (45.2%) (Table 7.1). Interestingly, it is the traditional healers who buy/order the most plants from the commercial harvesters. By and large, this indicates the degree to which the trade has shifted from a traditional, specialist occupation of the healers to a commercial activity of people not trained to respect natural resources. It also indicates the greater financial freedom of the healers within the market. Through additional income earned from consultations with patients, the healers are able to afford to buy plants from the gatherers. Non-healer traders, on the other hand, cannot always afford to buy the plants from the trading middlemen, and instead combine return family visits to the rural areas with collection trips.

In terms of differences between the locker and non-locker traders, the former buy more plants than they harvest (Table 7.1). Trends in plant part purchases have also shown the likelihood of locker traders buying plants with a longer shelf life (barks and roots), whereas non-locker traders buy and collect more perishable items like bulbs and whole plants. In terms of plant supply by actual *volume* to the market, however, the plant survey revealed that 55.3% of the plants sold in Faraday had been bought from commercial gatherers and 44.7% had been gathered by the traders themselves (this figure is based on the 2,252 plants recorded/cited during the survey).

Table 7.1 Suppliers of plants harvested for sale in the market. Plants are either sold to a street trader by a gatherer and/or harvested by the street trader (based on Question 7 of the street trader survey).

	Harvests own plants <u>and</u> buys from gatherers	Buys/orders plants from gatherers only	Only harvests own plants
Total street traders (n=93)	45.2%	36.6%	18.3%
Traditional healer traders (n=42)	42.9%	42.9%	14.3%
Non-healer traders (n=51)	52.9%	25.5%	21.6%
Locker traders (n=43)	41.9%	39.5%	18.6%
Non-locker traders (n=50)	54.0%	28.0%	18.0%

In addition to the gatherers that come to the market and the street traders that harvest from the rural areas, it was noted that some traders travel to, and buy from, other medicinal plant markets. Two markets that were mentioned are the large (and well-known) Durban market(s), and a market in Nongoma, Zululand. The author is not familiar with the latter, but it was mentioned by at least five street traders as a source for some plants. It is presumed that itinerant gatherers/traders at the Nongoma market travel to Faraday to sell plants as well.

7.3 Sources

The declining access to popular plants has led to an extension and intensification of the gathering network at regional and national levels [Marshall 1998]. A comparison between the location of plants harvested for trade in KwaZulu-Natal between 1988 and 1996 indicates that for the popular plants there has been an average increase in travel time by 45%, with several plant species being harvested exclusively in neighbouring countries [Mander 1998].

In Faraday, the bulk of the plants are harvested in KwaZulu-Natal. At least 66% of the plants recorded in the survey were harvested in the province (Table 7.2), followed by Gauteng (6.8%) and Mozambique (1.2%) and Lesotho (0.8%). It is to be noted that while percentages of origin might seem rather low for some provinces and countries given known harvesting trends, it wasn't possible to ascertain the harvesting locality for at least 23% of the plants sold. Some traders did not know where the plants were harvested, whilst others were reluctant to offer this information – a factor that was predicted before the survey, and taken into account during the design of the survey questionnaire. Firstly, traders were asked whether they harvested plants themselves or bought them (Question 7). Secondly, they were asked from where

the plants were bought/harvested (Question 8). A third mechanism was built into the questionnaire to address this matter: traders were asked where ‘home’ was (Question 11), the assumption being that traders that harvested their own plants would do so from areas familiar to them, and ‘home’ was the most likely place. Table 7.2 compares the results of the plant survey with the answers to Questions 8 and 11 to present a broader picture of the actual and potential origins of the plants sold in the Faraday market. The question of where ‘home’ is was discussed in Chapter 5.

While plants harvested in Gauteng account for 6.8% of the plants present in the market, 19.0% of the traders cited the province as a source for the plants harvested (Table 7.2). Similarly, Mozambique was cited as a major source of plant supply compared to what was actually present.

Table 7.2 The percentage of plants present in the market originating from different provinces or countries (from the plant survey), versus a comparison with the traders’ answer to Questions 8 (where are plants harvested?) and 11 (where is ‘home’?).

Source	Plant survey (n=2,252)	Question 8: where are plants harvested or bought?	Question 11: where is home? *
KwaZulu-Natal	66.2%	61.9%	84.3%
Gauteng	6.8%	19.0%	7.8%
Mpumalanga	0.6%	3.2%	
Free State	0.4%	1.6%	
Eastern Cape	0.3%	1.6%	2.9%
Mozambique	1.2%	9.5%	1.0%
Lesotho	0.8%		1.0%
Swaziland	0.7%	3.2%	
Zimbabwe	0.04%		
Uncertain origin	23.0%		2.9%

* Includes data from ‘Friday traders’

Further details of the specific localities from which plants are harvested are shown in Table 7.3. Specific harvesting sites that were cited during the plant survey are compared with the regions cited in Questions 8 and 11. Details of harvesting sites in KwaZulu-Natal corroborate the evidence that plants are mainly harvested from the Zululand, Maputaland, and southern regions of KwaZulu-Natal considered ‘home’ to the majority of the traders. In Gauteng, plants are mainly harvested in the south from Klipriviersburg to Heidelberg.

There is considerable labour migration between Lesotho, Swaziland, Mozambique and South Africa that promotes a large informal movement of plants between countries [Mander 1998]. Species once available in South Africa are now harvested in other countries. Mander [1998] reported that *Haworthia limifolia*, *Bowiea volubilis* and *Warburgia salutaris* are imported in large quantities from Swaziland and Mozambique, whilst *Eucomis autumnalis* and *Alepidea amatymbica* are imported from Lesotho in smaller quantities. Results from Faraday show that while there is a range of plants harvested in small quantities from other countries, the species harvested in the most significant numbers from outside South Africa are *Siphonochilus aethiopicus* and *Warburgia salutaris*. Half of the *Siphonochilus* recorded for sale in Faraday was harvested in Swaziland, Mozambique or Zimbabwe. Forty-three percent of the *Warburgia* was harvested in Mozambique and five percent in Swaziland.

Table 7.3 Specific localities within KwaZulu-Natal and Gauteng cited as the origin of the plants harvested, and comparisons with Questions 8 and 11.

Source/Locality	Plant survey (n=483 specific locality citations)	Question 8: where are plants harvested or bought?	Question 11: where is home? *
<u>KwaZulu-Natal</u>	(79.9%)	(61.9%)	(84.3%)
<u>Maputaland</u> Mkuze, Emanguzi, Ingwavuma, Ubombo, Mseleni, Kosi Bay, Umhlaba uYalingana	24.2%	29.0%	12.7%
<u>Zululand</u> Hluhluwe, Obonjeni, Ulundi, Mahlabatini, Nongoma, Hlabisa, Mtubatuba, Empangeni	30.4%	29.0%	18.6%
<u>Southern Natal</u> Durban, Mbumbululu, Umlazi, Mazakhele, Umkhomazi, Umzinto, Mtwalume, Port Shepstone	14.7%	3.2%	10.8%
<u>Natal Drakensberg</u> Bergville	10.6%	3.2%	4.9%
<u>Northern Natal</u> Nqutu, Utrecht, Newcastle, Dundee	-	3.2%	3.9%
<u>Gauteng</u>	(18.2%)	(19.6%)	(7.8%)
<u>North</u> Pretoria	0.4%	-	-
<u>South-east</u> Johannesburg, Vosloorus, Heidelberg, Klipriviersburg	7.0%	16.1%	3.9%
<u>South-west</u> Eikenhof, Randfontein, Orange Farm, Sebokeng	10.8%	3.5%	3.9%

* Includes data from 'Friday traders'

7.4 Frequency of Plant Supply to the Market

Most traders in Faraday replace their plant stock at least once/month – either buying it from the commercial gatherers arriving on a Friday, or going on their own collecting trips (Table 7.4). The healers and locker-traders tend to buy/harvest plants more frequently than the non-healers and non-locker traders. A quarter of the non-healers, for example, buy/harvest plants less than once/month compared to 7% of the healers. This trend is related to issues of income and affordability discussed in previous chapters.

Table 7.4 Frequency of gathering trips or plant purchases from the market (Question 10 of the street trader survey).

Frequency	Total street traders (n=93)	Healer traders (n=42)	Non-healer traders (n=51)	Locker traders (n=43)	Non-locker traders (n=50)
1 every 4 months	3.2%	-	5.9%	2.3%	4.0%
1 every 3 months	6.4%	2.4%	9.8%	2.3%	10.0%
1 every 2 months	7.5%	4.8%	9.8%	7.0%	4.0%
1 / month	41.9%	42.9%	41.2%	46.5%	38.0%
2 / month	16.1%	14.3%	17.6%	14.0%	18.0%
3 / month	2.1%	-	3.9%	2.3%	2.0%
4 / month	6.4%	11.9%	2.0%	4.7%	8.0%
+ 4 / month	1.1%	2.4%	-	2.3%	-
'often'	1.1%	-	2.0%	2.3%	-
When needed	7.5%	11.9%	3.9%	11.6%	4.0%
No answer	6.4%	9.5%	3.9%	4.7%	8.0%

7.5 Transport of Plants to the Market

Gauteng is not close to the source of supply for at least 60-80% of the plants sold in the market, and there are inherent risks involved in transporting plants across provincial borders. Routine roadblocks set up by the Traffic Department for the motorists along Oliviershoek and Van Reenen's Pass more than occasionally apprehend vehicles loaded with plants that are bound for Gauteng. Faraday traders have complained that they are more of a law enforcement target than their counterparts in KwaZulu-Natal and Mpumalanga.

Plants reach the market by bus, taxi or private car (Figure 7.1). Fourteen years ago, the committee of the Faraday Street traders made an arrangement with the Putco Bus Company to transport traders, gatherers and harvested plants between the rural areas and Johannesburg (Mr Mvubu *pers. comm.*). There are currently at least 15 buses operating between Mpumalanga, KwaZulu-Natal and the Eastern Cape (Photo 7.1). The buses arrive in Johannesburg from the rural areas on Friday loaded with people and plants, and then return to the rural areas on Monday. According to the Chairman (Mr Mvubu), there was initially violent opposition from the taxi owners when this arrangement was first made. The one-way cost of transport on the bus was R80 per person plus R12 per bag of plants in 2001¹⁵. By contrast, the taxi cost R110 per person one way and there was limited space available for the plants – usually only enough room for 2 bags per person. The traders that make use of the bus service include street traders that gather their own plants. At least 70% of the traders use the Putco bus service to either transport plants they have harvested themselves, or to buy from commercial gatherers who have used this facility to bring plants to Faraday, or to return home for familial visits.

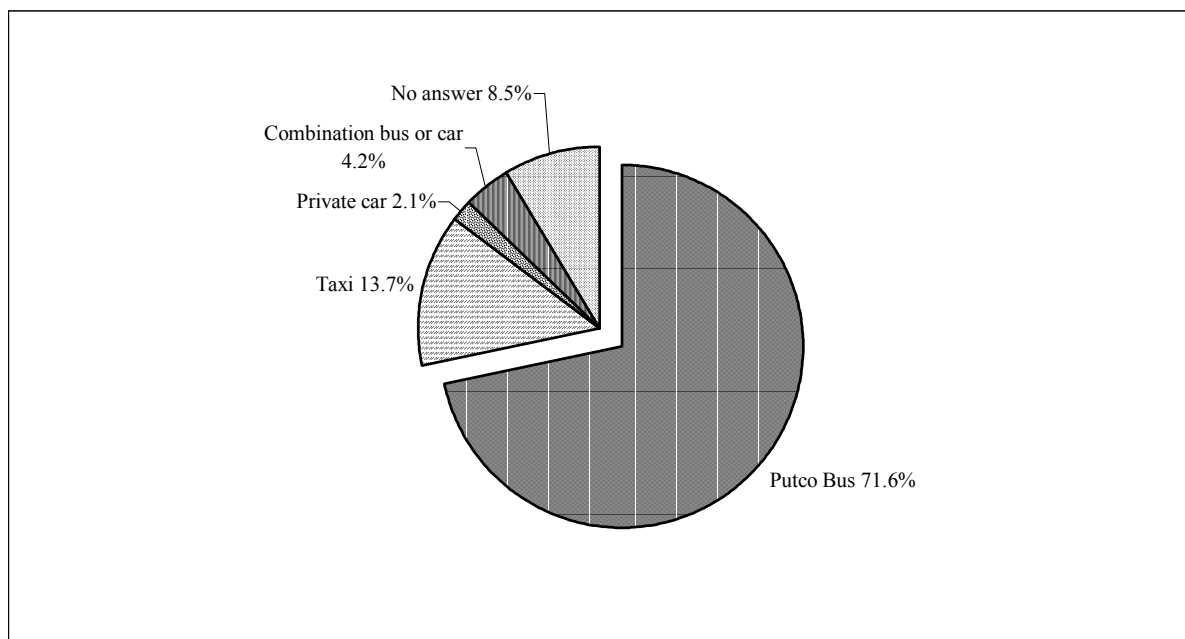


Figure 7.1 Transport mode by which plants reach the market.

Cultivation has not proved profitable for the majority of taxa in trade, partly because the costs associated with obtaining the plant material are relatively low in comparison with the cost of cultivating them. Usually the only financial costs to a gatherer are the transport costs. Given that a return trip to the rural areas on Putco bus is at least R160 plus R12 per bag of plants, the gatherer would have to ensure that enough plants were harvested on a trip to recover the costs and make a profit. Fifty-kilogram size bags of plants are sold in the market for between R80 and R120 (or more, depending on the species). Therefore, each gatherer and trader would have to transport at least 3 bags to justify the expense. The additional costs of plant cultivation are, therefore, important in the affordability equation if plant supply is to ideally shift from wild collected to cultivated in origin.

¹⁵ R80pp and R12/bag are 2001 prices. The cost increased to R90pp and R15/bag towards the middle of 2002. Similarly, taxi costs were R110pp in 2001, and increased to R120-R150pp in 2002. No prices were obtained for 2003.

Photo 7.1 One of the buses that arrive in Faraday on a Friday loaded with recently harvested plants.

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8.1 Introduction

An objective of the survey was to quantify the amount of plant material traded, and the value thereof. The assessment assists with determining the demand for certain species, the size and value of the trade for wild-collected medicinal plants in the Johannesburg area, the degree to which potentially cultivated sources would have to compete, and the potential risk to species should the harvesting patterns continue. Mander [1998] estimated that consumption in Durban is around 1,500 tonnes per annum, assuming that 84% of the black population uses medicines at 216.5g per use. Durban shop traders were estimated to trade 340 tonnes per year, and street traders 880 tonnes per year (physical stocks of plants entering the street markets in a year) [Mander 1998].

The survey of the Faraday market was comprehensive and extensive. Through information collected during the street trader survey, the customer survey and the return visit to the market several months later, it was possible to differentiate between plant part types as they relate to trade variables and dynamics - for example the proportion of weekly sales and the likely value thereof, and the average mass of the purchases. In this way, the methods used to evaluate the annual quantity and value of species traded in Faraday is different from other studies that do not differentiate between plant part types. The advantage of these methods is greater refinement in the information. Studies as detailed as Faraday are, however, not always possible due to time and budgetary constraints. It is believed that some of the data presented here will greatly assist with future evaluation of data in other studies.

8.2 Units and Quantities of Plant Sales to Customers

Species are normally sold to customers in units of R5; the quantity varies depending on the species and the size of the individual plant parts. As prices increase over time, the quantity per unit generally stays the same (except if the species is scarce, and then the quantity decreases and the plant sizes get smaller/thinner). During the brief survey of Faraday in 1995, similar quantities were sold for R2-R3 instead of R5 in 2001/2002. Box 8.1 describes the quantity sold for R5, and the variations in quantity for scarce species and different plant-part type. These data have been used in volume and value calculations throughout the report.

Box 8.1 Quantities of R5 plant sales in Faraday, and the mass thereof

Plant Part	Non-scarce species: one R5 purchase unit equates to:	Mean mass of R5 sale	Scarce species: 1 unit is R5, but the quantity is reduced by ½ to ⅓
Bulbs	1-2 handfuls; 6 ± 2.3 bulbs, depending on size and species	1.089 kg	Smaller bulbs or half the handful amount
Bark	2 handfuls / 1 bundle; ± 7 large pieces	0.553 kg	Half the mean mass amount, and the bark is thinner
Roots	1 bundle of varying size depending on species	0.519 kg	Sell pieces of roots, or smaller bundles
Tubers	2 handfuls; 4 ± 2.4 pieces depending on species and size	0.850 kg	Smaller pieces
Stems	1 bundle; ± 10 pieces, depending on species and size	0.695 kg	Smaller bundles
Leaves/stems			
• <i>Helichrysum sp.</i>	• 1 bundle is R5, whereas a large roll is R15	0.168 kg	Smaller bundles or handfuls
• Other species	• 2 handfuls or 1 bundle		
Fruit	1 handful; 7.3 ± 2.9 individuals, depending on size and species (e.g. <i>Solanum</i>)	0.260 kg	Half the amount of individuals
Whole plant	1 bundle (e.g. <i>Scabiosa columbaria</i>)	0.200 kg	Smaller bundles or twice the price
<i>Siphonochilus sp.</i>	Few individual rhizomes	-	0.080 kg for R10; no R5 sales
<i>Encephalartos sp.</i>	Few chopped up pieces of cone	1.095 kg	

Comparing Rand per kilogram values: the mass sold to a customer for R5 is disproportionately lower than the quantity sold for R10 (compare Box 8.4). Twice the price does not necessarily mean twice the volume; on average, the mass is 4.4 times more for R10 sales. Clearly, traders could make more Rand per kilogram ‘profit’ if they had more R5 sales, but the smaller relative volumes would mean that the stock lasted longer and wasn’t as fresh. A trade-off for selling larger volumes at a lower price, however, is quicker replacement of stock, and hence fresher material for sale. Considering that many traditional healer customers considered quality an important issue, and most of the wastage in the market occurs when plants become too old/rotten to sell, the larger sales (i.e. R10 or more) are important in the market dynamics. Previously in Figure 4.15, the frequency of sales greater than R5 is shown. R5 sales account for 62.3% of the customer purchases; R10 sales account for 20.1% of the purchases; R11-R15 sales for 1.0%; R20-R24 sales for 3.1%, and sales of greater than R25 account for 12.4% of the customer purchases. According to most traders, sales of greater than R25 occur about once a week. For traders with larger amounts of stock, this accounts for at least ½ - 1 sack per week valued at a minimum of R50 to R100, depending on the species. For some traders with larger stalls, the frequency of sales larger than R25 is higher.

8.3 The Wholesale Value of 50kg-Size Sacks

The wholesale value of species bought by traders from the gatherers generally ranges between R60 and R100, depending on the species (Figure 8.1). Scarce species are usually more expensive per sack, or the same price is paid for half the volume. The range of values for the different plant-part types described in Box 8.2 has been used in the calculation of plant market values. Some species like *Helichrysum sp.* are sold in rolls and bundles of varying sizes rather than sacks. Roots from trees and shrubs are usually sold in quantities of less than 50kg-size sacks, the price of which varies depending on the species and the scarcity thereof. Very scarce species like *Siphonochilus aethiopicus* that are wild-collected in Mozambique, Swaziland or Mpumalanga are not to be found in quantities larger than ¼ of a checkers packet; the most one usually sees at a trader’s stall is no more than 10 rhizomes.

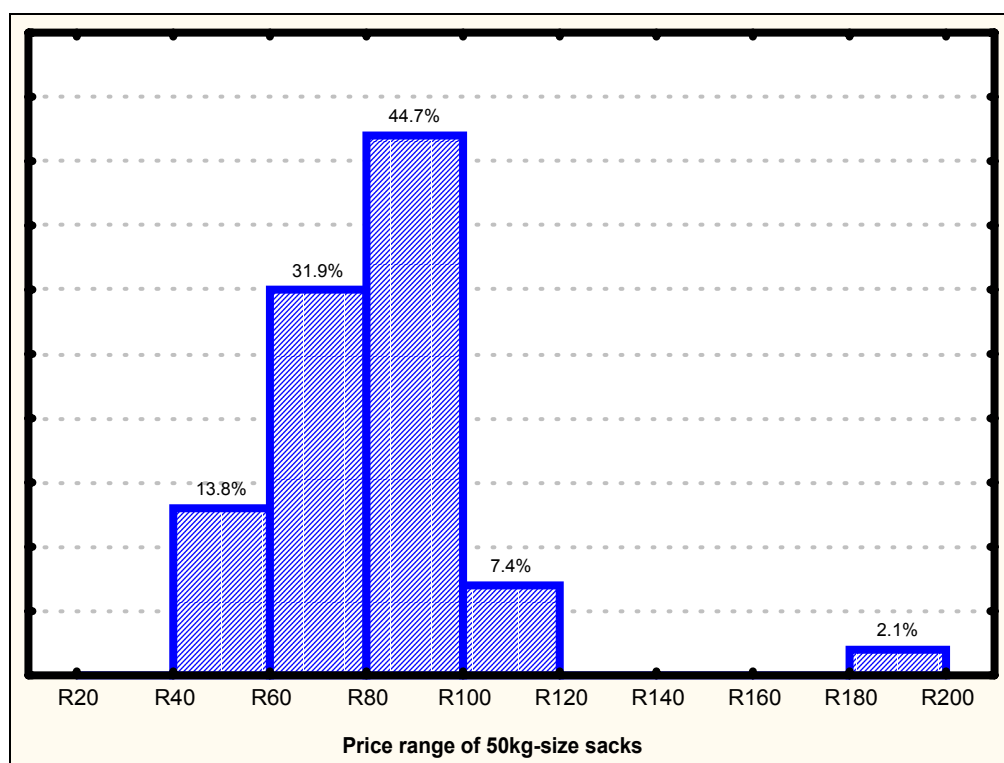


Figure 8.1 Range of wholesale prices paid for 50kg-size sacks by the traders buying from gatherers

Box 8.2 Wholesale price range of 50kg-size sacks bought by the street traders from the gatherers

Plant part	Mean	Std Dev.	Modal Range	Maximum cited
Bulbs	R84.80	± R19.60	R70 – R100	R120 – <i>Drimia sp</i>
Bark	R87.84	± R25.62	R70 – R100	R200 – <i>Warburgia</i>
Stems	R83.33	± R19.66	R60 – R100	
Leaves/stems	R90.00	± R15.49	R60 – R100	
Tubers	R83.67	± R27.71	R80 – R100	R110 – <i>Dioscorea</i>
Roots	Generally bought in a range of volumes less than a 50kg-size sack, usually ½ sack or less for R50-R100			
Whole plants	Generally not bought in 50kg-size sacks, but as bundles for R3 each or smaller volumes for R50 to R100			
Fruit	Generally bought as ½ a sack for R100 or less			
Total (all plant parts)	R89.26	± R24.33	R60 – R100	

8.4 The Quantity of Plant Material in Faraday During the Survey

8.4.1 Methods

Quantities of each ethnospecies for sale at the stall of every participant trader were recorded as a proportion of a sack or a ‘checkers’¹⁶ packet, for example ¾ checkers, or ½ a sack. The volumes were tallied for each species to give a total

¹⁶ The interviewers were required to make a rapid visual assessment of the volume of each ethnospecies sold by every trader interviewed. Visual estimation based on a recognisable volume was done so that the total volume of plants could be rapidly quantified for many traders. An assessment based on actual mass would have taken the survey longer. Estimating the proportion of a known volume is more expeditious and practical. A ‘sack’ is equivalent in volume to a 50kg maize sack; a ‘checkers’ is equivalent to a plastic shopping bag commonly given out at retail outlets. There are ± 3 sizes of ‘checkers’: the large bag was used to estimate the quantity on sale during the plant survey. Later, the small bag was used during the return visit to the market to estimate the mass of each plant part sold in a small ‘checkers’. Conversion factors between each representative volume were calculated (Box 8.3).

number of sacks and/or checkers packets on sale in the market during the survey. The number of checkers packets was thereafter converted to sacks to calculate the total volume (in sacks) of each species traded, and the total volume in the market. The conversion factors for converting checkers packets to sacks are described in Box 8.3.

Box 8.3 Conversion tables for sacks and 'checkers' packets

The relationship between sacks and checkers was calculated by filling up bags with homogenous leaf litter and weighing them on a scale that measures mass in 5g intervals. The calculation then assumed a 1:1 relationship between mass and volume (i.e. half the mass is equal to half the volume).

1 small checkers =	0.04378 sacks	1 sack =	22.84 small checkers packets
packet	0.40984 large checkers		9.36 large checkers packets
1 large checkers =	0.10684 sacks		
packet	2.44 small checkers		

Knowing the approximate mass of a sack (for a particular species) enables the calculation of the approximate total mass for the species traded, and hence all the plants in the market during the survey. To do this, two steps were taken:

- During Survey 3, the mean mass of 1 small checkers packet of each plant-part type (bulbs, bark, tubers, roots, leaves/stems, stems, fruit and whole plants) was calculated (Box 8.4)
- Using the conversion factors for checkers packets to sacks, the mass of the total number of sacks for each species was calculated.

Knowing the approximate mass of one checkers packet for the plant part types and the conversion factor for checkers packets to sacks enables the approximate mass of a sack to be calculated.

Box 8.4 Mean mass of a small checkers packet and 1 sack for specific plant part types

The mean mass of 1 checkers packet is an approximation for a range of species from scarce to popular (and hence small to large individual sizes and thicknesses). It is acknowledged that some species weigh more or less than the mean. The point here, however, is to reduce (where possible) under- or over-estimations in the calculations of mass when evaluating the whole market, especially where there are large differences in volume:mass ratios for different plant part types traded in different proportions in the market. One checkers packet of bulbs, for example, weighs 4.8kg compared to 0.46kg for 1 checkers packet leaves and stems. The mean mass of a checkers packet for all plant parts, however, is 2.46kg.

The average retail value of a small checkers packet is around R10 for bulbs, bark, leaves/stems, tubers and rhizomes; R11 for stems; and R12 for most roots and whole plants. Certain species, often scarce ones, are more expensive – for example, *Warburgia* bark is R20 for a small checkers packet; *Gunnera* roots are around R15; *Eucomis* bulbs can reach up to R25.

Plant part	Mean mass of 1 small checkers	Standard deviation	Conversion checkers → sacks x 22.84	Approx. mass of 1 sack
Bulbs	4.80kg	± 1.58kg		109.64kg
Bark	2.18kg	± 0.84kg		49.86kg
Stems	3.40kg	± 1.35kg		77.66kg
Leaves/stems	0.46kg	± 0.25kg		10.51kg
Tubers	4.44kg	± 2.21kg		101.60kg
Roots	2.18kg	± 1.42kg		49.77kg
Whole plants*	1.13kg	± 0.74kg		25.70kg
Fruit	2.03kg	± 0.74kg		46.25kg
Total (all plant parts)	2.46kg	± 1.48kg		58.73kg

* There is large variability in plant mass in the category 'whole plants'. Species range from *Scabiosa columbaria* and *Dianthus mooiensis* to *Haworthia limifolia* and *Ansellia gigantea*. The table is a guide for estimating mass, and where necessary, more appropriate values for the mass should be used (as they were during the calculations of volume and value in this study)

Summary of methods used to calculate the quantity of plant material in the market during the survey:

- Tally the total number of sacks and/or checkers packets from the survey for each ethnospecies;
- Convert the number of checkers packets to sacks using conversion factors in Box 8.3, and calculate the total number of sacks;
- Using the plant part conversion table for mean mass in Box 8.4, calculate the total mass of the sacks for each species, and hence the total mass and volume of plants in the market during the survey for 101 traders;
- Extrapolate these figures to the entire Faraday market for 164 traders.

8.4.2 The volume of plants present in Faraday during the survey

The total recorded volume of plants traded by 101 traders is 755.4 sacks. The mean number of sacks per species is 1.63 ± 2.92 (SD) sacks; the maximum number of sacks per species was for *Urginea sanguinea* at 24.9 sacks. The plants sold in the largest volumes are shown in Table 8.1. *Please note:* the estimates do not include the quantity of plants in storage.

Table 8.1 The species sold in the largest volumes (5 sacks or more between 101 street traders are listed).

Species: The total volume for all plants recorded in Faraday from 101 traders is 755.39 sacks	Total number of sacks
<i>Urginea sanguinea</i> / <i>Drimis</i> spp.	24.893
<i>Sarcophyte sanguinea</i>	18.977
<i>Albizia adianthifolia</i>	18.092
<i>Hypoxis</i> spp. (<i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	17.474
<i>Elaeodendron transvaalense</i>	16.054
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	13.189
<i>Acacia xanthophloea</i>	12.077
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	11.220
<i>Schotia brachypetala</i>	11.195
EP 6 (<i>Brachyleena discolor</i> ssp. <i>discolor</i> , <i>Hippobromus pauciflorus</i>)	10.729
<i>Helichrysum</i> spp.	10.602
<i>Rapanea melanophloeos</i>	10.169
<i>Scilla natalensis</i>	10.149
<i>Trichilia</i> spp. (<i>T. dregeana</i> , <i>T. emetica</i>)	9.803
<i>Urginea</i> spp. (incl. <i>U. alissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	9.332
EP 16 (incl. <i>Deinbollia oblongifolia</i> , <i>Maytenus acuminata</i> var. <i>acuminata</i> , <i>Myrica serrata</i> , <i>Nuxia floribunda</i>)	9.326
<i>Curtisia dentata</i>	9.164
<i>Adenia gummifera</i> var. <i>gummifera</i>	8.886
EP 20 (<i>Acridocarpus natalitius</i> ssp., <i>Spermacoce natalensis</i>)	8.705
EP 5 (<i>Gerrardina foliosa</i> , <i>Vernonia natalensis</i> , <i>Ziziphus mucronata</i> ssp. <i>mucronata</i>)	8.688
<i>Gunnera perpensa</i>	8.603
<i>Dombeya rotundifolia</i> var. <i>rotundifolia</i>	8.538
EP 29 (<i>Prunus africana</i> , <i>Rhus chirindensis</i>)	7.995
EP 1 (<i>Croton gratissimus</i> , <i>Gerrardina foliosa</i> , <i>Myrica serrata</i> , <i>Phyllanthus meyerianus</i>)	7.936
<i>Ekebergia capensis</i>	7.844
<i>Ornithogalum longibracteatum</i>	7.571
<i>Dioscorea sylvatica</i>	7.467
EP 17 (<i>Celosia trigyna</i> , <i>Crotalaria</i> spp.)	7.327
<i>Eucomis bicolor</i>	6.906
<i>Balanites maughamii</i>	6.898
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	6.535
EP 3 (<i>Acokanthera oppositifolia</i> , <i>Erythrophleum lasianthum</i> , <i>Margaritaria discoidea</i>)	6.329
<i>Maytenus undata</i>	6.276
<i>Rhoicissus tridentata</i> ssp.	6.084
EP 2 (<i>Berchemia discolor</i> , <i>Margaritaria discoidea</i> , <i>Ochna natalitia</i> , <i>Turraea floribunda</i>)	5.950
<i>Ptaeroxylon obliquum</i>	5.809
EP 31 (<i>Albizia versicolor</i> , <i>Pterocarpus angolensis</i> , <i>Trema orientalis</i>)	5.365
<i>Talinum caffrum</i>	5.087

8.4.3 The estimated mass of plants in Faraday during the survey

Using the conversion tables for calculating the mean mass per sack for plant part types (Box 8.4), the mass per species and the total mass of plants in the market for 101 out of 164 traders (61.6%) interviewed for the survey was calculated. The total mass of plants for sale by the surveyed traders was 44,365.57kg or 44.4 tonnes. This figure is not the total mass traded per annum because it only represents what was present in the market at the time of the survey. Table 8.2 lists the species present during the survey by the largest mass.

Table 8.2 Species present in the largest mass during the survey (500kg or more between 101 traders are listed).

Species	Total mass traded (kg)
Estimated total mass for all plants recorded in the market is 44.365.47kg or 44,4 tonnes	
<i>Urginea sanguinea</i> / <i>Drimia</i> spp.	2729.201
<i>Hypoxis</i> spp. (<i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	1915.744
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	1230.076
<i>Scilla natalensis</i>	1112.713
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	1023.116
<i>Sarcophyte sanguinea</i>	944.472
<i>Albizia adianthifolia</i>	902.099
<i>Ornithogalum longibracteatum</i>	830.082
<i>Elaeodendron transvaalense</i>	800.492
<i>Dioscorea sylvatica</i>	758.660
<i>Eucomis bicolor</i>	757.125
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	716.461
<i>Adenia gummifera</i> var. <i>gummifera</i>	690.107
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	657.629
<i>Acacia xanthophloea</i>	602.160
<i>Schotia brachypetala</i>	558.194
EP 6 (<i>Brachylena discolor</i> ssp. <i>discolor</i> , <i>Hippobromus pauciflorus</i>)	534.978
<i>Rapanea melanophloeos</i>	507.053

8.4.4 Summary, and extrapolation of quantity to 164 traders

The quantities presented in the previous Tables (8.1 and 8.2) represent the mass and volume of plants available for sale, or on display, by 101 traders during the survey. The amount of stored plant material was not recorded or quantified. The figures therefore represent the minimum quantity of plants in the market at any one point in time. Stocks, and the hence the quantity in the market, are depleted over the winter months when harvesting of summer annuals does not occur and the availability of many geophytes decreases. The 101 research participants represent 61.6% of the traders in the market, and Table 8.3 summarises the available quantities and the estimated likely minimum volume and mass in the market for the whole market at any one point in time, but more plausibly summer.

Table 8.3 Summary of the quantity of plant material on display in the market during the survey, and extrapolation of these figures to the entire market for 164 traders. These data do not account for stored plant material, and are therefore minimum quantities.

	Quantity recorded for sale (101 traders)	Estimated quantity in Faraday (164 traders)
Number of sacks	755.39 sacks	1 226,6 sacks
Estimated mass	44 365.37 kg or 44.4 tonnes	72 038,8 kg or 72.0 tonnes

8.5 Estimated Annual Quantity of Plants Traded in Faraday

The annual quantity of plants traded in Faraday can be estimated according to the frequency and volume of either wholesale purchases or retail sales. The latter method was chosen because certain data for wholesale purchases was not available. The format for calculating the quantity sold per annum is adapted from Mander [1998] and the result (Table 8.4) is consistent with the quantity expected to be traded in a market with fewer traders compared to Durban. The total minimum quantity sold annually in Faraday is 491 tonnes $\pm$ 851 tonnes. These quantities exclude potentially larger purchases from the muti shops. Assuming that the rate of large plant sales per trader in Faraday is at least 1½ sacks per month (for traders with larger stalls this is a lot more), and the mean mass of a sack is 58.73kg, then larger sales to muti shops and other buyers could account for an additional 154,1 tonnes per annum (valued at R234 218).

Table 8.4 Estimated quantity of plant material sold in Faraday per annum (Method adapted from Mander [1998]).

Based on trader estimates of quantities sold per week		Mean	Standard Deviation
Mean number of sacks sold per week per trader*	A	0.98 sacks	$\pm$ 1.70 sacks
Average mass of 1 sack (not plant part specific)	B	58.73 kg	58.73 kg
$\therefore$ Ave. mass per year per trader	$C = A \times B \times 52$	2 992.89 kg	$\pm$ 5 191.73 kg
Number of street traders	D	164	164
$\therefore$ Total minimum quantity sold per annum	$E = C \times D$	490 832.45 kg / 490.8 tonnes	$\pm$ 851 444.05 kg / $\pm$ 851.4 tonnes

* From Question 20, Street trader survey

8.6 The Estimated Value of Plant Material in Faraday During the Survey

8.6.1 Methods

The value of the plants for sale in the market during the survey was calculated in several comparatively different ways, depending on the wholesale or retail value:

- Wholesale value 1*: the method took into consideration the cost of buying a sack of plants (plant part specific¹⁷) and therefore estimated value according to volume (see Box 8.2) for all recorded ethnospecies. The results for 26 ethnospecies are shown in Table 8.6.
- Wholesale value 2*: based on the mean value of a 50-kg size bag, and the total number of sacks
- Retail value 1*: based on the potential number of purchases from the mean mass of a R5 sale, depending on the plant part (from Box 8.1), for each ethnospecies
- Retail value 2*: based on the price and mass of a checkers packet, depending on the plant part (from Box 8.4), for each ethnospecies.

The point of using at least two methods each for estimating wholesale and retail value is to corroborate the values and present the potential minimum range of values.

8.6.2 Estimated wholesale value of the plant material in Faraday during the survey

The total estimated wholesale value of plants traded between 101 traders is shown in Table 8.5. The value ranges between R67,400 $\pm$ R18,400 and R73,700. The plants with the highest wholesale value are shown in Table 8.6.

¹⁷ The value of species traded in medicinal plant markets is related to the plant part sold and the scarcity/popularity of the species. For the purposes of this study, the estimation of value did not specifically take the effect of scarcity into account, but the mean value of the volumes was calculated using both perceived scarce and non-scarce species and therefore value variabilities are generally accounted for.

Table 8.5 Estimation of the total wholesale value of the plants recorded (on display) during the survey of 101 traders.

Method 8.6.1 (i) Based on total mean value of a 50kg-size sack for different plant parts for each species Total value (Table 8.6 shows the results for 26 out of 319 ethnospecies)		Value R73 746.84	
Method 8.6.1(ii) Based on total number of sacks, and mean value of a 50kg-size sack		Mean	Std Dev.
Total number of sacks	A	755.39	
Mean value of a 50kg-size sack	B	R89.26	± R24.33
∴ Total minimum wholesale value of the species recorded for 101 traders	C = A x B	R67 426.11	± R18 378.64

Table 8.6 Estimated minimum wholesale values based on the cost of a 50kg-size sack for species traded by 101 traders. Only species with values greater than R700 are listed.

Species Estimated total value is R73 746.84	Minimum wholesale value
<i>Urginea sanguinea</i> / <i>Drimys</i> spp.	R 2,987.19
<i>Sarcophyte sanguinea</i>	R 2,277.20
<i>Albizia adianthifolia</i>	R 1,589.21
<i>Hypoxis</i> spp. (<i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	R 1,481.77
<i>Elaeodendron transvaalense</i>	R 1,410.21
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	R 1,158.53
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	R 1,121.96
<i>Acacia xanthophloea</i>	R 1,060.81
EP 20 (<i>Acridocarpus natalitius</i> ssp., <i>Spermacoce natalensis</i>)	R 1,044.57
<i>Schottia brachypetala</i>	R 983.36
<i>Helichrysum</i> spp. (<i>H. cymosum</i> , <i>H. decorum</i> , <i>H. epapposum</i> , <i>H. gymnocomum</i> , <i>H. natalitium</i> , <i>H. nudifolium</i> , <i>H. odoratissimum</i>)	R 954.14
<i>Gunnera perpensa</i>	R 946.38
EP 6 (<i>Brachylena discolor</i> ssp. <i>discolor</i> , <i>Hippobromus pauciflorus</i>)	R 942.46
<i>Rapanea melanophloeos</i>	R 893.26
<i>Trichilia</i> spp. (<i>T. dregeana</i> , <i>T. emetica</i>)	R 861.07
<i>Scilla natalensis</i>	R 860.65
EP 16 (<i>Deinbollia oblongifolia</i> , <i>Maytenus acuminata</i> var. <i>acuminata</i> , <i>Myrica serrata</i> , <i>Nuxia floribunda</i> , <i>Cunonia capensis</i>)	R 819.24
<i>Curtisia dentata</i>	R 804.97
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	R 791.35
EP 5 (<i>Gerrardina foliosa</i> , <i>Vernonia natalensis</i> , <i>Ziziphus mucronata</i> ssp. <i>mucronata</i>)	R 763.20
<i>Dombeya rotundifolia</i> var. <i>rotundifolia</i>	R 749.97
<i>Adenia gummifera</i> var. <i>gummifera</i>	R 740.50
EP 17 (<i>Celosia trigyna</i> , <i>Crotalaria</i> spp.)	R 732.73
<i>Rhoicissus tridentata</i> ssp.	R 730.08
<i>Warburgia salutaris</i>	R 728.02
EP 29 (<i>Prunus africana</i> , <i>Rhus chirindensis</i>)	R 702.26

8.6.3 Estimated retail value of the plant material in Faraday during the survey

The estimated retail values of the species in Faraday vary, depending on the method used to calculate the value (Table 8.7). As mentioned in Section 8.2, R5 sales have higher Rand per kilogram returns and this is reflected in the higher estimated values based on this method (Method 8.6.1 iii) compared with larger volume sales for a lower relative price. Considering that 62% of sales are for R5 purchases, and 20% for R10 purchases, the actual retail value is between the estimated ranges. 'Retail value 2' also gives the closest approximation to the traders weekly/monthly reported incomes.

Table 8.7 Estimation of retail value of the plants on display in the market during the survey of 101 traders.

Method 8.6.1 (iii) <i>Based on the potential number of purchases from the mean mass of a R5 sale for each species</i> Total retail value 1	Value R364 752. 50
Method 8.6.1(iv) <i>Based on the price and mass of a checkers packet for each species (approx. R10 per checkers)</i> Total retail value 2 (better approximation for weekly income)	R190 686.90

8.6.4 Summary, and extrapolation of value to 164 traders

The wholesale and retail value of plant material for sale in Faraday at any one time is summarised in Table 8.8. These values would vary seasonally and depend on the volume, diversity and quality of plant material for sale. Wholesale values range between R109,500 and R139,000, whereas retail values are between R309,600 and R592,300. These data do not account for the value of the stored plant material, or the value of very large sales to muti shops or other big spenders.

Table 8.8 Summary of the wholesale and retail value of plant material on display in the market during the survey, and extrapolation of these figures to the entire market for 164 traders. These data do not account for stored plant material, and are therefore minimum values.

	Value of plants on display (101 traders)	Estimated value in Faraday (164 traders)
Wholesale value 1	R73 747	R120 019
Wholesale value 2	R67 426 ± R18 379	R109 733 ± R29 910
Retail value 1	R364 753	R593 617
Retail value 2	R190 687	R310 336

8.7 Estimated Annual Value of Plants Traded in Faraday

The annual value of the trade in Faraday was calculated in three ways, namely:

- The average wholesale value of a sack
- The retail value based on the potential number of R5 sales (see Box 8.1)
- The retail value based on the potential number of checkers packet sales (see Box 8.4)

The annual wholesale value of the plant material purchased by the Faraday traders is estimated to be at least R746,000. The annual retail value, depending on the methods used to calculate it, is between R4,720,00 and R2,223,000 (Table 8.9), excluding the value of stored plants and the occasional large sales from muti shops and other buyers (which is estimated to be at least R234,218).

Table 8.9 Estimated annual wholesale and retail value for plants sold in Faraday, excluding the value of stored plant material. The shaded blocks are a comparative measure of estimated weekly income.

Annual wholesale value					
Number of sacks sold/trader/week		A	0.98 sacks		
Number of sacks sold/trader/year		B = A x 52	50.96 sacks		
Number of traders		C	164		
Number of sacks sold in Faraday per year		D = B x C	8 357.44 sacks		
Average wholesale value of a sack		E	R89.26		
∴ Annual wholesale value		F = D x E	R745 985		
Annual retail value					
Method 8.7 (ii) Based on potential number of R5 sale			Method 8.7 (iii) Based on potential number of sales of a small packet (± R11.14)		
No. sacks sold/trader/week		A	0.98 sacks		
Ave. mass of a sack		B	58.73kg		
∴ Ave. mass sold/trader/week		C = A x B	57.56kg		
Average mass of R5 sale		D	Average mass 1 checkers packet		D
Potential number sales/trader/week		E = C/D	Potential number sales/trader/week		E = C/D
Potential value of sales/trader/week		F = E x R5	Mean price of checkers packet		F
Potential value of sales/trader/annum		G = F x 52	Potential value of sales/trader/week		G = E x F
Number of traders in Faraday		H	Potential value of sales/trader/annum		H = G x 52
Potential value retail sales in Faraday per annum		I = G x H	Number of traders		I
		R4 720 248	Potential value of retail sales in Faraday per annum		J = H x I
					R2 223 020

The actual annual value of sales in Faraday is 6.7 to 7.4 times higher than the value of the market at any one time. If only 62% of sales are for R5 purchases, then Method 8.7(ii) (R4,720,248) indicates the upper-end of the retail market value because of the higher Rand per kilogram value associated with such purchases. This apparent quantity- versus quality-related value is an important dynamic in the market. Calculation of the annual retail value based on the number of sales of checkers packets is a closer approximation of the trader's cited monthly income (shaded blocks in the table).

8.8 Verification of Monthly Reported Income

Previously in Section 5.4, the reported weekly/monthly incomes of the traders in Faraday was verified as a function of their cited weekly expenditure, where expenditure was viewed as an indicator of minimum gross income before plant part purchases (Method A). Results showed average cited weekly incomes to be between R150 and R200, compared to minimum weekly expenditure of $R121.1 \pm R175.5$. Based on the degree to which incomes were under-reported and the inclusion of plant purchases, the majority of traders are expected to earn between R200 and R300 per week (compared to R200 as cited by the traders). Based on the calculations for annual retail value of the market (shaded blocks of Table 8.9), the potential weekly value of sales (as an indicator of income) is between R554 and R261. Method 8.7 (iii) therefore gives a closer approximation mean weekly income, and hence annual retail value of the trade.

In Table 8.10, Method B (expected value of weekly retail sales given the number of customers per week and the frequency of plant purchases within specific price ranges) is further expanded to show the effect of including or excluding the occasional high value customer plant purchases (i.e. large sales such as to *muti* shops) on the estimation of the traders' weekly incomes. When high value sales are taken into account, the fewer traders are expected to earn less than R200 per week. As with the other methods, however, most weekly incomes are expected to be up to R200,

with the median between R200 and R300 per week. The traders were generally accurate in predicting their weekly income, and estimates based on retail value and expenditure were within similar ranges.

Table 8.10 Comparison of the weekly income cited by the traders, with income estimates based on retail sales (Method B). One estimate includes the frequency and value of large sales in the calculation (i), and the other method excludes it (ii).

Weekly income	Cited weekly income	Estimated weekly income based on frequency of retail sales	
		(i) Excluding large sales	(ii) Including large sales
Less than R100 per week	48.4%	39.8%	17.2%
R100-R200	28.4%	26.9%	40.9%
R201-R300	8.4%	10.0%	8.6%
R301-R400	2.1%	3.2%	10.0%
R401-R500	5.3%	1.1%	3.2%
R501-R600	2.1%	1.1%	-
+ R601	1.1%		2.2%
No answer	4.2%		

9 TEMPORAL DYNAMICS OF THE FARADAY MARKET

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9.1 Introduction

In addition to the time-related factors that have been described in previous chapters, such as frequency of plant collection trips or return visits (Chapter 5) and plant supply (Chapter 7), there are other key factors within the market that characterise and influence the supply and demand chain. These factors include:

- Temporal variability of business within the market
- Age of plant material in the market
- Frequency of plant purchases related to specific plant-part types

Temporal variabilities within the market are important for market-related cultivation and conservation strategies. For example, setting targets for supplying the market with plants during the times of the year when the market is busiest and traders are most likely to buy plants is a ‘better’ business practise.

9.2 Temporal Variability of Business within the Market

Patterns of customer spending in the market are evident through the trader’s perceptions of busy and slow periods within the market. The busiest days of the week are Fridays (when some workers are paid and do their shopping), and to a certain extent on Saturday because people are not working. The slowest days are during the working week and on Sunday (Table 9.1). The general perception is that the end of the month is the busiest after payday (Table 9.2). The slowest times are a just after paydays and again towards the middle of the month.

Table 9.1 Trader’s perceptions of the busiest and slowest days of the week.

Busiest days	Percent traders	Slowest days	Percent
Friday	55.6%	Monday to Thursday	79.2%
Saturday	13.9%	Friday	1.8%
Weekend	4.6%	Saturday	3.6%
Other days of the week	6.5%	Sunday	6.7%
No difference	9.3%	No difference	4.0%

Table 9.2 Trader’s perceptions of the busiest and slowest days during the month.

Busiest times of the month	Percent	Slowest times of the month	Percent
End of month (25 th – 31 st)	54.7%	Middle (15 th – 21 st)	26.8%
End to beginning (25 th – 5 th)	10.9%	Beginning of the month (1 st – 5 th)	25.4%
Beginning (1 st – 5 th)	6.3%	Other times	8.5%
Other times	7.8%	No difference	18.3%
No difference	20.3%		

The busiest time of the year is usually November and the first week or two in December before people go on holiday and return ‘home’ (Table 9.3). After the winter period, many of the geophytes have started to appear in the veld, and the market is full of freshly harvested plants. The slowest period in the market is from the middle of December to February, before people arrive back at work. Interestingly, wintertime (June and July) is regarded as both a slow and busy period

in the market: a busy time because winter illnesses are on the increase, and a slow time because of the decreased availability of freshly collected geophytic and annual plants (except for those that have been stockpiled).

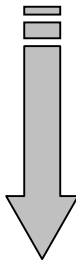
Table 9.3 Trader's perceptions of the busiest and slowest times of the year.

Busiest times of the year	Percentage	Slowest times of the year	Percentage
January	3.9%	January	23.4%
February	2.3%	February	5.1%
March	4.7%	March	2.2%
April	2.3%	April	4.4%
May	0.8%	May	2.9%
June	9.4%	June	
July		July	11.7%
August	3.1%	August	4.4%
September	1.6%	September	2.9%
October	4.7%	October	1.5%
November		November	0.7%
December (usually first 2 weeks)	21.1%	December	3.6%
No difference	3.2%	No difference	10.2%

9.3 Age of Plant Material in the Market

As part of the plant survey, traders were requested to indicate when they had purchased or collected each plant they were selling. In total, the age of plants at each stall was recorded for just fewer than 900 plants. The results showed that, not so coincidentally, the plants most recently bought/collected had the least longevity and most perishability and were therefore bought/collected more often (Table 9.4). This fact was validated when, during the return visit to the market (Survey 3), traders were asked to indicate how frequently they purchased plant-part types (Table 9.5).

Table 9.4 Mean age of plants in the market, listed in order of the most recently collected/purchased plants to the oldest plants. These data are more appropriate for summer conditions in the market because seasonal variations in harvesting would mean that plants sold in winter would be relatively older, or not available.

Plant Part	Mean age – months	Mean age – weeks & days	Most perishable
Tubers	0.7	2 weeks, 4 days	
Whole plants	0.9	3 weeks, 4 days	
Fruit	1.2	4 weeks, 5 days	
Bulbs	1.2	4 weeks, 4 days	
All plants	1.2	4 weeks, 6 days	
Stems	1.3	5 weeks, 0 days	
Root	1.4	5 weeks, 3 days	
Bark	1.5	6 weeks, 1 days	
Leaves/stems	1.6	6 weeks, 3 days	
			Least perishable

On average, plants in the market are 5 weeks old. Tubers are the most recently collected plants (2 weeks and 4 days), and long lasting leaves/stems like *Helichrysum* were bought/collected less recently (6 weeks and 3 days). It could be argued that the 'youngest' plants are in the most demand, but it is likely that because they are more perishable that the quality declines quicker and therefore they have to be bought more often – hence the increased demand. Species most in demand are generally bulbs, roots and bark but they have longer shelf lives (relative to tubers such as *Dioscorea*) and hence they are 'older' in terms of their age in the market. Plant age in the market does not, therefore, necessarily indicate consumer demand related to species-specific preferences, but a need for replacement based on decreased quality of plant-part types. It is also the more perishable plants that are more likely to be thrown away, hence contributing to the wastage that occurs within the market.

9.4 Frequency of 50kg Plant Part Purchases

During the return survey, traders were asked to indicate how frequently they bought 50kg-size sacks. The sample size was less than 30 traders. Because many traders with smaller stalls do not purchase plants in that volume, the results do not indicate the overall frequency of plant-part purchases – only 50kg-size sacks. It is common for traders with smaller stalls to purchase more frequently plants such as roots and stems in volumes such as $\frac{1}{3}$ of a sack, rather than full sacks. Fruits are generally bought individually or in small packets, and leaves/stems such as *Helichrysum* are bought in bundles or small quantities. Bulbs, bark and tubers and usually sold in 50kg-size sacks. Therefore, the results are influenced by the quantity in which the plant parts are generally sold, the demand and the perishability of the plant part (Table 9.5). Overall, however, there is still a tendency for more perishable plants to be bought more often. Leaves, stems, roots and fruits are not purchased that often in 50kg-size sacks because they are not usually available in those quantities.

Table 9.5 Average frequency of purchase of 50kg-size bags. Because many traders buy plants in smaller quantities, these results are not indicative of overall purchase frequency but only of 50kg-size sacks. (Please read the preceding paragraph).

Plant Part	Average purchase frequency of 50kg-size sacks	Average age – weeks & days
Tubers	Once every 1.2 months	4 weeks, 5 days
Whole plants	Once every 1.7 months	6 weeks, 5 days
Bulbs	Once every 2.3 months	9 weeks, 1 days
All plants	Once every 2.5 months	10 weeks, 0 days
Bark	Once every 2.7 months	10 weeks, 5 days
Leaves/stems	Once every 2.8 months	11 weeks, 1 days
Stems	Once every 4 months	16 weeks, 0 days
Root	Once every 4 months	16 weeks, 0 days
Fruit	Once every 4.4 months	17 weeks, 4 days

10 PERCEPTIONS OF PLANT AVAILABILITY, CONSERVATION & CULTIVATION

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The knowledge and perceptions of resource users provide beneficial insights into the perceived risks of harvesting plant resources and the acceptability of cultivated sources of plants. This in turn assists with the development of conservation and resource management proposals. There is a large market for medicinal plants, and resulting pressures on plant populations have reduced the availability of some species, but not necessarily the demand and size of the market for them. The acceptability of cultivated plants is important to the success of cultivation initiatives and any other proactive steps taken to providing alternatives to wild-collected sources, as well as limiting the harvesting pressures.

Any promotion of cultivated plants needs to proceed with caution, as this may lead to the loss of income to thousands of people deriving an income from the wild collection of plants. One way of conserving wild medicinal plants may be to ensure that the commercial value of the resources (wild and cultivated) provides an economic incentive to the harvesters to conserve the areas in which the plants grow [Lange 1998].

10.1 Perceptions of Plant Availability¹⁸

Over one-third of Faraday traders believe that current plant scarcities are related to the harvesting of plants for the trade, bad harvesting practices and the need for people to earn a living by this activity through gathering and/or trading in the market (Table 10.1). Sixteen percent of the traders are of the opinion that natural disasters and environmental restrictions result in plant scarcities; whilst “white farmers especially the Boers” are blamed for fencing the land and restricting access to badly needed plant resources. A further 14% of the traders do not accept that plant scarcities are possible, with some traders believing that it is their access to transport that limits their ability to collect plants from far away sources. It is interesting to see how some traders do not perceive that declines in plant availability are a result of over-harvesting – even though they have to broaden their search for plants that were once proximate to their traditional collecting sites.

Table 10.1 Trader perceptions of plant availability and scarcity (Q25).

Perceptions	% of Traders
Plant scarcities not possible or a reality	14.4%
Environmental and ecological restrictions (e.g. poor soil quality, drought, heat, flooding, seasonal availability, habitat restrictions, natural scarcities)	16.3%
Too many gatherers harvesting large quantities	14.4%
Bad harvesting techniques (e.g. ring-barking; removal of whole plant) and ignorance	7.7%
Too many people selling in the markets	5.6%
Over-utilisation and over-harvesting	5.6%
Certain species only available outside SA in other countries	3.9%
Restricted access to land (e.g. ‘Boer farmers fencing it off’)	3.8%
Farming practices that restrict access and availability (e.g. burning and ploughing)	2.9%
Difficulty accessing transport to sites	2.9%
Other	6.7%
Don’t know or don’t care why plants are becoming scarce	9.6%
No answer to the question	5.8%

When asked what measures they would take to ensure future plant availability (for either use or retail), 19% of the traders replied “nothing”; 5% believe that plant scarcity is impossible, and 30% said that they practised less destructive harvesting techniques (e.g. not ring-barking trees, rotating visits to sites) or plant preservation at the market (13.3%) (Table 10.2). Only a few traders mentioned that they would cultivate, or encourage cultivation, to meet their needs. Of

¹⁸ The individual answers of all the respondents to Questions 21 to 27 are provided in the Supplement document. The customer’s responses to some of these questions are described in Sections 4.5 and 4.6

concern were the 11% of the respondents who believed that harvesting and buying greater quantities plants was a way of ensuring they had plants to sell in the future. Clearly, some traders are aware of the long-term benefits of conservation action, but others have the narrow view that stockpiling is a short-term answer to their long-term needs should they continue to trade.

Table 10.2 What traders would do to ensure future plant availabilities (Q22).

Perceptions	% of Traders
Nothing	19.0%
Buy plants in bulk and order more from the gatherers	10.5%
Nothing: plant availability in the market depends on the gatherers	7.9%
Plant scarcity is not possible	4.8%
Practice less destructive forms of harvesting (e.g. rotate visits to sites, leave some plant parts behind)	28.6%
Limit wastage by using plants carefully, preserving them, keeping them clean and making sure they don't rot	13.3%
Cultivate or encourage cultivation	2.9%
Ask guidance from the ancestors	2.9%
Don't know	2.3%
No answer to the question	7.9%

The first two questions relating to perceptions of plant availability (Tables 10.1 and 10.2) focussed on *why* plant shortages were occurring, and what the traders could do. The idea was to see if plant availability was perceived to be related to over-utilisation and whether the traders were prepared to do something to ensure a continuous supply (and hence their continuance in the market as a trader). The last question (Table 10.3) was aimed at finding out what they perceived their alternatives to be, should plants become unavailable. This is important to know because some sustainable use and management programs have social costs to stakeholders in the trade, and the trader's perceived ability to survive plant shortages indicates their flexibility and adaptability within an unstable market.

When questioned on what they would do if certain plants were no longer found in the bush, the majority of traders (52.7%) responded that they would do nothing – mainly because they believe that plant scarcities and alternative employment are not possible (Table 10.3). The remainder of the traders believe that they can accommodate plant shortages (through adaptation) and continue trading because they have no alternatives. A number of traders indicated that they would seek alternative employment and stop selling plants. Clearly, most traders do not consider alternative employment outside of gathering/selling plants for the market. It is worth noting that the 52.7% of traders who would do nothing if plants become unavailable, corresponds with the 53.7% of traders in the market who are not traditional healers. Traditional healers in the market clearly have greater flexibility, whilst non-healers with no additional job skills are at high risk. The social costs to plant management programs will be highest in this sector of the trade.

Table 10.3 What traders would do if certain plants were no longer available (Q27).

Perceptions	% of Traders
Nothing, plant scarcities not possible	10.0%
Nothing, alternative employment is not possible	11.8%
Become unemployed and destitute	11.8%
The job would become very difficult	10.9%
Go back home (to KZN)	0.9%
Order plants from other countries and gatherers with the plants	23.6%
Practice less destructive harvesting	6.4%
Find alternative employment and/or stop harvesting/selling	5.9%
Cultivate or encourage plant cultivation	3.6%
Mix plants in a special way to overcome scarcities	1.8%
Continue my job as a sangoma	0.9%
Ask guidance from the ancestors	0.9%
Don't know	7.3%
No answer to the question	4.6%

10.2 Acceptability of Cultivated Plants

The success of cultivation depends on the attitudes of the traders, healers and customers to cultivated material [Cunningham 1997]. The plants would be competing in the market with wild-collected material, hence requiring the plants to be produced at relatively uninterrupted volumes (apart from seasonal limitations) and resale values that are cheaper than the wild-collected varieties. At present, however, few species can be cultivated at a low enough price or marketed at a high enough value to make commercial cultivation possible. Only a few high priced and/or fast growing species (e.g. *Siphonochilus aethiopicus*) are cultivated, and it is a likely scenario that some wild populations would have to decline further (hence increasing the market price) before cultivation becomes a viable option [Cunningham 1997]. This will be discussed further on in the report. An additional consideration on the perceived acceptability of cultivated plants is the ‘strength’ or efficacy of the medicine.

Eighty percent of the traders in Faraday would conditionally buy cultivated plants, but only if it is less expensive than the cost of harvesting the plants themselves or buying them from gatherers (Table 10.4). The effectiveness of a cultivated versus wild collected plant was a minor issue because healing people was more important to the traders. Plants are mostly used in combination, so mixing wild collected with cultivated plants can overcome any inevitable decrease in the quantity of active ingredient found in the cultivated plant. The 8% of traders who responded that they would not buy cultivated material believed the plants to be ineffective, unnatural and expensive.

Table 10.4 Acceptability of cultivated medicinal plants (Q23)

Perceptions	% of Traders
<i>Traders would buy cultivated plants only if:</i>	
The plants are cheaper	46.8%
They run out of wild collected stock and need plants to sell	29.9%
The plants become extinct or scarce	10.4%
To make sure there are plants in the future	3.9%
<i>Other answers:</i>	
I am already buying cultivated plants (one trader believed that some plants from Lesotho were cultivated)	6.5%
I would buy plants to support local farmers	2.6%
There's no difference between wild-collected and cultivated plants	5.2%

In trying to establish the acceptability of cultivated plants, it is necessary to establish whether the traders would be able to recognise the difference between a wild collected and cultivated plant. Only 40% said that they would recognise the differences, 29% said they could not tell the difference, 16% said that there is no difference, and 12% said that they weren't sure how to distinguish between the two. Table 10.5 lists the responses to the question of how a wild-collected plant is distinguishable from a cultivated plant. Most traders said that the lack of power in a cultivated plant was a recognisable difference, as well as the more ‘spread out’ and soft nature of the cultivated plant.

10.3 Perceptions of Plant Conservation

While no specific questions on perceptions of plant conservation were asked, perceptions on *why it is important to cultivate plants* gives insight into the perceived necessity to conserve utilisable resources. *Ex-situ*¹⁹ cultivation can be viewed as an act of conservation because it: 1) preserves genetic diversity and ensures long term survival, 2) reduces the pressure on wild collected resources, and 3) provides and maintains an alternative source of supply of plants to the market that is less threatening to plant populations, genetic diversity and habitat destruction.

¹⁹ *Ex situ* conservation can be defined as ‘conservation of a plant outside of its original or natural habitat’ [Anon 2001]

Table 10.5 Traders perceptions on how to recognise the difference between a wild-collected and propagated plant. (Q24).

Perceptions	% of Traders
<i>The main difference between wild-collected and cultivated plants is:</i>	
Cultivated plants have no power	17.1%
Cultivated plants are spread out, don't grow tall and the stems are soft	17.1%
The soils around the roots are different	8.6%
You can just tell by looking at them (requires experience and knowledge)	8.6%
Wild collected plants dry out quicker	8.6%
The water levels in the roots and stems are different	5.7%
Wild plants 'look natural'	5.7%
Cultivated plants are better cared for	5.7%
<i>You can also tell by the:</i>	
Size	2.9%
The leaves	2.9%
The taste	2.9%
Bark and stems which look different	2.9%
Polluted and poor quality of the cultivated plants	2.9%
Slow growing nature of cultivated plants	2.9%
Price of the cultivated plant (more expensive)	2.9%
You can't always tell the difference	2.9%

On the importance for cultivating or not cultivating medicinal plants, 74% of the traders gave reasons why the plants should be grown (Table 10.6) – the primary reason (35% of the traders) being that plants are important for healing people and hence need to be available for that reason. In addition, plants are a source of income to many people and growing them would enable them to earn a living. Only a few traders suggested that plant cultivation was important to prevent species extinctions and population reductions. The main reasons cited for not cultivating plants were that it is difficult to do so, and plants should only grow in the wild.

Table 10.6 Perceptions of conservation as it applies to the reasons why it is important to cultivate medicinal plants (Q26)

Perceptions	% of Traders
<i>Reasons to cultivate</i>	<i>(73.9%)</i>
To ensure a supply of plants that are necessary for healing diseases in humans and animals	34.8%
To have plants to earn a living with	12.2%
To ensure that plants don't become extinct or depleted	12.2%
To have nearby and ready access to the plants (and reduce the need to travel)	8.7%
To preserve traditional knowledge for future generations	2.6%
Cultivate only if they are no longer available in the bush	2.6%
<i>Reasons not to cultivate</i>	<i>(14.8%)</i>
Difficult to grow	3.5%
Plants should only grow in the wild	2.6%
Our culture does not grow plants	2.6%
Cultivated plants don't have the same strength as wild collected ones	1.7%
There is no reason to grow them	1.7%
Don't know / never thought about it	2.6%
No answer to question	11.3%

Limited acts of plant 'preservation' in the market contribute in a very small way towards *in situ*²⁰ conservation by limiting the volume of plants that are thrown away and hence the need to replace them by harvesting more. The quantity saved, however, is negligible when comparing the volumes harvested for the trade and the wastage that cannot be contained because of the informal nature of the market. Support from the Greater Johannesburg Metropolitan Council in 1996/97 contained previous mass wastages when traders were given lockers that enabled them to store the plants when

²⁰ *In situ* conservation is defined as the conservation of taxa where they developed their distinctive properties i.e. in the wild or in farmers (uncultivated) fields [Anon 2001]

they went home or on collecting trips instead of throwing the plants away. The provision of the lockers, however, encouraged the expansion of the Faraday market by providing storage facilities that encourages stock piling amongst those traders with lockers. Traders without lockers, however, tend to buy what they can sell within a shorter time period, and therefore their plant material is usually fresher. In addition, traders with lockers tend to sell more barks and roots – i.e. plants with a longer shelf life, whereas non-locker traders were observed to keep more bulbous material and are inclined to process it more (e.g. chop it up and/or make mixtures).

Plants are generally thrown away because they get too old or wet, and hence lose their value (medicinal and economic). Approximately 41% of the traders indicated that they threw plants away for various reasons. This amounts to about $\frac{2}{3}$ of a checkers packet per trader per week. It is difficult to judge whether this is a realistic figure or not. Significantly, there was no difference between the percentage of locker and non-locker traders who said they threw plants away (40% locker traders; 44% non-locker traders). An explanation for this is that (despite the storage facilities of the locker traders), all the traders display their plants in a similar way: i.e. spread out on the ground, with plastic to protect it during bad weather. Therefore, the degree of exposure to the elements is the same.

10.4 Plants Cited as Scarce and/or Popular

Perceptions of scarcity and popularity by the resource users are useful tools in setting conservation priorities. This knowledge is often gained from years of buying and selling plants, and can be verified against other sources of empirical knowledge so that perceptions of scarcity, for example, that may be an artefact of limited distribution can be distinguished from scarcity due to over-exploitation [Cunningham 1996a]. This knowledge can be used to highlight key indicator species [Williams *et al.* 2000].

Table 10.7 lists species most commonly cited by traders as scarce. Whilst citation numbers may be low, many of the species listed are traded in large volumes (e.g. *Urginea sanguinea* / *Drimia* spp., *Sarcophyte sanguinea*, *Elaeodendron transvaalense* and *Acacia xanthophloea*) and/or at high prices (e.g. *Warburgia salutaris*, *Siphonochilus aethiopicus*). In addition, some of these species are listed as endangered/protected by either the provincial conservation ordinances or the IUCN Red List. It is my opinion that most species listed in Table 10.7 represent an accurate account of key species threatened in the short and long-term by over-utilisation. Previous studies of the medicinal trade in South Africa have already indicated that trade in some of these species is not sustainable, and that they are at risk of over-exploitation.

Table 10.8 lists species most commonly considered to be popular (with the customers) in the market. Some of these species have already been cited as scarce by the traders (e.g. *Urginea sanguinea* / *Drimia* spp., *Elaeodendron transvaalense*, *Sarcophyte sanguinea*), whilst others may become scarce if current harvesting volumes and demand continues. Based on what is known about the populations for some of these species, they fall into high, medium and low risk categories. Hence any assessment of their vulnerability to over-utilisation needs to take into consideration their life-form and rate of regeneration as well as their known population biology and trade characteristics – however, this is a general principle for the assessment of all species traded in the market.

There is a clear relationship between the plant part being harvested, the impact on the plant, and the degree of disturbance to the population [Cunningham 1988]. The removal of whole plants, bulbs and roots is more damaging to populations than the removal of leaves, stems and bark – although the latter is species specific. Some species, for example *Elaeodendron transvaalense*, are sensitive to bark removal while other species are less so. Seventy percent of the species cited as scarce by the traders in Table 10.7 are either bulbs, roots or whole plants. This is an affirmation for the validity of the perceptions of the resource users. By contrast, 70% of the species in Table 10.8 cited as popular are harvested for their bark. Any assessment of risk therefore needs to take into consideration all known trade and biological factors as well as the perceptions of the resource users.

Table 10.7 Citations of species scarcity by the Faraday traders. Only species with 50% or more of the maximum number of citations ($n_{\max}=10$) are listed. The full list of species citations are in Appendix 3a.

Species	Plant part	Number of citations of scarcity
<i>Urginea sanguinea</i> / <i>Drimia</i> spp.	bulb	10
<i>Warburgia salutaris</i>	bark	10
<i>Sarcophyte sanguinea</i>	root	8
<i>Gunnera perpensa</i>	root	7
<i>Elaeodendron transvaalense</i>	bark	7
<i>Acacia xanthophloea</i>	bark	6
<i>Albizia adianthifolia</i>	bark	6
<i>Clivia</i> spp.	bulb	6
<i>Siphonochilus aethiopicus</i>	rhizome	6
<i>Hypoxis</i> spp.	bulb	6
<i>Acridocarpus natalitius</i> sspp. / <i>Spermacoce natalensis</i> (EP 20)	bark	6
<i>Croton</i> spp.	bark	5
<i>Rhoicissus tridentata</i> ssp. <i>tridentata</i>	root	5
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	bulb	5
<i>Olinia radiata</i>	root	5
<i>Crotalaria</i> spp. / <i>Celosia trigyna</i> (EP 17)	whole plant / root	6
<i>Thesium pallidum</i>	whole plant	5
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	bulb	5
<i>Callilepis laureola</i>	root	5
<i>Boscia</i> spp.	root	5

Table 10.8 Citations of popular species by the Faraday traders. Only species with 50% or more of the maximum number of citations ($n_{\max}=27$) are listed. The full list of species citations are in Appendix 3b.

Species	Plant part	Number of citations of popularity
<i>Elaeodendron transvaalense</i>	bark	27
<i>Urginea sanguinea</i> / <i>Drimia</i> spp.	bulb	27
<i>Albizia adianthifolia</i>	bark	23
<i>Acacia xanthophloea</i>	bark	23
<i>Schotia brachypetala</i>	bark	22
<i>Sarcophyte sanguinea</i>	root	19
<i>Adenia gummifera</i> var. <i>gummifera</i>	stem	17
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	bark	17
<i>Trichilia</i> spp.	bark	17
<i>Curtisia dentata</i>	bark	16
<i>Maytenus undata</i>	bark	15
<i>Deinbollia oblongifolia</i> / <i>Maytenus acuminata</i> var. <i>acuminata</i> / <i>Nuxia floribunda</i> / <i>Cunonia capensis</i> / <i>Myrica serrata</i> (EP 16)	bark	15
<i>Gerrardina foliosa</i> / <i>Phyllanthus meyerianus</i> / <i>Croton gratissimus</i> / <i>Gerrardina foliosa</i> (EP 1)	bark	14
<i>Hypoxis</i> spp.	bulb	14
<i>Prunus africana</i> / <i>Rhus chirindensis</i> (EP 29)	bark	13
<i>Rapanea melanophloeos</i>	bark	14
<i>Ekebergia capensis</i>	bark	13
<i>Vernonia natalensis</i> / <i>Ziziphus mucronata</i> ssp. <i>mucronata</i> / (EP 5)	bark	13
<i>Dioscorea sylvatica</i>	tuber	13
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	bulb	13

11 ASSESSMENT OF THE CONSERVATION STATUS FOR SPECIES TRADED IN FARADAY

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Unchecked and uncontrolled national exploitation of floral resources has resulted in significant decreases in plant population sizes for certain species with commercial and utility value, including medicinal flora. Utilisation of many of these species represents a source of income to some people, and may contribute to the country's fiscus [Bodasing & Mulliken 1996]. Legislation exists at provincial, national and international levels regulating the harvest of and trade in indigenous flora, and also characterises the conservation status of these species. While blatant infringements of these regulations do occur (e.g. harvesting of cycads), the listing of these various species within the various national and international ordinances and appendices draws attention to species that are candidates for research, management, and further protection within the ambit of conservation and sustainable utilisation programs. Limiting factors to implementing such ideals, however, include: outdated legislation; and, fragmented information concerning plant biology, ecology, and trade. In many cases, throughout the world, conservation measures for species are only begun once the species has already become threatened or endangered [Lange 1998]. It is recognised, however, that radical changes and challenges in South Africa's political landscape and priorities have resulted in conservation issues not being foremost in the minds of its policy makers. Many provinces are, however, actively engaged in revising their legislation.

11.1 Global Conservation Status: Red Data List

11.1.1 1997 Status

Approximately 13 (2.7%) species sold in Faraday are threatened according to the 1996/7 Red Data Lists [Hilton-Taylor 1996a, b; 1997] (Table 11.1). A further 20 species (4.2%) were characterised as either 'Insufficiently Known' or 'Not Threatened'. The global conservation status of *Siphonochilus aethiopicus* was characterised as 'Not Threatened', even though subsequent corrections to the Red Data List [Hilton-Taylor 1997] have listed the species as locally extinct in KwaZulu-Natal because *Siphonochilus* has not been collected in the wild since the turn of the century. The plant is cultivated in KwaZulu-Natal, but wild collected plants originating from Mpumalanga, Swaziland, Mozambique and Zimbabwe are sold in Faraday.

Thirteen species in Table 11.1 are protected in Gauteng according to the old Conservation Ordinance (Transvaal Nature Conservation Ordinance 12 of 1983). However, with the subdivision of the former Transvaal Province into four new Provinces only four of these species now occur within Gauteng, namely: *Bowiea volubilis*, *Eucomis autumnalis*, *Stapelia gigantea* and *Dianthus mooiensis* ssp *kirkii*, although *Dianthus sspp.* is not listed as protected by the Ordinance.

11.1.2 2002 Status

The Red Data List for plants in southern Africa has been revised according to the new IUCN Red List categories [Golding 2002]. The revised Red Data List status of taxa sold in Faraday is shown in Table 11.2. Only two species are considered threatened with extinction in South Africa, namely *Diaphanathe millarii* (Endangered) and *Mondia whitei* (Vulnerable). In the new IUCN classification²¹, a taxon is 'Endangered' when facing a high risk of extinction in the wild in the *near future*, as defined by a set of criteria (A to E). A taxon is 'Vulnerable' when facing a high risk of

²¹ Source: <http://www.redlist.org/>

extinction in the *medium-term future*, as defined by a set of criteria (A to E). In the case of *Diaphananthe*, the species is Endangered because of a severely fragmented distribution and a continuing decline in the extent of occurrence, occupancy and extent/quality of habitat. However, *Diaphananthe* is not specifically threatened by the medicinal plant trade. The species is one of at least 10 species of Orchidaceae sold under the name ‘*iPhamba*’, and other threats to *Diaphananthe* include heavy exploitation by orchid collectors and habitat modification resulting from alien plant infestations in forests [Scott-Shaw 1999]. *Mondia whitei* is Vulnerable due to observed population reductions (20% in 10 years) and a small/restricted number of mature individuals – a facet of the population compounded by increased collection pressure by harvesters. Neither of these species, however, is traded in large volumes in Faraday or considered to be scarce by the traders – however, in the case of *Mondia whitei* the low volumes are likely to be an artefact of decreasing availability.

Although not mentioned in the new IUCN listings for South Africa, Govender *et al.* [2001] reported from cited sources that *Eucomis autumnalis* ssp. was listed as Endangered by the IUCN Red Data categories. However, the Southern African Plant Red Data List [Golding 2002] only records *Eucomis* as being Vulnerable in Lesotho (Table 11.2). The source of Govender *et al.*’s [2001] information (“workshop notes”) was therefore not verified by the IUCN/Species Survival Commission Red List Authority. Victor [2002] only updated 20-25% of Hilton-Taylor’s work, and it is possible that many species were omitted because of time constraints or because they are not Red List species [Janice Golding *pers. comm.*]. In the assessment of rare and threatened plants in KwaZulu-Natal and neighbouring regions, Scott-Shaw [1999] categorises *Eucomis* as Vulnerable in the province (Table 11.3).

Golding [*pers. comm.*] is of the opinion that *Eucomis autumnalis* ssp. *clavata* is threatened in KZN and Lesotho, but at a national level it is not in any trouble now, hence the reason for no national listing of the species as endangered or vulnerable. According to Govender *et al.* [2001], mature bulbs of *Eucomis autumnalis* are becoming rare in muti markets and, until recently, the species was not threatened due to its widespread distribution in South Africa. However, increasing demands have resulted in a few sustainable populations for this species remaining within protected areas.

The inconsistency in data serves to highlight how plant risk needs to be assessed at a species-specific level once high-risk species in trade have been identified. Fragmented data (and access thereto) can hinder informed decision making processes, including the assessment of the Red List status of plants. Janine Victor, Neil Crouch (both from NBI) and Vivienne Williams are currently working together to revise the Red Data List status for medicinal plants traded mainly in the KwaZulu-Natal and Gauteng markets in South Africa.

In addition to listing Red Data plants in South Africa, Table 11.2 also lists those species sold in Faraday that have Red Data status in neighbouring countries. Species that have CR, EN or VU ratings in neighbouring countries that were cited as sources for plants sold in Faraday include:

- Lesotho: *Agathosma ovata* (VU); *Alepidea amatymbica* (VU);
- Swaziland: *Siphonochilus aethiopicus* (EN); *Warburgia salutaris* (CR);
- Mozambique: *Stangeria eriopus* (VU); *Warburgia salutaris* (VU).

In addition, two species recorded as Data Deficient, namely *Euclea undulata* and *Vitex rehmannii* were reported to be harvested in Swaziland.

Given that most plants sold in Faraday originate from KwaZulu-Natal, then the Red Data status of plants in KwaZulu-Natal [Scott-Shaw 1999] known to be sold in Faraday are important (Table 11.3). Most of the species listed as VU, CR and EN are traded in significant quantities from Faraday. The only plant in Gauteng with a Red List status within the Province is *Bowiea volubilis*, considered to be Low Risk – near threatened (Michele Pfab *pers. comm.*).

Table 11.1: Plant taxa sold in Faraday that have a conservation status according to the 1996/1997 Red Data List for southern Africa [Hilton-Taylor 1996a, b; 1997]. Abbreviations: 1) Provinces/Countries: KN = KwaZulu-Natal, T= Transvaal, O = (Orange) Free State, C = Cape; S = Swaziland; L = Lesotho; B = Botswana; N = Namibia. 2) Global conservation status: Ex = Extinct; E = Endangered, V = Vulnerable; R = Rare; I = Indeterminate; K = Insufficiently known; nt = not threatened. Species in **bold** occur within Gauteng.

Species	IUCN CONSERVATION STATUS*								GLOBAL STATUS (1997)*
	Old Provincial Boundaries				Neighbouring Countries				
	KN	T	O	C	S	L	B	N	
<i>Agathosma ovata</i>	nt			nt		K			nt
<i>Alberta magna</i>	R			R					R
<i>Ansellia africana</i>	V	nt			I		V	V	nt
<i>Begonia dregei</i> §	R			R					R
<i>Begonia homonyma</i> §	R			R					R
<i>Bowiea volubilis</i>	V	K	V	K	K				K
<i>Bridelia cathartica</i>	nt	nt				K		nt	nt
<i>Cassipourea flanaganii</i>				R					R
<i>Celtis mildbraedii</i>	nt			K					nt
<i>Clivia miniata</i> ∞		I			nt	K			nt
<i>Clivia nobilis</i> §	nt				nt				nt
<i>Dianthus mooiensis</i> sspp.		nt				K			nt
<i>Diaphananthe millarii</i>	R			R					R
<i>Elaeodendron croceum</i>					nt				nt
<i>Encephalartos</i> sp. §	Many species of <i>Encephalartos</i> are listed as either E, V or R								E, V or R
<i>Entada rheedii</i>	R								nt
<i>Eucomis autumnalis</i>§	V	nt	R		I	V	?		K
<i>Euphorbia woodii</i>	R			K					R
<i>Faurea macnaughtonii</i>	R	R		R	K				R
<i>Gardenia thunbergia</i>	nt				R	K			nt
<i>Gasteria croucheri</i> §	V				V				V
<i>Haworthia fasciata</i> §				R					R
<i>Haworthia limifolia</i> §					R				V
<i>Mondia whitei</i>	V					K			nt
<i>Noltea africana</i>					nt				nt
<i>Ocotea bullata</i> §	V	K			nt	?			nt
<i>Schlechterina mitostemmatoides</i>	V								nt
<i>Scilla natalensis</i> ∞	V	nt	V	?	?	V			K
<i>Siphonochilus aethiopicus</i> §†	Ex	E				I			nt
<i>Stangeria eriopus</i>	R			R	E				R
<i>Stapelia gigantea</i>§	nt	nt			R	K		nt	nt
<i>Strychnos mitis</i>	?	K		?	?				nt
<i>Warburgia salutaris</i>	E	E			V				V

* Source: Hilton-Taylor [1996a,b; 1997]. At that time, the old IUCN categories were used because many of the southern African data were too sparse to apply the new criteria and categories

† Hilton-Taylor [1996a] listed *Siphonochilus* as Endangered (E) in KwaZulu-Natal and former Transvaal, and Indeterminate (I) in Swaziland. The overall global conservation status of the species was listed as Not Threatened (nt). A subsequent correction to the conservation status of the species in KwaZulu-Natal listed *Siphonochilus* as Extinct (Ex) in the province [Hilton-Taylor 1997]. However, no change to the global conservation status of the taxon was recommended, hence the species is cited as Not Threatened in the above table.

§ Signifies a protected plant within Gauteng [Transvaal Nature Conservation Ordinance 12 of 1983]

Table 11.2: Southern African Red Data List status of taxa sold in Faraday, according to the Southern African Plant Red Data List [Golding 2002], for counties bordering South Africa. IUCN categories are as follows: CR = Critically endangered; EN = Endangered; VU = Vulnerable; LR-nt = Lower risk – near threatened; LR-lc = Lower risk – least concern; DD = Data deficient. Species in **bold** occur within Gauteng.

Species	SOUTHERN AFRICAN RED DATA LIST (2002)						
	South Africa	Lesotho	Swaziland	Mozambique	Zimbabwe	Namibia	Botswana
Acridocarpus natalitius ssp.					CR B1B2abcD		
Afzelia quanzensis				LR-nt	LR-lc		
Agathosma ovata	LR-lc	VU A1cd					
Alepidea amatymbica var. amatymbica		VU A1dA2d			CR B1B2ceC2a		
Aloe aristata		LR-nt					
Aloe dewetii			EN A1acd				
Aloe ferox		LR-lc					
Aloe spicata					VU C1C2a		
Ansellia gigantea var. nilotica	LR-nt					VU B1B2e	VU A1ad
Boophae disticha		EN A2d				LR-lc	
Boscia foetida ssp. rehmanniana							LR-nt
Bowiea volubilis			EN A1d				
Capparis tomentosa						LR-lc	
Celtis mildbraedii			CR B1B2cC2a		VU D2		
Clivia miniata	LR-lc		LR-nt				
Clivia nobilis	LR-lc		DD				
Crinum delagoense			LR-lc				
Croton pseudopulchellus						DD	
Dianthus mooiensis ssp.			VU C1C2a				
Diaphanthe millari	EN B1B2abc						
Dichrostachys cinerea ssp. africana						LR-lc	
Dicoma anomala		VU A2d					
Dioscorea dregeana						DD	
Diospyros galpinii			LR-lc				
Dombeya rotundifolia var. rotundifolia						LR-lc	
Ehretia rigida		DD					
Elephantorrhiza elephantina		DD					
Encephalartos sp.	CR, EN, VU in most countries, including ZA, ZW, SW, MW, MZ						
Eriospermum mackenii					LR-nt		
Euclea undulata			DD				
Eucomis autumnalis ssp. clavata		VU A1acdA2cd					
Eulophia speciosa	LR-lc		DD			LR-lc	
Euphorbia cooperi					LR-lc		
Euphorbia ingens						DD	
Faurea macnaughtonii			DD				
Gardenia thunbergia			CR C2b				

Table 11.2 continued....

Species	South Africa	Lesotho	Swaziland	Mozambique	Zimbabwe	Namibia	Botswana
Haemanthus coccineus						LR-lc	
Haworthia limifolia			DD				
Margaritaria discoidea			LR-lc				
Mimosa pigra						LR-lc	
Mondia whitei	VU A1dD2		DD				
Myrica serrata			VU C2a				
Olea woodiana			DD				
Polygala galpinii			LR-lc				
Prunus africana		DD	EN C2aD				
Ptaeroxylon obliquum						LR-lc	
Pterocarpus angolensis					LR-nt	VU A1bcd2bcd	
Salacia leptoclada					EN C2a		
Scadoxus puniceus					DD		
Scilla natalensis		DD	LR-nt				
Scolopia mundii					CR D		
Siphonochilus aethiopicus	CR A1bcde*		EN A1d				
Stangeria eriopus				VU C2bD1D2			
Stapelia gigantea					DD		
Strychnos mitis					VU D2		
Synadenium cupulare			DD				
Teclea gerrardii			DD				
Tephrosia kraussiana			LR-lc				
Trema orientalis						VU D2	
Tridactyle bicaudata					EN B1B2c		
Vitex rehmannii			DD				
Warburgia salutaris			CR A1bcd	VU A2cd	CR A1dB1B2abcdeC1C2aD		
Ximenia caffra var. natalensis						LR-lc	
Zanthoxylum davyi					EN D		

* Janine Victor, National Botanical Institute (pers. comm.)

Table 11.3 Taxa sold in Faraday with conservation status in KwaZulu-Natal [Scott-Shaw 1999]. IUCN categories are as follows: RE = Regionally extinct; CR = Critically endangered; EN = Endangered; VU = Vulnerable; LR-nt = Lower risk – near threatened; LR-cd = Lower risk – conservation dependent; LR-lc = Lower risk – least concern; DD = Data deficient; (loc) = locally. Species in **bold** occur within Gauteng.

Species	Conservation status
<i>Alberta magna</i>	LR-cd
<i>Albizia suluensis</i>	VU
<i>Alepidea amatymbica</i> var. <i>amatymbica</i>	A1cB1B2abcdeC1C2aD1D2
<i>Aloe aristata</i>	LR-nt
<i>Aloe dewetii</i>	LR-lc
<i>Aloe supratifolia</i>	LR-lc
<i>Ansellia gigantea</i> var. <i>nilotica</i>	VU A1A2d
<i>Begonia dregei</i>	LR-nt
<i>Begonia homonyma</i>	VU A1cd
<i>Bowiea volubilis</i>	VU A1acdA2cd
<i>Celtis mildbraedii</i>	EN (loc) (LR globally)
<i>Clivia miniata</i>	LR-nt
<i>Crinum moorei</i>	LR-lc
<i>Cryptocarya myrtifolia</i>	LR-lc
<i>Curtisia dentata</i>	LR-cd
<i>Diaphanathe millarii</i>	EN B1B2abc
<i>Dioscorea sylvatica</i>	LR-nt
<i>Encephalartos</i> spp.	VU, EN or CR

Species	Conservation status
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	VU A1acdA2cd
<i>Euphorbia woodii</i>	VU A1cdB2abcd
<i>Faurea macnaughtonii</i>	LR-lc
<i>Gasteria croucheri</i>	VU A1acdA2cd
<i>Haworthia limifolia</i>	VU A1acdA2cd
<i>Hypoxis hemerocallidea</i>	LR-lc
<i>Kniphofia rooperi</i>	LR-lc
<i>Mondia whitei</i>	LR-cd
<i>Myrothamnus flabellifolius</i>	LR-cd (loc)
<i>Mystacidium venosum</i>	LR-cd (loc)
<i>Ocotea bullata</i>	VU (loc) (LR-cd globally)
<i>Olinia radiata</i>	LR-lc
<i>Polygala galpinii</i>	LR-nt
<i>Prunus africana</i>	LR-cd (loc)
<i>Scilla natalensis</i>	VU A1acdA2cd
<i>Siphonochilus aethiopicus</i>	RE (EN A1cd globally)
<i>Stangeria eriopus</i>	LR-cd
<i>Synaptolepis kirkii</i>	LR-cd
<i>Warburgia salutaris</i>	EN A1acd

11.2 Provincial Conservation Status

Based on what is known about the trade patterns for plants sold in the Faraday and other national markets, the revised IUCN Red Data Status does not adequately characterise the levels of threat to some of the species listed in Table 11.2. The provincial conservation ordinances ‘better’ represent those species under the most threat by the current utilisation/collection patterns of healers and gatherers of medicinal plants. The ordinances are outdated in most instances and were written at a time before the current boom in urban development, utilisation and commercial trade that now pose a threat to many floral habitats. Protection of species by an Ordinance is one thing, but applying the law is another. Considering the dependence of many resource users on flora in southern Africa, any measures taken to protect plants requires a multidisciplinary approach to the challenge.

Most provinces are currently revising their legislation, however the Schedules of the old Transvaal, Free State, Natal and Cape Nature Conservation Ordinances (of 1983, 1969, 1974 and 1974 respectively) are mostly still in use until the revised sections of the new legislation have been enacted. The current status in the provincial revision of nature conservation Acts and Bills is as follows²²:

- **Gauteng:** currently revising, but still using, the Schedules of the 1983 Transvaal Ordinance. The whole Ordinance will be revised and made into an Act once the Biodiversity Bill has been enacted;
- **KwaZulu-Natal:** the legislation (including the Schedules) has been revised as the new *KwaZulu-Natal Nature Conservation Bill of 1999*. However, the Bill has not been enacted and the Schedules of the old Natal Ordinance still apply.
- **Mpumalanga:** currently using the new *Mpumalanga Nature Conservation Act No 10 of 1998*;
- **Limpopo:** published a draft Bill for comment towards the end of 2002. New Bill and Schedules expected to be enacted by September 2003;
- **Eastern Cape:** currently drafting new legislation that incorporates the old Cape Nature Conservation Ordinance and former Transkei and Ciskei legislation. Schedules from the old Cape Ordinance are still used;
- **Free State:** currently revising legislation, and using the Schedules from the 1969 Orange Free State Ordinance;

²² Information obtained from personal communications with: Michele Pfab (Gauteng, DACEL); Rob Scott-Shaw (KZN Nature Conservation); Blackie Swart (Mpumalanga Parks Board); Riaan (Limpopo Environmental Affairs); Mike Fryer (Eastern Cape Nature Conservation); Deon Hignett and Jennifer Nicholson (Western Cape Nature Conservation Board); Dewald Badenhorst (Northern Cape Nature Conservation Service); Diana Nel (Free State, DEAT); Thando Bam (North West, DACE).

- **Western Cape:** legislation has been updated to the *Western Cape Conservation Laws Amendment Act No 3 of 2000*. However, the Schedules of the new Act are currently under revision and therefore the Schedules of the old Cape Ordinance still apply in the interim;
- **Northern Cape:** the Schedules have been amended and the legislation is being revised, however, the Schedules from the old Cape Ordinance are in use until the new legislation is enacted;
- **North West:** currently revising legislation and are using the Schedules from the Transvaal Ordinance of 1983, the Cape Ordinance of 1974 and the former Bophuthatswana.

Table 11.4 summarises the protected status of species listed in the provincial conservation ordinances as they apply to the medicinal flora sold in Faraday. Several plant families and genera are protected by the Ordinances, and over 100 species are Protected or Specially Protected between the nine provinces. The most inclusive level of protection is afforded by KwaZulu-Natal (according to both the old Natal Ordinance and the revised Schedules of the new Bill listed in Appendix 5) – the provincial source for most of the plants sold in Faraday. Gauteng flora is not as threatened by the trade in Faraday as KwaZulu-Natal flora is, given that Gauteng is not the main origin of the biodiversity traded there.

Table 11.4: Taxa sold in Faraday that are provincially protected, specially protected and/or endangered[‡]. In some provinces, taxa are protected as a Family, rather than by Genus or Species. **Please note:** where taxa are protected provincially as a family, the provincial status is not re-listed in the table if a taxa is protected as a Genus or Species in a different province. For example, *Eucomis spp.* is *Protected* in Gauteng and the Free State, however the genus is *Protected* within the family Hyacinthaceae in KwaZulu-Natal.

FAMILIES, GENERA AND SPECIES PROTECTED BY THE ORDINANCES	Gauteng, North West†, Limpopo	Mpumalanga	KwaZulu-Natal	Eastern Cape, Western Cape, Northern Cape, North West†	Free State
Schedules currently used from Provincial Acts or Ordinances	Transvaal Nature Conservation Ordinance 12, 1983	Mpumalanga Nature Conservation Act 10, 1998	Natal Nature Conservation Ordinance, 15 of 1974*	Cape Nature Conservation Ordinance 19, 1974	Free State Nature Conservation Ordinance 8, 1969
1. FAMILIES					
AMARYLLIDACEAE: Includes members of the genera <i>Boophane</i> , <i>Clivia</i> , <i>Crinum</i> , <i>Haemanthus</i> , and <i>Scadoxus</i>			Specially Protected	Protected	
ASCLEPIADACEAE:				Protected	
DIOSCOREACEAE			Specially Protected		
EUPHORBIACEAE				Several protected sp.	
IRIDACEAE:				Protected	
LILIACEAE sensu lato: includes members of the genera <i>Agapanthus</i> , <i>Albuca</i> , <i>Aloe</i> , <i>Asparagus</i> , <i>Behnia</i> , <i>Bowiea</i> , <i>Bulbine</i> , <i>Drimia</i> , <i>Eriospermum</i> , <i>Eucomis</i> , <i>Gasteria</i> , <i>Haworthia</i> , <i>Kniphofia</i> , <i>Ledebouria</i> , <i>Ornithogalum</i> , <i>Sansevieria</i> , <i>Scilla</i> , <i>Smilax</i> , <i>Tulbaghia</i> and <i>Urginea</i> .			Specially Protected		
MESEMBRYANTHEMAC EAE				Protected	
ORCHIDACEAE: Includes members of the genera <i>Ansellia</i> , <i>Cyrtorchis</i> , <i>Diaphanorhiza</i> , <i>Eulophia</i> , <i>Microcoelia</i> , <i>Mystacidium</i> , and <i>Tridactyle</i>	Protected, excl. those sp. not occurring in the former Transvaal	Protected	Specially Protected	Protected	Protected
PROTEACEAE: Includes members of the		Protected		Protected, except 5 Endangered‡ sp.	

Hawkers of Health: The Faraday Street Medicinal Plant Market in Johannesburg

genus <i>Faurea</i> .					
RUTACEAE				Protected	
VELLOZIACEAE			Specially Protected		
ZAMIACEAE			Specially Protected		
2. GENERA					
<i>Adenia</i> spp.		Protected			
<i>Agapanthus</i> spp.	Protected	Protected			Protected
<i>Aloe</i> spp.	Protected, excl. all sp. not occurring in the former Transvaal	Protected, excl. all sp. not occurring in Mpumalanga		Protected, except 3 Endangered sp.	Protected
<i>Begonia</i> spp.	Protected				
<i>Clivia</i> spp.	Protected	Protected			
<i>Crinum</i> spp.	Protected	Protected			Protected
<i>Cussonia</i> spp.	Protected				Protected
<i>Cyrtanthus</i> spp.		Protected			
<i>Dierama</i> spp.	Protected				Protected
<i>Dietes</i> spp.	Protected				
<i>Dioscorea</i> spp.	Protected	Protected			Protected
<i>Encephalartos</i> spp.	Specially protected	Specially protected		Endangered	Protected
<i>Eucomis</i> spp.	Protected	Protected			Protected
<i>Euphorbia</i> spp.	Several sp. protected				Protected
<i>Gasteria</i> spp.	Protected				
<i>Gladiolus</i> spp.	Protected	Protected			Protected
<i>Haemanthus</i> spp.	Protected	Protected			Protected
<i>Haworthia</i> spp.	Protected	Protected		Protected	
<i>Helichrysum</i> spp.					Protected
<i>Kniphofia</i> spp.	Protected	Protected		Protected	Protected
<i>Ocotea</i> spp.		Protected			
<i>Olea</i> spp.		Protected			
<i>Podocarpus</i> spp.		Protected			
<i>Scadoxus</i> spp.	Protected	Protected			
<i>Scilla</i> sp.		Protected			Protected
<i>Stapelia</i> spp.	Protected	Protected	Specially Protected		
3. SPECIES					
<i>Berchemia zeyheri</i>		Protected			
<i>Bersama tysoniana</i>		Protected			
<i>Boophane disticha</i>		Protected			Protected
<i>Bowiea volubilis</i>		Protected			
<i>Cassipourea gerrardii</i>		Protected			
<i>Cunonia capensis</i>				Protected	
<i>Gloriosa superba</i>				Protected	
<i>Ilex mitis</i> var. <i>mitis</i>				Protected	
<i>Ocotea bullata</i>	Protected	Protected	Specially protected		
<i>Olea europaea</i> ssp. <i>africana</i>					Protected
<i>Pterocarpus angolensis</i>	Protected	Protected			
<i>Scilla natalensis</i>	Protected				
<i>Siphonochilus aethiopicus</i>		Protected			
<i>Spirostachys africana</i>	Protected	Protected			
<i>Stangeria eriopus</i>			Specially Protected	Endangered	
<i>Warburgia salutaris</i>		Protected			

† North West Province use the Schedules from both the old Transvaal and Cape Ordinances.

‡ 'Endangered flora', in terms of the Western Cape Ordinance, means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of CITES. In Gauteng, every species of flora referred to in CITES Appendix I and II is an 'endangered or rare species' in addition to its protected or specially protected status.

* In terms of the Natal Ordinance of 1974, all indigenous plants other than the 'specially protected' taxa listed in the above table are 'protected'. The Schedule of plants listed as protected or specially protected by the *KwaZulu-Natal Nature Conservation Bill of 1999* that are sold in Faraday are in **Appendix 5**. This Bill, however, has yet to be enacted and therefore the revised schedule is not shown in the above table.

Utilisation of natural resources has evolved and in some cases intensified with political and social change and population growth within South Africa. Species under threat that are given little or no mention by the old and revised ordinances and that need to be considered include *Elaeodendron transvaalense*, *Hypoxis* sp. (a species also in demand by pharmaceutical companies), and *Urginea sanguinea* / *Drimia* spp. – the latter being sold in the highest volumes.

Block 11.1 summarises the legislation within the provincial ordinances as they apply to harvesting and trade of indigenous medicinal flora.

Block 11.1 Summary of the provincial ordinances as they apply to the trade in indigenous floral species for traditional medicine: [adapted from S. McKean *pers. comm.* for KZN legislation]

1. No protected/specially protected/endangered plants may be gathered without a permit or licence, and none may be sold without a licence
2. If one wants to gather plants and *not sell*, then only a permit is required
3. If one wants to gather *and sell*, then a gathering permit and a selling permit/licence is required
4. One permit is needed for gathering and sale of '*protected*' plants. If one already has a permit and licence to gather and sell '*specially protected*' plants, then one is allowed to gather and sell '*protected*' plants
5. Written permission from the landowner or landholder is required to gather plants on the property
6. Permits and licences must be carried when gathering and/or selling any of the plants

11.3 National Forests Act

The Department of Water Affairs and Forestry recently proposed a revised list of tree species to be declared protected by the National Forests Act (No. 84 of 1998). The tree species sold in Faraday that would be protected by the Act (once ratified) are listed in Table 11.5. All of the species on the list were cited to be scarce and/or popular by the traders (Tables 10.7 and 10.8; full list in Appendix 3a, b), especially species such as *Elaeodendron transvaalense*, *Warburgia salutaris*, *Rapanea melanophloeos* and *Sclerocarya birrea*. Fairly large volumes of bark from these species were on sale in Faraday during the survey (e.g. 13.2 and 10.2 sacks respectively for *Sclerocarya* and *Rapanea*). However bark from some species, as a result of current scarcities, were present in smaller quantities than their popularity ratings would suggest (e.g. 6.1 sacks for *Elaeodendron*; <5 sacks for *Warburgia* and *Ocotea bullata*).

Table 11.5 List of tree species proposed by the National Forests Act to be declared protected that are sold in Faraday.

Species
<i>Azelia quanzensis</i>
<i>Balanites maughamii</i>
<i>Barringtonia racemosa</i>
<i>Boscia albitrunca</i>
<i>Elaeodendron transvaalense</i>
<i>Ocotea bullata</i>
<i>Pittosporum viridiflorum</i>
<i>Podocarpus henkeli</i>
<i>Pterocarpus angolensis</i>
<i>Rapanea melanophloeos</i>
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>
<i>Sidoxylon inerme</i>
<i>Warburgia salutaris</i> .

11.4 CITES Checklist of Species Traded in Faraday

For a while, medicinal and aromatic plants species played a minor role within CITES [Lange 1999]. However the growing awareness of the threats faced by these species owing to the unprecedented demand for plant-based medicines, the increasingly global nature of the trade, the very high proportion of wild-collected species, and their relatively low prices have led to increased pressure on plant populations and the subsequent broadening of the scope of CITES to include these species [Lange 1999]. Fourteen plant species (including *Prunus africana*) were explicitly included due to their over-exploitation for medicinal purposes [Lange & Schippmann 1999]. Additionally, species of other CITES plant groups that have been included in the Appendices as higher taxa (e.g. Orchidaceae and *Aloe* spp.) are often traded for medicinal purposes or at least have trade potential [Lange & Schippmann 1999].

At least 21 species traded in Faraday are included in CITES Appendices and are subject to the relevant trade controls (Table 11.6). Of these, *Encephalartos* sp. and *Stangeria eriopus* are Appendix I species and are additionally threatened by collectors of rare species and cycads. *Stangeria* is a relatively popular species with the Faraday traders, although scarcities limit the number of traders selling the plant (9.4% of the traders). *Stangeria* is also the only species in Table 11.6 to have been harvested outside of South Africa: one trader reportedly purchased plant material that had been harvested in Mozambique.

Table 11.6 Species traded in the Faraday market covered by CITES. Additionally listed are the comparative perceptions of the traders on scarcity and popularity of the species. (For explanation of annotations and implications of CITES Appendix I or II listings, see Table 11.7).

Species	Family	% Traders in Faraday selling the species	Perceived scarcity (% traders in Faraday)	Perceived popularity (% traders in Faraday)	Protection	
					Protection by CITES Appendix	Annotations to CITES
<i>Aloe aristata</i>	Liliaceae s.l.				App II	# 1
<i>Aloe chabaudii</i>	Liliaceae s.l.	1.0%	1.0%	-	App II	# 1
<i>Aloe ferox</i>	Liliaceae s.l.	1.0%	1.0%		App II	# 1
<i>Aloe marlothii</i>	Liliaceae s.l.	1.0%	1.0%	-	App II	# 1
<i>Aloe</i> sp.	Liliaceae s.l.	4.2%	-	2.1%	App II	# 1
<i>Ansellia gigantea</i>	Orchidaceae	4.2%	2.1%	1.0%	App II	# 7
<i>Cyrtorchis</i> sp.† (1 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7
<i>Diaphanathe</i> sp. †(2 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7
<i>Encephalartos</i> spp.	Zamiaceae	6.3%	2.1%	-	App I	
<i>Eulophia</i> sp.† (5 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7
<i>Euphorbia woodii</i>	Euphorbiaceae	4.2%	-	3.1%	App II	# 1
<i>Microcoelia</i> sp.† (1 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7
<i>Mystacidium</i> sp.†(2 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7
<i>Prunus africana</i> ‡	Rosaceae	26.0%	3.1%	14.6%	App II	# 1
<i>Rhipsalis</i> sp. (1 sp.)	Cactaceae	9.4%	1.0%	5.2%	App II	# 4
<i>Stangeria eriopus</i>	Stangeriaceae	9.4%	2.1%	3.1%	App I	
<i>Tridactyle</i> sp.†(2 sp.)	Orchidaceae	8.3%	-	3.1%	App II	# 7

†: These species of Orchidaceae are all traded under the ethnospecies name of 'iPhamba'. Hence, the % traders in the market selling that species, represents the % of traders selling a plant with that common name, and not necessarily the specific species.

‡: Explicitly included in the CITES Appendices because of trade for medicinal purposes [Lange & Schippman 1999]. The species may be alternately used with *Rhus chirindensis*, which has the same common name.

Data source: Lange & Schippmann [1999]; <http://www.cites.org.za/> (South African flora as listed in CITES)

Table 11.7 Description of the level of protection afforded by the CITES Appendices (I and II), and the annotations to CITES Appendices species designates.

App I = Appendix I	Species threatened with extinction, which are or may be affected by international trade. Trade in specimens of these species is permitted only in exceptional circumstances, such as purposes that are deemed not detrimental to species survival (e.g. scientific research), and when the import is not to be used primarily for commercial purposes.
App II = Appendix II	Species not necessarily now threatened with extinction, but may become so unless international trade is subjected to strict regulations and controls to avoid utilization that is not detrimental or incompatible with their survival.
# 1	Designates all parts and derivatives, except a) seeds, spores and pollen (including pollinia); b) seedling or tissue cultures obtained <i>in vitro</i> , in solid or liquid media, transported in sterile containers; and c) cut flowers of artificially propagated plants
# 7	Designates all parts and derivatives, except a) seeds, spores and pollen (including pollinia); b) seedling or tissue cultures obtained <i>in vitro</i> , in solid or liquid media, transported in sterile containers; c) cut flowers of artificially propagated plants; and d) fruits and parts of derivatives thereof of artificially propagated plants of the genus <i>Vanilla</i>
# 4	Designates all parts and derivatives, except: a) seeds, except those from Mexican cacti originating in Mexico, and pollen; b) seedling or tissue cultures obtained <i>in vitro</i> , in solid or liquid media, transported in sterile containers; c) cut flowers of artificially propagated plants; d) fruits and parts of derivatives thereof of naturalised or artificially propagated plants; and e) separate stem (pads) and parts and derivatives thereof of naturalised or artificially propagated plants of the genus <i>Opuntia</i> subgenus <i>Opuntia</i> .

Source: Bodasing & Mulliken [1996]; Lange & Schippmann [1999]; <http://cites.org/index.html> ("How CITES works")

The sale of *Prunus africana*, regarded as a globally significant in the medicinal plant trade and explicitly included in Appendix II, was recorded for sale by 25% of the traders surveyed. Compared to other species traded in South Africa, however, *Prunus* is in the medium to lower ranges of a vulnerability scale. This species may also be used alternately with *Rhus chirindensis*; hence, it is unlikely that all 25% of the records are from one species. The same applies to the sale of six Orchidaceae genera traded as 'iPhamba' (*Cyrtorchis* sp., *Diaphananthe* sp., *Eulophia* sp., *Microcoelia* sp., *Mystacidium* sp., *Tridactyle* sp.). There are additionally 3 other orchid genera with the same common name as the species in Table 11.7 that are not listed in CITES Appendices, hence the percentage recorded for sale for the individual species is likely to be lower than 8.3%. It is not known at this stage what species from this group called 'iPhamba' are preferentially harvested. Trade in these species, however, is more likely threatened by orchid collectors than medicinal plant gatherers and users. Despite the low percentage of traders with the species, *Ansellia gigantea* is seasonally common in the market, and likely to be the most threatened of the Orchidaceae traded in the medicinal plant markets.

Apart from *Encephalartos*, *Stangeria* and *Prunus*, which are globally traded and threatened taxa, the extent of illegal international trade in CITES listed species at Faraday is limited. Inter-provincial trade in these species (and other Appendix II taxa), however, is notable and hence contrary to the provincial legislation that prohibits the trade in rare and endangered species without a permit. *Prunus africana* is less threatened by use and international trade in South Africa than it is in Tropical Africa (e.g. Cameroon, Kenya and the DRC). International trade in *Prunus* bark is reportedly the largest of all wild-collected African tree species [Schippmann 2001], and volumes are estimated to be between 3,200-4,900 tons annually [Cunningham *et al.* 1997] – none of this, however, originating from South Africa.

In general, one can use the species listed in this report and the descriptions of threat levels to species contained within CITES, Red Data List and Provincial Ordinance listings as a reason to support remedial conservation action. Trade in Endangered, Vulnerable and CITES listed species should be contained until the status of the species improves through the conservation action taken.

12 ASSESSMENT OF RISK AND VULNERABILITY TO OVER-EXPLOITATION

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12.1 Introduction

Knowing what species are traded commercially is the foundation for identifying taxa threatened by commercial harvesting for the medicinal plant trade, as well as for comparing regional and national markets. Furthermore, understanding the dynamics of the trade and factors influencing supply and demand are steps towards setting priorities and goals for conservation and management programs. Identification of priority plant species at risk of over-utilisation, and the methodology to achieve this, poses a challenge to field workers and researchers.

Cunningham [1996a] suggests that the identification of vulnerable species is based on: 1) indicators of demand; 2) information derived from observations at local markets and local resource users, or from commercial trade elsewhere in Africa; 3) life form categories as indicators of population biology; 4) part used as an indicator of impact on the individual plant; and 5) experience of resource management problems which have arisen elsewhere that could be avoided. These tools are useful where management guidelines are required, and more extensive research is not possible.

Lange [1998] recommends that to identify and assess those species most threatened by wild-collection owing to their demand in trade, the following knowledge is necessary: plant part used; level of demand; trade volumes; trade routes; source countries; collection practices and harvesting techniques, as well as biological parameters, such as life form; population sizes; plant community considerations; habitat requirements; distribution; growth rates; and reproductive biology. All these parameters have to be evaluated, correlated and weighted. However, gathering all these data for over 400 species traded in Faraday is an enormous project and biological information for most of these species is fragmentary. In addition, for many species that are not being over-exploited the collection of these data diverts attention from researching those species known to be high risk. Therefore, it is necessary to use a few parameters for which data is practically accessible, and an approach that can rapidly assess species and conservation priorities. A rapid assessment is one of several steps that can be taken to short-list the most threatened species.

The steps to narrow down threatened taxa are as follows, according to Cunningham [1996b] and Lange [1998]: 1) identification of major sales sites; 2) identification of medicinal and aromatic plants in trade; 3) preparation of a short-list of species in trade which are slow-growing, destructively harvested, expensive and/or popular and/or sold in great quantities and considered to be increasing in scarcity by traders and/or collectors; 4) preparation of a further short-list on the basis of commonness or rarity and on the basis of habitat requirements, geographic distribution and local population sizes; 5) the setting of priorities within the resulting short list after completion of step 4, based on phylogenetic distinctness.

Steps 1 and 2 have already been achieved. Major medicinal plant markets have been identified in South and southern Africa, and the various surveys have identified over 700 species in trade [e.g. Cunningham 1988; Hutchings 1996; Marshall 1998; Dold & Cocks 1999, 2002; Botha *et al.* 2001; Williams *et al.* 2000, 2001]. The preparation of a short-list of plant species (Step 3) threatened by the trade in Faraday will be produced in this chapter. Steps 4 and 5 are elements of a conservation and management program that should be implemented by DACEL, or any other appropriate role player.

Further assessments of vulnerability are based on a number of principles drawn from ecology, sociology and economics. According to Wild and Mutebi [1996], these principles are:

- There is a relationship between species population size and quantities of material available for harvest.

- This relationship is modified by species ecology, life history, and which parts are harvested and used (as well as the volume harvested for utilisation).
- The growth and reproductive capacity of a plant may respond positively or negatively to harvesting.
- Each species has a range of levels of harvesting at which harvesting will be sustainable. This can range from almost zero to some upper quantity often referred to as the ‘maximum sustainable yield’ or MSY.
- For any one species, the range of harvestable quantities will vary with location, season and part used. The range of harvestable quantities can be considered a margin of vulnerability, sustainability, or error.
- As demand increases, there is often a progression of social and economic changes from subsistence use to commercial exploitation.

In the case of the Faraday market, commercial exploitation is occurring and commercial use of plants has predominated subsistence use for some time. As demand increases in this case (in urban commercial medicinal markets), harvesting pressures increase, population sizes are reduced, local extinction of resources can occur resulting in longer travel times to source of supply, and there is a concomitant increase in plant prices in the market [Mander 1998]. These factors have social impacts and costs to both resource users and gatherers who can neither use nor harvest these resources, resulting in a loss of potential income to the gatherers. Should cultivation of these species become necessary, then the beneficiary of potential economic benefits derived from these resources changes from the harvester to the cultivator.

12.2 Methods for Determining Conservation Priority²³

Trader perceptions of plant sales and scarcity, as well as trade data, were integrated into priority rating system called a ‘Numerical Importance Value’ or NIV. The result was a priority score based on the frequency of occurrence of the ethnospecies traded (i.e. the number of times a species was recorded for sale), the volume²⁴ (not the mass) of the species recorded in the market, trader perceptions of popularity and scarcity, and plant part.

Two NIV priority scores were calculated. Rating 1 *excluded* plant part as a parameter in the calculation, whilst Rating 2 *included* plant parts. The reason is as follows: plant parts used/harvested indicate the degree to which destructive and sustainable harvesting is occurring within a population. Populations of species harvested for whole plants and bulbs are less likely to recover or regenerate because the entire individual plant is removed and hence harvesting becomes unsustainable because little or no persistence or replacement in the habitat can occur. By contrast, when harvesting for bark and leaf material parts of the individual behind, therefore the individuals can potentially regenerate and resprout. This is a more sustainable practice, but can depend on the extent to which species-specific harvesting occurs (e.g. trees that are fairly resilient to ring-barking will ultimately not survive if repeatedly harvested when the demand for bark exceeds supply). Rating 1 therefore prioritises species based on the extent to which they are traded and harvested, and favours those species harvested in large volumes. Rating 2 prioritises species on the basis of destructive harvesting and its sustainability *in addition* to the extent of harvesting. Therefore, smaller species that are not harvested in the same comparable bulk as the ‘mega flora’ are not over-looked when assessing sustainability of the harvesting practise. Both scores are equally important and answer a different question on the sustainability of harvesting and priorities for future management of the species.

For each species, a value between 0 (lowest score) and 1 (highest score) was derived for each NIV parameter; the value obtained is a quotient of the highest value for that parameter. For example, the highest frequency of occurrence was *Urginea sanguinea* / *Drimia* spp. with 61 traders, and is therefore given an NIV score of 1. The second highest recorded

²³ Methods described in this chapter are derived and adapted from the author’s current research for a PhD thesis entitled: “*The design of a risk assessment model to determine the impact of the herbal medicine trade on the Witwatersrand on resources of indigenous plant species*” [Williams forthcoming].

²⁴ During the survey, volumes for each ethnospecies sold at each trader’s stall were recorded as a fraction of either a ‘checkers’ packet or a sack (e.g. ½ checkers; ⅓ sack). That way, rapid assessments of volume could be made by sight. The total volume for each species was calculated by converting the total number of checkers packets *into* sacks (using a conversion factor of 1 sack = 9.361 checkers packets) and adding the figure to the total number sacks. A conversion factor was available to approximate the mass of each sack, depending on the plant part type, but using this in the NIV would have weighted the scores in favour of the heavier species. Hence, the volume in terms of the number of sacks was used to standardise the data and calculate the priority score.

occurrence was *Sarcophyte sanguinea* with 49 traders, and hence the NIV score is 0.803 (or, 49/61). The maximum total score for each ethnospecies was therefore 4 (Rating 1; four parameters) or 5 (Rating 2; five parameters).

The NIV scores for the trader's perceptions of scarcity and popularity were obtained slightly differently – by using a modified quotient for the highest value. *Urginea sanguinea* / *Drimia* spp. had the highest number of citations for scarcity, namely 10. Sixty-one traders had the species at their stalls, therefore 16.4% of the traders that sold the species cited it as scarce. By comparison, only 1 trader was recorded as having *Aloe marlothii* and they cited it as scarce, therefore 100% of the traders with the species cited it as scarce. To calculate a numerical importance value based on this would distort priorities and give greater weight to infrequently recorded species that were cited as scarce by most of the traders keeping them. To bypass this distortion, the NIV was first calculated as a ratio of citation of scarcity (or popularity) to the frequency of occurrence (e.g. *Urginea sanguinea* / *Drimia* spp. = 0.164) and then finally as a quotient of the highest score (highest score was for *Siphonochilus* with 6 out of 8 traders citing it as scarce, or 0.75). The final NIV value between 0 and 1 for *Urginea sanguinea* / *Drimia* spp., for example, was then 0.164/ 0.75 = 0.22. To reduce further distortions of the NIV, species with 4 or less occurrences in the market were removed from the list (to reduce the chances of a high NIV score for an infrequently cited species). The disadvantage to doing this, however, was the removal of *Mondia whitei*, *Ansellia africana*, *Synaptolepis kirkii* and *Euphorbia woodii* (to name a few) from the list – species which are known to be extensively utilised, but which may be infrequently recorded because of decreased availability or seasonal fluctuations.

12.3 The 'Top 100' Species

A prioritised list of the 'top 100' species traded in Faraday is presented in two formats. The first, Rating 1 (Table 12.1), is based on a prioritisation method that measures species vulnerability based on the extent to which they are traded and harvested, and favours those species harvested in large volumes. The second, Rating 2 (Table 12.2), prioritises species vulnerability to over-exploitation on the basis of the potential damage to populations, and the sustainability of destructive harvesting levels should current harvesting patterns continue. Therefore, species that do not produce large individual amounts of biomass, but are at great risk because entire plants are destructively harvested, are not overlooked during the prioritisation and ranking procedure. The response of plants to exploitation and the implications of declining productivity under a high frequency or intensity of exploitation are critical to policy development [Cunningham 1996a].

The response of populations from the high ranked species from Rating 2 to harvesting would be declining productivity and regeneration capacity under the high frequency and intensity of exploitation - as indicated by the high volumes traded and frequency of occurrence in the market. This kind of harvesting is not sustainable in the long-term. More than anything, species ranked highest in Rating 2 must seriously be considered for cultivation and *in-situ* conservation action in collaboration with other Nature Conservation authorities, and receive consideration for revised IUCN Red List status. While some of the species at the top of the list (e.g. *Acacia xanthophloea*) may sell for relatively low prices at present (comparative to other scarce species such as *Warburgia salutaris*), this is unlikely to be the case for much longer as scarcity starts to drive prices up.

Seven of the first ten species on both lists are the same (Tables 12.1 and 12.2). These species are *Urginea sanguinea* / *Drimia* spp., *Elaeodendron transvaalense*, *Albizia adianthifolia*, *Sarcophyte sanguinea*, *Acacia xanthophloea*, *Hypoxis* sp. and *Clivia* sp. The only difference is that Rating 2 prioritises those species most destructively and unsustainably harvested, in this case *Urginea sanguinea* / *Drimia* spp., *Hypoxis* sp, and *Sarcophyte sanguinea*. The higher the rating, the more unsustainable continued and unchecked harvesting of these species is. While it may be difficult to 'protect the commons', i.e. prevent over-harvesting in rural areas outside of core conservation areas, *ex-situ* cultivation becomes a necessary management strategy. In the case of those plants whose natural habitats have been already destroyed, or cannot be preserved, or in the case of very rare or locally extinct tax (e.g. *Siphonochilus*), *ex-situ* protection should be a priority.

Table 12.1 The top 100 species prioritised according to Rating 1: based on the extent to which species are sold in the market and harvested. The rating favours those species harvested in large volumes. High scores indicate a high degree of utilisation and trade within the market. Species in **bold** occur in Gauteng. (EP# = 'ethnospecies #'. See Appendix 1d).

Species	NIV SCORES: RATING 1		
	Trade ²⁵ (max 2)	Trader perception (max 2)	TOTAL Score (max 4)
<i>Urginea sanguinea</i> / <i>Drimys</i> spp.	2.000	0.735	2.735
<i>Elaeodendron transvaalense</i>	1.432	0.851	2.283
<i>Albizia adianthifolia</i>	1.415	0.829	2.244
<i>Sarcophyte sanguinea</i>	1.566	0.670	2.236
<i>Acacia xanthophloea</i>	1.108	0.917	2.025
<i>Hypoxis</i> spp. (<i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	1.358	0.546	1.904
<i>Schottia brachypetala</i>	0.974	0.927	1.901
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	1.054	0.745	1.799
<i>Brachylena discolor</i> ssp. <i>discolor</i>	0.824	0.972	1.797
<i>Curtisia dentata</i>	0.778	0.960	1.738
<i>Deinbollia oblongifolia</i> / <i>Maytenus acuminata</i> var. <i>acuminata</i> / <i>Nuxia floribunda</i> / <i>Myrica serrata</i> / <i>Cunonia capensis</i> (EP 16)	0.784	0.913	1.697
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	0.861	0.833	1.694
<i>Trichilia</i> spp. (<i>T. dregeana</i> , <i>T. emetica</i>)	0.787	0.882	1.669
<i>Spermacoce natalensis</i> / <i>Acridocarpus natalitius</i> ssp. (EP 20)	0.760	0.880	1.640
<i>Rapanea melanophloeos</i>	0.851	0.759	1.610
<i>Adenia gummifera</i> var. <i>gummifera</i>	0.832	0.776	1.608
<i>Acalypha villicaulis</i>	0.265	1.333	1.598
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	0.883	0.704	1.587
<i>Ekebergia capensis</i>	0.692	0.891	1.583
<i>Phyllanthus meyerianus</i> / <i>Gerrardina foliosa</i> / <i>Croton gratissimus</i> / <i>Grewia caffra</i> (EP 1)	0.663	0.905	1.568
<i>Warburgia salutaris</i>	0.539	1.024	1.563
<i>Prunus africana</i> / <i>Rhus chirindensis</i> (EP 29)	0.715	0.847	1.562
<i>Maytenus undata</i>	0.596	0.960	1.556
<i>Helichrysum</i> spp. (<i>H. cymosum</i> , <i>H. decorum</i> , <i>H. epapposum</i> , <i>H. gymnocomum</i> , <i>H. natalitium</i> , <i>H. nudifolium</i> , <i>H. odoratissimum</i>)	0.705	0.843	1.548
<i>Paeronylon obliquum</i>	0.512	0.980	1.492
<i>Celosia trigyna</i> / <i>Crotalaria</i> spp. (EP 17)	0.639	0.817	1.456
<i>Dombeya rotundifolia</i> var. <i>rotundifolia</i>	0.687	0.746	1.433
<i>Ziziphus mucronata</i> ssp. <i>mucronata</i> / <i>Vernonia natalensis</i> / <i>Gerrardina foliosa</i> (EP 5)	0.742	0.688	1.430
<i>Scilla natalensis</i>	0.850	0.580	1.430
<i>Erythrophleum lasianthum</i> / <i>Acokanthera oppositifolia</i> / <i>Margaritaria discoidea</i> (EP 3)	0.517	0.896	1.413
<i>Gunnera perpensa</i>	0.657	0.737	1.394
<i>Cynium racemosum</i>	0.126	1.267	1.393
<i>Pleurostylia capensis</i>	0.159	1.233	1.392
<i>Dioscorea sylvatica</i>	0.775	0.615	1.390
<i>Pittosporum viridiflorum</i>	0.162	1.214	1.376
<i>Spirostachys africana</i>	0.385	0.987	1.372
<i>Balanites maughamii</i>	0.589	0.772	1.361
<i>Azalia quanzensis</i> / <i>Eucalyptus</i> spp. * (EP 12)	0.320	1.026	1.346
<i>Callilepis laureola</i>	0.543	0.797	1.340
<i>Ornithogalum longibracteatum</i>	0.698	0.639	1.337
<i>Margaritaria discoidea</i> / <i>Turraea floribunda</i> / <i>Berchemia discolor</i> / <i>Ochna natalitia</i> (EP 2)	0.501	0.833	1.334
<i>Stapelia gigantea</i>	0.313	1.013	1.326
<i>Justicia capensis</i>	0.400	0.923	1.323
<i>Gnidia</i> sp. (incl. <i>G. polyantha</i>)	0.352	0.970	1.322
<i>Euclia</i> spp. (<i>E. crispa</i> , <i>E. divinorum</i> , <i>E. natalensis</i> , <i>E. undulata</i>)	0.442	0.870	1.312
<i>Haworthia</i> spp. (<i>H. fasciata</i> , <i>H. limifolia</i>); <i>Aloe aristata</i> (EP 57)	0.112	1.200	1.312

²⁵ NIV Trade scores calculated using the species' frequency of occurrence in the market, and volume.

<i>Rhoicissus tridentata</i> ssp.	0.638	0.667	1.305
<i>Rauvolfia caffra</i>	0.350	0.949	1.299
<i>Olinia radiata</i>	0.336	0.962	1.298
<i>Siphonochilus aethiopicus</i>	0.142	1.146	1.288
<i>Calodendrum capense</i>	0.208	1.071	1.279
<i>Withania somnifera</i>	0.232	1.042	1.274
<i>Garcinia</i> spp. (<i>G. gerrardii</i> , <i>G. livingstonei</i>)	0.296	0.967	1.263
<i>Macaranga capensis</i>	0.372	0.881	1.253
<i>Pterocelastrus rostratus</i> , <i>P. tricuspidatus</i> , <i>P. echinatus</i> / <i>Elaeodendron croceum</i> (EP 22)	0.408	0.833	1.241
<i>Thesium pallidum</i>	0.453	0.780	1.233
<i>Talinum caffrum</i>	0.516	0.711	1.227
<i>Mimusops</i> sp.	0.225	1.000	1.225
<i>Albizia versicolor</i> / <i>Trema orientalis</i> / <i>Pterocarpus angolensis</i> (EP31)	0.412	0.806	1.218
<i>Protorhus longifolia</i>	0.180	1.028	1.208
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	0.623	0.568	1.191
<i>Heteromorpha arborescens</i>	0.366	0.822	1.188
<i>Ziziphus mucronata</i> ssp. <i>mucronata</i>	0.216	0.972	1.188
<i>Boophane disticha</i>	0.295	0.879	1.174
<i>Ximenia caffra</i>	0.141	1.028	1.169
<i>Eucomis bicolor</i>	0.523	0.633	1.156
<i>Acokanthera</i> spp. (<i>A. oblongifolia</i> , <i>A. oppositifolia</i>)	0.148	1.000	1.148
<i>Anemone</i> spp. (<i>A. caffra</i> , <i>A. fanninii</i>)	0.139	1.000	1.139
<i>Zanthoxylum</i> spp. (<i>Z. capense</i> , <i>Z. davyi</i>)	0.287	0.850	1.137
<i>Raphionacme</i> sp.	0.420	0.716	1.136
<i>Kigelia africana</i>	0.269	0.848	1.117
<i>Cadaba natalensis</i>	0.144	0.967	1.111
<i>Schlechterina mitostemmatoidea</i>	0.171	0.933	1.104
<i>Mesembryanthemum</i> sp. / <i>Rhipsalis baccifera</i> (EP 8)	0.293	0.796	1.089
<i>Vitex</i> spp. (<i>V. rehmannii</i> , <i>V. wilmsii</i>)	0.173	0.905	1.078
<i>Elephantorrhiza elephantina</i>	0.300	0.773	1.073
<i>Cephalaria humilis</i>	0.211	0.857	1.068
<i>Urginea delagoensis</i>	0.214	0.833	1.047
<i>Eriospermum</i> spp. (incl. <i>E. mackenii</i>)	0.265	0.773	1.038
<i>Monanthotaxis caffra</i>	0.203	0.833	1.036
<i>Ocotea bullata</i>	0.217	0.815	1.032
<i>Chenopodium ambrosioides</i> / <i>Senecio</i> spp. (<i>S. gregatus</i> , <i>S. serratuloides</i> , <i>S. speciosus</i>) (EP 15)	0.273	0.750	1.023
<i>Dioscorea dregeana</i>	0.285	0.738	1.023
<i>Plectranthus</i> sp.	0.188	0.833	1.021
<i>Alepidea amatymbica</i> var. <i>amatymbica</i>	0.201	0.815	1.016
<i>Maytenus heterophylla</i> / <i>Salacia kraussii</i> / <i>Corchorus asplenifolius</i> / <i>Eriosema salignum</i> / <i>Rhynchosia</i> spp. / <i>Hippocratea longipetiolata</i> / <i>Tragia meyeriana</i> (EP14)	0.223	0.792	1.015
<i>Pelargonium luridum</i>	0.217	0.796	1.013
<i>Tieghemia quinquenervia</i> / <i>Viscum verrucosum</i> (EP 7)	0.199	0.806	1.005
<i>Tulbaghia</i> spp. (<i>T. alliacea</i> , <i>T. ludwigiana</i> , <i>T. simmleri</i> , <i>T. violacea</i>)	0.323	0.679	1.002
<i>Hippobromus pauciflorus</i>	0.302	0.681	0.983
<i>Dumasia villosa</i> / <i>Cissampelos torulosa</i> (EP 13)	0.145	0.833	0.978
<i>Polygala</i> spp. (incl. <i>P. confusa</i> , <i>P. gerrardii</i> , <i>P. natalensis</i>)	0.182	0.792	0.974
<i>Crabbea hirsuta</i>	0.175	0.796	0.971
<i>Gladiolus</i> spp. / <i>Eulophia</i> spp. / <i>Crocasmia</i> spp. / <i>Dierama pendulum</i> (EP 24)	0.289	0.667	0.956
<i>Salacia leptoclada</i>	0.246	0.704	0.950
<i>Ledebouria</i> spp. (<i>L. cooperi</i> , <i>L. ovatifolia</i> , <i>L. revoluta</i>)	0.281	0.667	0.948
<i>Stangeria eriopus</i>	0.262	0.685	0.947
	0.205	0.729	0.934
<i>Capparis</i> spp. (<i>C. brassii</i> , <i>C. tomentosa</i>)	0.388	0.544	0.932
<i>Vernonia tigna</i>	0.124	0.806	0.930
<i>Maesa lanceolata</i>	0.152	0.778	0.930

Table 12.2 The top 100 species prioritised according to Rating 2, based on the extent of destructive harvesting and the sustainability of harvesting. High scores indicate a high degree of damage to the populations and harvesting at levels that are not likely to be sustainable because of continuous off-take and reduced regeneration capabilities/opportunities. Species in **bold** occur in Gauteng. (EP # = 'ethnospecies #'. See Appendix 1d)

SPECIES	NIV SCORES: RATING 2		
	Trade ²⁶ (Max 3)	Trader perception (max 2)	TOTAL Score (max 5)
<i>Urginea sanguinea</i> / <i>Drimis</i> spp.	3.000	0.735	3.735
<i>Hypoxis</i> spp. (incl. <i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	2.358	0.546	2.904
<i>Sarcophyte sanguinea</i>	2.066	0.670	2.736
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	1.861	0.833	2.694
<i>Elaeodendron transvaalense</i>	1.765	0.851	2.616
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	1.883	0.704	2.587
<i>Albizia adianthifolia</i>	1.749	0.829	2.578
<i>Scilla natalensis</i>	1.850	0.580	2.430
<i>Dioscorea sylvatica</i>	1.775	0.615	2.390
<i>Acacia xanthophloea</i>	1.441	0.917	2.358
<i>Ornithogalum longibracteatum</i>	1.698	0.639	2.337
<i>Stapelia gigantea</i>	1.313	1.013	2.326
<i>Haworthia</i> spp. (<i>H. fasciata</i> , <i>H. limifolia</i>); <i>Aloe aristata</i> (EP 57)	1.112	1.200	2.312
<i>Siphonochilus aethiopicus</i>	1.142	1.146	2.288
<i>Schotia brachypetala</i>	1.308	0.927	2.235
<i>Talinum caffrum</i>	1.516	0.711	2.227
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	1.623	0.568	2.191
<i>Boophane disticha</i>	1.295	0.879	2.174
<i>Eucomis bicolor</i>	1.523	0.633	2.156
	1.260	0.880	2.140
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	1.388	0.745	2.133
<i>Adenia gummifera</i> var. <i>gummifera</i>	1.332	0.776	2.108
<i>Schlechterina mitostemmatoides</i>	1.171	0.933	2.104
<i>Acalypha villicaulis</i>	0.765	1.333	2.098
<i>Mesembryanthemum</i> sp. / <i>Rhipsalis baccifera</i> (EP 8)	1.293	0.796	2.089
<i>Elephantorrhiza elephantina</i>	1.300	0.773	2.073
<i>Curtisia dentata</i>	1.111	0.960	2.071
<i>Urginea delagoensis</i>	1.214	0.833	2.047
<i>Eriospermum</i> spp. (incl. <i>E. mackenii</i>)	1.265	0.773	2.038
<i>Deinbollia oblongifolia</i> / <i>Maytenus acuminata</i> var. <i>acuminata</i> / <i>Nuxia floribunda</i> / <i>Myrica serrata</i> / <i>Cunonia capensis</i> (EP 16)	1.118	0.913	2.031
<i>Dioscorea dregeana</i>	1.285	0.738	2.023
<i>Viscum verrucosum</i>	1.199	0.806	2.005
<i>Trichilia</i> spp. (<i>T. dregeana</i> , <i>T. emetica</i>)	1.121	0.882	2.003
<i>Tulbaghia</i> spp. (<i>T. alliacea</i> , <i>T. ludwigiana</i> , <i>T. simmleri</i> , <i>T. violacea</i>)	1.323	0.679	2.002
<i>Gladiolus</i> spp. / <i>Eulophia</i> spp. / <i>Crocasmia</i> spp. / <i>Dierama pendulum</i> (EP 24)	1.289	0.667	1.956
<i>Celosia trigyna</i> / <i>Crotalaria</i> spp. (EP 17)	1.139	0.817	1.956
<i>Ledebouria</i> spp. (<i>L. cooperi</i> , <i>L. ovatifolia</i> , <i>L. revoluta</i>)	1.281	0.667	1.948
<i>Stangeria eriopus</i>	1.262	0.685	1.947
<i>Rapanea melanophloeos</i>	1.184	0.759	1.943
<i>Ekebergia capensis</i>	1.025	0.891	1.917
<i>Erythrophleum lasianthum</i> / <i>Acokanthera oppositifolia</i> / <i>Margaritaria discoidea</i> (EP 3)	1.017	0.896	1.913
<i>Dianthus mooiensis</i> ssp.	1.158	0.750	1.908
<i>Scilla nervosa</i> / <i>Albuca</i> sp. cf. <i>setosa</i> (EP 4)	1.239	0.667	1.906
<i>Phyllanthus meyerianus</i> / <i>Gerrardina foliosa</i> / <i>Croton gratissimus</i> / <i>Grewia caffra</i> (EP 1)	0.996	0.905	1.901
<i>Warburgia salutaris</i>	0.873	1.024	1.897
<i>Prunus africana</i> / <i>Rhus chirindensis</i> (EP 29)	1.048	0.847	1.895

²⁶ NIV Trade scores calculated using species' frequency of occurrence in the market, volume and a rating for plant part

<i>Gunnera perpensa</i>	1.157	0.737	1.8939
<i>Cynium racemosum</i>	0.626	1.267	1.893
<i>Maytenus undata</i>	0.930	0.960	1.890
<i>Bowiea volubilis</i>	1.244	0.646	1.890
<i>Brachylena discolor</i> ssp. <i>discolor</i> / <i>Hippobromus pauciflorus</i> (EP 6)	1.324	0.549	1.873
<i>Callilepis laureola</i>	1.043	0.797	1.840
<i>Ptaeroxylon obliquum</i>	0.845	0.980	1.825
<i>Justicia capensis</i>	0.900	0.923	1.8228
<i>Gnidia</i> sp. (incl. <i>G. polyantha</i>)	0.852	0.970	1.822
<i>Rhoicissus tridentata</i> ssp.	1.138	0.667	1.805
<i>Withania somnifera</i>	0.732	1.042	1.774
<i>Dombeya rotundifolia</i> var. <i>rotundifolia</i>	1.021	0.746	1.767
<i>Ziziphus mucronata</i> ssp. <i>mucronata</i> / <i>Vernonia natalensis</i> / <i>Gerrardina foliosa</i>	1.076	0.688	1.764
<i>Helichrysum</i> spp. (<i>H. cymosum</i> , <i>H. decorum</i> , <i>H. epapposum</i> , <i>H. gymnocomum</i> , <i>H. natalitium</i> , <i>H. nudifolium</i>)	0.905	0.843	1.748
<i>Thesium pallidum</i>	0.953	0.780	1.733
<i>Pleurostylia capensis</i>	0.493	1.233	1.726
<i>Pittosporum viridiflorum</i>	0.496	1.214	1.710
<i>Spirostachys africana</i>	0.718	0.987	1.705
<i>Balanites maughamii</i>	0.922	0.772	1.694
<i>Heteromorpha arborescens</i>	0.866	0.822	1.688
<i>Pentanisia prunelloides</i> ssp. <i>prunelloides</i>	1.149	0.533	1.682
<i>Eucalyptus</i> spp. * / <i>Azelia quanzensis</i>	0.654	1.026	1.6792
<i>Mystacidium</i> spp. / <i>Tridactyle</i> spp. / <i>Diaphanathe</i> spp. / <i>Cyrtorchis</i> spp. / <i>Eulophia</i> spp. / <i>Microcoelia</i> sp. (EP 9)	1.233	0.438	1.671
<i>Ximenia caffra</i>	0.641	1.028	1.669
<i>Margaritaria discoidea</i> / <i>Turraea floribunda</i> / <i>Berchemia discolor</i> / <i>Ochna natalitia</i> (EP 2)	0.835	0.833	1.668
<i>Brachylena discolor</i> ssp. <i>discolor</i>	0.687	0.972	1.659
<i>Euclea</i> spp. (<i>E. crispa</i> , <i>E. divinorum</i> , <i>E. natalensis</i> , <i>E. undulata</i>)	0.776	0.870	1.6459
<i>Zanthoxylum</i> spp. (<i>Z. capense</i> , <i>Z. davyi</i>)	0.787	0.850	1.637
<i>Raphionacme</i> sp.	0.920	0.716	1.636
<i>Rauvolfia caffra</i>	0.683	0.949	1.632
<i>Olinia radiata</i>	0.669	0.962	1.631
<i>Calodendrum capense</i>	0.542	1.071	1.613
<i>Garcinia</i> spp. (<i>G. gerrardii</i> , <i>G. livingstonei</i>)	0.629	0.967	1.596
<i>Macaranga capensis</i>	0.706	0.881	1.587
<i>Pterocelastrus rostratus</i> , <i>P. tricuspidatus</i> , <i>P. echinatus</i> / <i>Elaeodendron croceum</i> (EP 22)	0.741	0.833	1.574
<i>Cephalaria humilis</i>	0.711	0.857	1.568
<i>Aptenia cordifolia</i> var. <i>cordifolia</i>	1.099	0.467	1.566
<i>Crinum</i> spp. (<i>C. bulbispermum</i> , <i>C. delagoense</i> , <i>C. macowanii</i> , <i>C. moorei</i>)	1.264	0.296	1.560
<i>Albizia versicolor</i> / <i>Trema orientalis</i> / <i>Pterocarpus angolensis</i>	0.746	0.806	1.552
<i>Protorhus longifolia</i>	0.513	1.028	1.541
<i>Monanthes taxifolia</i>	0.703	0.833	1.536
<i>Senecio</i> spp. (<i>S. gregatus</i> , <i>S. serratuloides</i> , <i>S. speciosus</i>) (EP 15)	0.773	0.750	1.523
<i>Ziziphus mucronata</i> ssp. <i>mucronata</i>	0.549	0.972	1.521
<i>Plectranthus</i> sp.	0.688	0.833	1.521
<i>Alepidea amatymbica</i> var. <i>amatymbica</i>	0.701	0.815	1.516
<i>Maytenus heterophylla</i> / <i>Salacia kraussii</i> / <i>Corchorus asplenifolius</i> / <i>Eriosema salignum</i> / <i>Rhynchosia</i> spp. / <i>Hippocratea longipetiolata</i> / <i>Tragia meyeriana</i> (EP14)	0.723	0.792	1.515
<i>Pelargonium luridum</i>	0.717	0.796	1.513
<i>Hippobromus pauciflorus</i>	0.802	0.681	1.483
<i>Polygala</i> spp. (incl. <i>P. confusa</i> , <i>P. gerrardii</i> , <i>P. cf. natalensis</i>)	0.682	0.792	1.474
<i>Anemone</i> spp. (<i>A. caffra</i> , <i>A. fanninii</i>)	0.473	1.000	1.473
<i>Crabbea hirsuta</i>	0.675	0.796	1.471
<i>Cadaba natalensis</i>	0.477	0.967	1.444
<i>Ipomoea</i> spp. / <i>Turbina oblongata</i> / <i>Solanum mauritianum</i> * (EP 32)	0.705	0.729	1.434
<i>Vernonia tigna</i>	0.624	0.806	1.430

A comparison of the Faraday survey with the 1994/5 survey conducted by the author in the Witwatersrand muti shops revealed changes in the frequency of occurrence and availability for several species (Table 12.3). Most notable, were the declines in availability of *Bowiea volubilis*, *Knowltonia bracteata*, *Ocotea bullata*, *Stangeria eriopus*, *Scabiosa columbaria* and *Peucedanum magalismsontanum*. *Scilla natalensis* and *Warburgia salutaris* only showed moderate declines in availability, whilst *Urginea sanguinea* / *Drimia spp.* and *Elaeodendron transvaalense* showed no changes in their high degree of availability with traders. Both *Gunnera perpensa* and *Siphonochilus aethiopicus* remained unchanged in their low frequency of occurrence in the market. By contrast, rapid increases in volume and availability of *Hypoxis sp.* and especially *Sarcophyte sanguinea* were evident. Of all the species found to be traded, *Sarcophyte* has increased in volume the most and is very evident in the market.

Table 12.3 Changes in the frequency of observance of species and their availability between 1994/5 and 2001. Based on the comparison of a trade survey conducted for Witwatersrand muti shops in 1994/5 [Williams *et al.* 2000, 2001] and the Faraday study in January 2001. * = the most significant increases or decreases in availability.

Noticeable decrease in frequency of occurrence	Slight decrease in frequency	Stable	Increase in frequency
<i>Alepidea amatymbica</i> * <i>Boophane disticha</i> <i>Bowiea volubilis</i> * <i>Dianthus mooiensis</i> <i>Eucomis autumnalis</i> <i>Helichrysum sp.</i> <i>Knowltonia bracteata</i> * <i>Myrothamnus flabellifolia</i> <i>Ocotea bullata</i> * <i>Peucedanum magalismsontanum</i> * <i>Scabiosa columbaria</i> * <i>Stangeria eriopus</i> * <i>Thesium pallidum</i>	<i>Scilla natalensis</i> <i>Warburgia salutaris</i>	<i>Acacia xanthophloea</i> <i>Adenia gummifera</i> <i>Clivia sp.</i> <i>Elaeodendron transvaalense</i> <i>Gunnera perpensa</i> <i>Rapanea melanophloeos</i> <i>Siphonochilus aethiopicus</i> <i>Urginea sanguinea</i> / <i>Drimia spp.</i>	<i>Albizia adiantifolia</i> <i>Dioscorea sylvatica</i> <i>Hypoxis sp.</i> * <i>Sarcophyte sanguinea</i> * <i>Schotia brachypetala</i> <i>Sclerocarya birrea</i>

It is important to note that most studies conducted in South Africa on vulnerabilities to medicinal flora in trade arrive at a similar core group of species for conservation priority. For example, Table 12.4 lists species prioritised in a study by TRAFFIC International [Marshall 1998]. The table presents those species in South Africa that are destructively harvested, reported to be scarce, traded in large volumes, traded widely, and have high market value. The top three species identified by the urban herb traders were *Ocotea bullata*, *Warburgia salutaris* and *Eucomis sp.* [Marshall 1998]. The only real differences in these studies, is that regional trading patterns and demands change the frequency of occurrence of these species in the market (different health care needs and the diversity of ethnic groups in Gauteng are two of the reasons for these differences).

The fact that some of the core group of species may have a lower than expected ranking in Faraday does not mean that their status has improved or that we ought to be less concerned, it is merely a function of several factors: 1) the regional nature of the market means that certain species are in more demand than in other areas; 2) the species might be traded in lower volumes (and hence have a lower NIV rank) because of the decreasing supply of that resource and the impact on the populations from repeated harvesting over the years. This study highlights new species for conservation consideration. *Urginea sanguinea* / *Drimia spp.*, *Acacia xanthophloea*, *Sarcophyte sanguinea*, *Acacia xanthophloea* and *Albizia adianthifolia* have not really been identified as high conservation priority before. As shown by the Faraday study, however, more attention to these species is warranted based on the high volumes traded in the market, and the frequency with which they occur.

Table 12.4 Medicinal species reported as scarce, heavily traded or with a high price in South Africa [from Marshall 1998]

Species	Reported as scarce in the market	Traded in large volumes	Traded widely	Reported to have a high value/price
<i>Alepidea amatymbica</i>	X	X	X	X
<i>Aloe aristata</i>				X
<i>Ansellia africana</i>			X	X
<i>Artemisia afra</i>		X		
<i>Boophane disticha</i>		X	X	X
<i>Bowiea volubilis</i>	X	X	X	X
<i>Bulbine</i> sp.			X	
<i>Cassipourea gerrardii</i>		X	X	
<i>Clivia miniata</i>	X	X	X	
<i>Curtisia dentata</i>			X	X
<i>Dioscorea dregeana</i>		X		X
<i>Dioscorea sylvatica</i>			X	X
<i>Drimia elata</i>		X		
<i>Eucomis autumnalis</i>	X	X	X	X
<i>Gunnera perpensa</i>		X	X	
<i>Haworthia limifolia</i>	X			X
<i>Ocotea bullata</i>	X	X	X	X
<i>Rapanea melanophloeos</i>			X	
<i>Scabiosa columbaria</i>				X
<i>Scilla natalensis</i>		X	X	
<i>Siphonochilus aethiopicus</i>	X			X
<i>Stangeria eriopus</i>	X			X
<i>Synaptolepis kirkii</i>		X	X	
<i>Tulbaghia alliacea</i>			X	X
<i>Warburgia salutaris</i>	X	X	X	X

12.4 Management of Priority Species

Cultivation of alternative sources of supply of popular, high conservation priority species outside of core conservation areas is essential because the high-level of input and resources required for intensive management of these species is unlikely to occur in Africa [Cunningham 1997]. Commercial cultivation of high conservation priority species is not a simple solution and is unlikely to be a profitable activity for most species because of the slow growth rates and low prices paid for them [Cunningham 1997]. High-priority slow growing species are a priority for *ex-situ* conservation and rigorous protection within core conservation areas. The prices paid for some species does make them potential new crop plants for agro-forestry systems (e.g. *Warburgia salutaris*) or agricultural production (e.g. *Siphonochilus aethiopicus*) [Cunningham 1997].

Table 12.5 compares the results of the conservation priorities determined for the plants sold in Faraday, with the results of an assessment of potential utilisation and sustainability of harvesting of medicinal plants within the Abe Bailey and Roodeplaat Dam Nature Reserves by Dzerefos & Witkowski [1999, 2001]. The reserves are about one hour outside of Johannesburg, and a potential source of medicinal plants sold in Faraday. The Dzerefos & Witkowski study divided the plants into 3 categories that require different management strategies (see Footnotes 26, 27 & 28; Table 12.5 for explanation of categories).

The results of the Faraday investigation support the findings of Dzerefos & Witkowski [1999, 2001]. However, the localised nature of their study within a specific vegetation type (Rocky Highveld Grassland), and the resulting predominance of plants with perennial underground storage organs and a low diversity of species with a woody component [van Wyk & Malan 1988] in their study, means that most of the woodland and forest component sold in Faraday are absent from the comparative table. It is the author's opinion that it is practicable to apply Category 1, 2 and 3 classifications as a management guide to numerous high priority species (non-grassland) sold in Faraday.

Table 12.5 Species sold in Faraday and ranked according to NIV Rating 1 or 2 that were identified by Dzerefos & Witkowski [1999, 2001] as Category 1 (C1)²⁷, Category 2 (C2)²⁸ or Category 3 (C3)²⁹, from an assessment of potential utilisation in Abe Bailey and Roodeplaat Dam Nature Reserves. (nr = no rank).

	Rank in NIV Rating 1	Rank in NIV Rating 2	Abe Bailey	Roodeplaat
<i>Urginea sanguinea</i>	1	1	C1	C1
<i>Hypoxis hemerocallidea</i>	6	2	C1	C2
<i>Tallinum caffrum</i>	57	16	C2	
<i>Eucomis autumnalis</i>	61	17	C1	C1
<i>Boophane disticha</i>	64	18		C1
<i>Elephantorrhiza elephantina</i>	76	26	C2	
<i>Ledebouria marginata</i>	96	37	C2	
<i>Ledebouria ovatifolia</i>	96	37	C2	C1
<i>Dianthus mooiensis</i>	101	42	C1	
<i>Albuca setosa</i> (EP 4)	103	43	C2	
<i>Scilla nerosa</i> (EP 4)	103	43	C2	
<i>Ziziphus mucronata</i>	63	58	C2	C1
<i>Pentanisia prunelloides</i>	126	67	C1	
<i>Zanthoxylum capense</i>	69	74	C2	
<i>Corchorus asplenifolius</i> (EP 14)	86	92	C2	C2
<i>Eriosema cordatum</i> (EP 14)	86	92	C2	
<i>Eriosema salignum</i> (EP 14)	86	92	C2	
<i>Maytenus heterophylla</i> (EP 14)	86	92		C2
<i>Pelargonium luridum</i>	87	93	C2	
<i>Crabbea hirsuta</i>	93	97	C1	C1
<i>Turbina oblongata</i>	98	99	C1	
<i>Gnidia kraussiana</i>	105	104	C2	
<i>Scabiosa columbaria</i>	138	113	C2	C1
<i>Senecio coronatus</i>	121	115	C2	
<i>Chenopodium ambrosioides</i>	82	119	C3	
Species not NIV ranked in the Faraday study because of a frequency of ≤ 4				
<i>Acacia caffra</i>	nr	nr		C2
<i>Artemisia afra</i>	nr	nr		C1
<i>Asparagus africanus</i>	nr	nr	C2	
<i>Bulbine abyssinica</i>	nr	nr	C2	
<i>Cheilanthes hirta</i>	nr	nr		C2
<i>Commelina africana</i>	nr	nr	C1	C2
<i>Commelina benghalensis</i>	nr	nr	C2	C2
<i>Convolvulus sagittatus</i>	nr	nr	C2	
<i>Corchorus confuses</i>	nr	nr		C2
<i>Cucumis hirsutus</i>	nr	nr	C3	
<i>Cucumis zeyheri</i>	nr	nr	C2	
<i>Cyanotis speciosa</i>	nr	nr	C2	C2
<i>Dianthus zeyheri</i>	nr	nr		C2
<i>Dicoma anomala</i>	nr	nr	C1	
<i>Eriospermum ornithogaloides</i>	nr	nr		C2
<i>Gerbera piloselloides</i>	nr	nr	C1	C1
<i>Grewia occidentalis</i>	nr	nr	C2	
<i>Helichrysum aureonitens</i>	nr	nr		C2
<i>Kalanchoe rotundifolia</i>	nr	nr		C2
<i>Lipkea javanica</i>	nr	nr		C1
<i>Pellaea calomelanos</i>	nr	nr	C2	C2
<i>Striga elegans</i>	nr	nr	C2	C2
<i>Xerophyta retinervis</i>	nr	nr		C2
<i>Xysmalobium undulatum</i>	nr	nr	C1	

²⁷ **Category 1:** species are indicators of over-exploitation, harvesting results in plant mortality, and current levels of harvest are not sustainable. Species should be propagated in nurseries, and alternatives are urgently needed.

²⁸ **Category 2:** species have the potential to be harvested according to site and species specific quotas. Research needed to set quotas and harvesting levels according to prevailing environmental conditions (e.g. precipitation, fire regimes).

²⁹ **Category 3:** appropriate for high impact harvesting

The extrapolation of the results and management categories of Dzerefos & Witkowski [1999, 2001], designed for grassland, to include the woody species from Savanna and Forest biomes that are predominantly sold in Faraday, should be done on a case-specific basis. To apply this system objectively, however, would require consideration of the combined risks of species-specific harvesting, growth rates, reproductive strategies and known distributions.

In general, Category 1 (C1) is applied here to species characterised by harvesting that removes the entire plant (e.g. bulbs, tubers, and plants with woody rootstock), or where bark removal on trees has negatively impacted the populations. Category 2 (C2) are applied to species where removal of the entire plant has not reached levels perceived as being currently unsustainable, to trees harvested for bark, and plants harvested for aerial parts. Category 3 (C3) is applied to species harvested for fruits, and prolific and/or exotic species.

Using NIV Rating 2, which weights priority according to the degree of plant part related destructive harvesting, the following general recommendations are made regarding the extrapolation of C1, C2 and C3 management strategies to species sold in Faraday:

1. Bulbs, corms, rhizomes and tubers: C1 for species with $NIV \geq 2$; C2 for species with $NIV < 2$
2. Woody rootstock: If the whole plant is removed, then a C1 categorisation is appropriate (e.g. *Dianthus mooiensis*, *D. zeyheri* and *Scabiosa columbaria*), especially if individual plants are harvested in large, unsustainable numbers. If harvesting volumes are low, or population density/habitat is still high (area of occupancy is high) then C2 is suitable.
3. Roots (from trees and shrubs): Generally C2, except if the species is known to be under high levels of threat from medicinal plant harvesting then a C1 rating is appropriate.
4. Bark: Generally C2, except for species such as *Elaeodendron transvaalense* where bark harvesting results in a high probability of tree mortality, and *Warburgia salutaris* where bark harvesting is a major threat to the species. C1 appropriate for case-specific species.
5. Whole plants: C1 if popular (e.g. *Ansellia gigantea*) or else C2. *Haworthia limifolia* is used interchangeably with *Aloe aristata*, and the latter is believed to present most frequently in the market, usually from cultivated sources.
6. Leaves, stems and flowers: C2 for most species, unless individually assessed as C1.
7. Fruit: C3 for all species

Table 12.6 shows the proposed C1-C3 ratings of some high ranked species according to NIV Rating 2 as a management guide. The original classifications of some species by Dzerefos & Witkowski are in bold.

Individual, case-specific, assessments are strongly advised. According to Dzerefos & Witkowski [2001], current harvesting levels of *E. elephantina* rhizomes does not appear to have significant impact possibly because the species is common in southern Africa – therefore, a C2 rating would be more appropriate than C1. Additionally, certain species with a frequency of less than 4 citations were not NIV ranked; some of these species are currently scarce and so their failure to appear on the priority list does not mean that they are not candidates for resource management. However, not all species have a commercial value in an urban market such as Faraday, however, and it is also possible that some of the species identified by Dzerefos & Witkowski [1999, 2001] are impacted on heavily by local use rather than regional or national use.

Table 12.6 Management recommendations for the top 50 ranked species from Rating 2. Ratings in bold are those recommended in the study by Dzerefos & Witkowski [1999, 2001].

Species	NIV 2 Score	Management category rating
<i>Urginea sanguinea</i> / <i>Drimia</i> spp.	3.74	C1
<i>Hypoxis</i> spp. (incl. <i>H. colchicifolia</i> , <i>H. gerrardii</i> , <i>H. hemerocallidea</i>)	2.90	C1
<i>Sarcophyte sanguinea</i>	2.74	C1/C2
<i>Clivia</i> spp. (<i>C. miniata</i> , <i>C. nobilis</i>)	2.69	C1
<i>Elaeodendron transvaalense</i>	2.62	C1
<i>Urginea</i> spp. (incl. <i>U. altissima</i> , <i>U. macrocentra</i> , <i>U. physodes</i>)	2.59	C1
<i>Albizia adianthifolia</i>	2.58	C2
<i>Scilla natalensis</i>	2.43	C1
<i>Dioscorea sylvatica</i>	2.39	C1
<i>Acacia xanthophloea</i>	2.36	C1
<i>Ornithogalum longibracteatum</i>	2.34	C2
<i>Stapelia gigantea</i>	2.33	C1
<i>Haworthia</i> spp. (<i>H. fasciata</i> , <i>H. limifolia</i>)	2.31	C1
<i>Siphonochilus aethiopicus</i>	2.29	C1
<i>Schotia brachypetala</i>	2.24	C2
<i>Talinum caffrum</i>	2.23	C1
<i>Eucomis autumnalis</i> ssp. <i>clavata</i>	2.19	C1
<i>Boophane disticha</i>	2.17	C1
<i>Eucomis bicolor</i>	2.16	C1
<i>Spermacoce natalensis</i> / <i>Acridocarpus natalitius</i> sspp (EP 20)	2.14	C2
<i>Sclerocarya birrea</i> ssp. <i>caffra</i>	2.13	C2
<i>Adenia gummifera</i> var. <i>gummifera</i>	2.11	C2
<i>Schlechterina mitostemmatoides</i>	2.10	C2
<i>Acalypha villicaulis</i>	2.10	C2
<i>Mesembryanthemum</i> sp. / <i>Rhipsalis baccifera</i>	2.09	C2
<i>Elephantorrhiza elephantina</i>	2.07	C1/C2
<i>Curtisia dentata</i>	2.07	C2
<i>Urginea delagoensis</i>	2.05	C1
<i>Eriospermum</i> spp. (incl. <i>E. mackenii</i>)	2.04	C1
<i>Deinbollia oblongifolia</i> / <i>Maytenus acuminata</i> / <i>Nuxia floribunda</i> / <i>Myrica serrata</i> / <i>Cunonia capensis</i> (EP 16)	2.03	C2
<i>Dioscorea dregeana</i>	2.02	C1
<i>Viscum verrucosum</i>	2.01	C2
<i>Trichilia</i> spp. (<i>T. dregeana</i> , <i>T. emetica</i>)	2.00	C2
<i>Tulbaghia</i> spp. (<i>T. alliacea</i> , <i>T. ludwigiana</i> , <i>T. simmleri</i> , <i>T. violacea</i>)	2.00	C1/2
<i>Gladiolus</i> spp. / <i>Eulophia</i> spp. / <i>Crocasmia</i> spp. / <i>Dierama pendulum</i>	1.96	C2
<i>Celosia trigyna</i> / <i>Crotalaria</i> spp. (EP 17)	1.96	C2
<i>Ledebouria</i> spp. (<i>L. cooperi</i>, <i>L. ovatifolia</i>, <i>L. revoluta</i>)	1.95	C2
<i>Stangeria eriopus</i>	1.95	C1
<i>Rapanea melanophloeos</i>	1.94	C2
<i>Ekebergia capensis</i>	1.92	C2
<i>Erythrophleum lasianthum</i> / <i>Acokanthera oppositifolia</i> / <i>Margaritaria discoidea</i> (EP 3)	1.91	C2
<i>Dianthus moolensis</i> sspp.	1.91	C1
<i>Scilla nervosa</i> / <i>Albuca</i> sp. cf. <i>setosa</i> (EP 4)	1.91	C2
<i>Phyllanthus meyerianus</i> / <i>Gerrardina foliosa</i> / <i>Croton gratissimus</i> / <i>Grewia caffra</i> (EP 1)	1.90	C2
<i>Warburgia salutaris</i>	1.90	C1
<i>Prunus africana</i> / <i>Rhus chirindensis</i>	1.90	C2
<i>Gunnera perpensa</i>	1.89	C2
<i>Cycnium racemosum</i>	1.89	C2
<i>Maytenus undata</i>	1.89	C2
<i>Bowiea volubilis</i>	1.89	C2

13 RESOURCE MANAGEMENT, AND CONSIDERATIONS FOR CONSERVATION, CULTIVATION AND COMMERCIALISATION OF MEDICINAL PLANT SPECIES

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It is becoming increasingly evident that cultivation and conservation of key species is a matter of urgency, a huge challenge, generally not always cost-effective and certainly not a quick-fix solution. It can be argued that cultivation detracts from the incentive to informally conserve habitats since it removes the impetus to protect individual species *in situ* [Sheldon *et al.* 1997]. This argument is becoming redundant - as evidenced by the growth in the medicinal plant trade and the challenges that conservation officials have in trying to contain the activities of commercial gatherers around the country.

While cultivation is a resource management option for declining plant supplies and resource depletion, it is a far broader task to recognise and address solutions pertaining to what motivates people to become involved in the medicinal plant trade as either consumers, traditional healers, shop traders, street traders and/or commercial gatherers. These factors include the affordability and accessibility of basic primary health care, education, employment opportunities and the economic climate. In addition to considering the deleterious effects of harvesting plants on the environment, resource management initiatives must therefore also consider the social and economic costs and benefits to communities of the intended initiatives.

13.1 Considerations for Resource Management

Most people in South Africa have a low standard of living and the population is growing rapidly. There is evidence that resource destruction from over-exploitation is occurring on a scale where conservation efforts need to expand to protect resources. Poverty and under-development often force people to disregard resource management practices [Smuts & Hobbs 1991]. The challenge for resource management, however, is to make the right trade-offs between conservation needs and development needs [Stauth & Baskind 1992]. According to Stauth & Baskind [1992], conservation efforts cannot succeed if the economy is not able to satisfy the basic desires and aspirations of the great majority of the population. Further, where there is a great want there is usually always a danger of over-exploitation, the three major causes of which are poverty, ignorance and “greed”. While greed and ignorance can, to a limited extent, be handled through regulation and education, only economic development can alleviate poverty [Stauth & Baskind 1992]. The challenge thereafter, is to find ways of fostering strong economic growth (and/or poverty alleviation) without causing significant environmental damage.

The preceding paragraph illuminates the challenge for protecting and managing medicinal plant resources. Plant resources provide a buffer for rural communities against poverty and unemployment during cyclic economic depression [Cunningham 1991b], and an employment prospect where formal education-reliant opportunities are lacking. Most street traders in Faraday, and the commercial gatherers in general, have had limited education and the traditional healers amongst them even less. In addition, they come from very poor regions of KwaZulu-Natal, usually single income households, where current low living standards are exacerbated by unemployment, lack of education and skills, inadequate access to primary health care facilities (except for traditional medicine) and more recently the scourge of AIDS which is eroding rural populations. ‘Need’ rather than ‘greed’ is the stimulus for unreserved over-exploitation of medicinal resources because conditions within the rural economy have prompted participation in this activity, hence causing gatherers to harvest as much as possible to maximise their short-term income and provide life support. It is not a myth for some people that money ‘grows on trees’. For conservation and cultivation programs to be effective therefore, economic development and social upliftment within the rural areas must be addressed concurrently with

resource management, and in a manner that is consistent with social values and encourages ‘grassroots’ participation in the development process [Smuts & Hobbs 1991].

‘Management’ implies the execution of planned controls to achieve a desired outcome in a manner that optimises benefits and minimises costs [Fuggle 1992]. The questions are: what is the desired outcome, and what are the costs? The desired outcome should take into consideration the following principles proposed by the World Conservation Union in 1991 [*in* Fuggle 1992]:

- Conserve diversity
- Minimise the depletion of resources
- Enable/empower communities to be caretakers of their environments
- Improve the quality of human life
- Integrate conservation and development within a national framework, and create alliances with stakeholders.

The goal of resource management should be to promote the efficient, equitable and sustainable³⁰ use of resources with the above principles in mind, as well as considering any social, economic and environmental costs/benefits. This might be a sublime challenge when previous conservation paradigms have promoted preservation, and proponents of social welfare have criticised the ‘locking up of resources’ at a time when many people are living in poverty [Stauth & Baskind 1992]. Economic incentives benefiting communities exploiting resources are therefore important if the management strategy involves increased regulation of the resources.

Once the policy goal for resource management has been set, the approach to implementing the policy has to be determined. For medicinal plants, this approach would involve a combination of conservation and cultivation initiatives. Cultivation initiatives for ethnomedicinals require the valuation of the resources, and the challenge in *this* regard is that of valuing common property resources. The prices of plants in the market do not usually reflect all the costs (environmental, economic and social) associated with the harvesting of the resource. In addition, people do not often perceive the links between their consumption of the commodity and the environmental damage costs through their actions [Stauth & Baskind 1992]. Market prices do not, therefore, always constitute an accurate measure of the resource value. While the cost-effectiveness of planting ethnomedicinals is a moot point, cultivation is certainly a more constructive action than depleting the resource.

Management and conservation of biodiversity and natural capital is additionally contingent on property rights, a gatherers access to the land and/or a farmer’s tenure rights thereto. Questions that must be asked to address this matter include: Who owns the resource? Who has the right to harvest or use the resources? What restrictions apply to the management thereof? [from FAO 1995]. Property rights can be divided into four categories, namely: private property, common property³¹, open-access, and state or public property – all of which are sources of material for the medicinal markets. Nature reserves within Gauteng that are harvested frequently for plants include Klipriviersburg and Suikerbosrand. It is in the interests of the state to enforce resource management on property over which it has greater jurisdiction. Open-access resources are difficult to manage, and negotiation with curators of common-property may make it possible to better manage the affected resources.

Another consideration for resource management in the context of the Faraday market is that 18.3% of the traders sell plants they have gathered themselves, 36.6% only buy from the commercial gatherers, and 45.2% both buy and gather-self the plants. There are, therefore, a large number of people involved in the trade who are not seen in the market (except on Monday or Friday when they arrive with the buses from the rural areas to sell plants in the market) who could be the beneficiaries of resource management programs, capacity building, and related rural empowerment initiatives.

³⁰ Stauth and Baskind [1992] suggest questioning the efficiency, equitability and sustainability of proposed actions in the following way: *efficiency* – would the benefits exceed the costs?; *equitability* – would the benefits/costs be distributed fairly?; *sustainability* – would the benefits continue to exceed the costs over intergenerational time periods?

³¹ Definitions [from FAO 1995]: *Common property* is characteristic of many traditional communal land use systems. The resources have clearly recognised users who, although they may not own the resource, have recognised access rights and the ability to limit access to others. *Open-access* resources are accessible to all, have no recognised users and are not easily controlled.

In order to achieve the goals set for managing the resources and addressing the stimuli for participation in this hidden economy, resource management strategies for Faraday can be targeted at several levels, each requiring different degrees of commitment, participation and collaboration from departments within national, provincial and local government. The target areas for resource management are:

- The entire national trade where species harvested from around southern Africa are transported to the various provincial markets, including the Faraday Street market within Gauteng, and involves many thousands of itinerant traders and commercial gatherers. This requires a high degree of participation at both an inter-provincial and national level.
- Species harvested nationally that are for sale within the Faraday market
- Species harvested within Gauteng that are traded in local and provincial markets
- Initiatives that specifically involve the traders in Faraday and the gatherers that supply them
- The 'Friday traders' – Gauteng-resident sellers that trade in plants harvested from the province, primarily in the Sotho vernacular
- Local traditional healers and stakeholders within Gauteng.

Because $\pm$ 80% of the plants harvested for sale in Faraday, and 92% of the traders, are from outside Gauteng, the ultimate goal for resource management of ethnomedicinals should be the progressive expansion of initiatives towards an integrated national strategy. Any initiatives that repeatedly focus too narrowly on the conservation of local resources are only likely to be a temporary solution, and will not successfully stem the tide in the national exploitation of plants (assuming that the ultimate goal is to address the national trade).

Sustainable harvesting of plants is possible in theory, but is more complex than policy-makers think because it depends as much on understanding the biological component as the social and economic aspects of plant use [Martin *et al.* 2001]. The term 'natural resource management' is misleading in many ways because it entails more about people than natural resources [Martin *et al.* 2001].

13.2 Considerations Regarding Conservation, Cultivation and Commercialisation

As has been demonstrated in this report, over-exploitation of resources has stemmed, in part, from local poverty which is the direct result of the particular socio-economic situation in which many rural inhabitants have found themselves in. The prices paid for the plants are often so low as to act as a stimulus for over-collection through traders feeling compelled to over-harvest in order to obtain a reasonable income [Lewington 1993]. Moreover, higher prices paid for certain species encourage further depletion of the resource because of the potentially higher income generated by harvesting them.

Research over the last few years has demonstrated that cultivation/domestication³² is a promising means for reducing pressure on wild collected resources and supplementing the demand within the plant markets. However, the cost-effectiveness of such initiatives has inhibited the success of these ventures on a large scale (in terms of the volume and the number of species farmed), except as it relates to local traditional healers, communities and consumers proximate to (or, beneficiaries of) these initiatives, and certain high-value species such as *Siphonochilus aethiopicus*. Calls to 'conserve through cultivation' have largely gone unheard, and little or no commercial cultivation has taken place – mainly because of the lack of understanding with respect to marketing, cultivation economics and production of indigenous plants [Mander *et al.* 1996].

Promotion of cultivation should be done carefully, as this may lead to: 1) loss of income to commercial gatherers and the degradation/destruction of habitats where economic benefits are no longer derived from conserving the resource [Lange 1998], and 2) high risks for farmers investing in a new venture where benefits are not guaranteed. It is therefore

³² Domestication, according to Lund [1996], is the act or process of converting plants to household use. It often means moving the plant from its natural habitat, introducing it to a modified habitat and providing the means for it to maintain itself in its new location. This may involve genetic modification and breeding. The intention of domestication may not necessarily be to profit from the act. A plant may be domesticated for commercial purposes, such as the cultivation of ethnomedicinals like *Siphonochilus aethiopicus*.

difficult to balance wild-collection and cultivation, and *almost impossible without commitment to regulation by government authorities* [Lange 1998] and also support from the private sector.

Lange [1998] suggests that a good way of conserving medicinal plants is through ensuring that the commercial value of the resources provides an economic incentive to the harvesters (communities and individuals) to conserve the areas in which the plants grow. The challenge for southern Africa is developing sustainable incentives that encourage curatorship and management of plant resources concurrently with sustaining rural incomes and livelihoods that are not overly detrimental to the environment.

Sheldon *et al.* [1997] raise the question of whether utilisation and conservation of plant resources can coexist. Conservation-minded utilisation is achievable through the appropriate management of resources and cultivation. Cultivation is the link between conservation and commercialisation initiatives. Conservation measures include *in situ* preservation and *ex-situ* cultivation of the resources at an appropriately determined level and scale depending on the species, resource users and growers. Sustainable commercialisation³³ of most plant resources can only occur through cultivation/domestication. Rather than banning wild collection and commercial gatherers of medicinal plants, it appears sensible to encourage prudent, sustainable harvesting along with propagation and cultivation where possible [Lewington 1993].

Cultivation of medicinal plants within rural areas (or by stakeholders already utilising/harvesting the resource for commercial purposes) holds prospects for higher rural incomes and conservation of biodiversity [FAO 1995]. The advantages of cultivation include the ability to:

- Help sustain the supply of plants by meeting market demands, hence stabilising the market;
- Relieve habitat pressures on plants that are wild collected, hence protecting the species *in-situ*;
- Provide income-generating opportunities and resources to communities and resource users;
- Facilitate easier harvesting and collection of the plants;
- Improve plant reproduction, regeneration and growth rates;
- Selectively breed for certain qualities, e.g. root size and alkaloid content [Sheldon *et al.* 1997]
- Offer a crop of cultural familiarity and value.

The disadvantages of cultivation include:

- Increased susceptibility of species to pests and diseases, often leading to a potentially detrimental dependence on pesticides [FAO 1995];
- Detraction from the long-term potential for conservation of habitats by removing the impetus to protect individual species *in-situ* [Sheldon *et al.* 1997];
- Dependence on regular inputs of genetic material from wild sources to maintain genetic viability;
- The necessity for capital inputs and the investment in infrastructure;
- The danger of concentrating the income-generating potential in larger entities away from the poor households that currently harvest the resources, thereby disadvantaging them further.

The goal of community conservation and cultivation initiatives should be:

- To facilitate, through propagation, the sustainable use of medicinal plant resources
- To preserve habitats and alleviate collecting pressures on wild populations by plant propagation
- To develop capacity in local communities
- To create economic opportunities for the beneficiaries of the initiatives
- To optimally utilise natural resources

³³ 'Commercialisation' is defined by the draft Gauteng Nature Conservation Act as: the use or exploitation of indigenous plants (their progeny or derivatives) with the object of (or resulting in) financial gain, and includes (but is not limited to) the following activities: selling, applying for, obtaining or transferring intellectual property rights or other tangible or intangible rights by sale or licence or in any other matter, commencement of product development, conducting market research, and seeking pre-market approval. Taylor *et al.* [1996] suggest that two approaches to commercialisation of natural products can be developed, namely: 1) sustainable management of the resource; and 2) domestication and cultivation. The two are not mutually exclusive.

- To propagate scarce indigenous medicinal plants.

Cultivated plants are generally acceptable to both customers (the users) and traders (the buyers of the material). Eighty percent of traders indicated that they would buy cultivated plants, but only if they were less expensive than wild-collected material (Table 10.4). A further 74% cited reasons why it was important to cultivate, but this had less to do with conservation and more to do with plants being available for healing purposes (Table 10.6). However, less than 5% of traders considered cultivation as an activity they would consider participating in to ensure future plant availabilities. While cultivated plants are acceptable, most traders do not believe that plant scarcities are a reality and therefore obviate any reason why they should participate in such ventures. Greater awareness is therefore necessary.

13.3 Recommendations Regarding Resource Management, Conservation, Cultivation and Commercialisation

The recommendations are made on the assertion that initiatives to address the over-exploitation of medicinal plant resources will need to extend beyond species-specific action, and be inclusive of considerations for management, conservation, cultivation, rural empowerment and, sustainable job creation in alternative activities. Implementing the recommendations will require the participation of a host of public and private sector institutions, as well as the traditional healers and commercial plant traders. These recommendations are intended to compliment the recommendations of other market studies, such as Mander [1998], but do not address issues relating to supplying the phyto-pharmaceutical industry. Some recommendations made in previous chapters are not necessarily repeated here.

Resource Management

- Determine the policy goals for resource management in terms of the desired outcomes.
- Determine the target area for the proposed initiatives and hence the stakeholders and beneficiaries.
- Establish the approach (method, time frame and locality) for implementing the goals – e.g. increased regulation; cultivation etc.
- Anticipate how the proposed initiative(s) would affect the various stakeholders and beneficiaries, and address/adapt the solutions to any potential conflicts that may arise (for example, reducing, anticipating or preventing conflict arising from job losses caused by increased law enforcement).
- Identify social, environmental and economic costs and benefits of the proposed management strategy, and the extent to which total benefits exceed total costs.
- Address policy issues and considerations for rural economic development and social upliftment as part of a multi-disciplinary resource management approach. This will require a provincial commitment to the resource management plan, and liaison and co-operation between different provincial departments, to ensure sustainability of the initiatives instead of temporary and transient successes.
- Use this market study, and the species identified as being at risk, to further short-list species for resource management. Parameters for assessment include: population size and geographic distribution, plant community considerations, habitat requirements, commonness or rarity within a population, growth rates, reproductive biology, and, if necessary, phylogenetic distinctness.
- Ascertain the level of protection necessary and develop species-specific management programs to reduce further endangerment, or reverse existing threats to the populations.
- Determine the land tenure rights (e.g. open-access or state property) applicable to the proposed resource management initiative, and hence the appropriate measures to be taken. Ask the questions: Who owns the resource? Who has the right to harvest or use the resources? What restrictions apply to the management thereof?

Conservation, Cultivation and Commercialisation

- ***Enhancement of cultivation efforts and increased protection:*** cultivation is a means of reducing pressures on plant populations that are being detrimentally harvested. Plants shown to be high risk, very rare or locally extinct would benefit from increased protection to reduce pressures on wild populations, and consideration of cultivation

measures to increase supply to the markets and preserve genetic diversity. It is necessary to determine at what level the species can be sustainably harvested, and the degree to which propagation would be of assistance.

- **Species to be considered for conservation and cultivation:** species warranting further investigation and consideration for protection and cultivation include:
 - Top ranked species in Tables 12.1 & 12.2, namely: *Urginea sanguinea* / *Drimia* spp., *Hypoxis* sp., *Sarcophyte sanguinea*, *Clivia* sp., *Elaeodendron transvaalense*, *Urginea* sp., *Scilla natalensis*, *Dioscorea sylvatica*, *Albizia adianthifolia*, *Acacia xanthophloea*.
 - All species listed in Table 12.3 that indicate where there have been notable changes in availability and occurrence of species between 1994/5 and 2001. Notable decreases in species occurrences that signify population decline include *Gunnera perpensa*, *Alepidea amatymbica*, *Boophane disticha*, *Bowiea volubilis*, *Dianthus mooiensis*, *Eucomis autumnalis*, *Stangeria eriopus*, and *Warburgia salutaris*. Noteworthy increases in occurrence in the market that signify potential population decreases in the future (if not already) include *Albizia adianthifolia*, *Dioscorea sylvatica*, *Hypoxis* sp., *Sarcophyte sanguinea* and *Schotia brachypetala*. These species should also be assessed using the new IUCN Red Data system.
 - Species perceived by traders as scarce and/or popular (Tables 10.7 & 10.8) include: *Urginea sanguinea* / *Drimia* spp., *Sarcophyte sanguinea*, *Elaeodendron transvaalense*, *Acacia xanthophloea*, *Warburgia salutaris*, *Siphonochilus aethiopicus*, *Gunnera perpensa*, *Hypoxis* sp. and *Clivia* sp.
 - Species reported to be vulnerable, Endangered and/or CITES listed (Tables 11.1 & 11.4) include: *Encephalartos* sp., *Gasteria croucheri*, *Haworthia limifolia*, *Warburgia salutaris*, *Aloe* sp., *Orchidaceae*, *Eulophia* sp., *Euphorbia* sp., *Prunus africana* and *Stangeria eriopus*.
- **Establish a co-operative relationship with Phindulwandle medicinal plant nursery:** the established community-based nursery is located near Hectorspruit, close to Malelane in Mpumalanga³⁴, and currently cultivates +200 species of medicinal plants. The nursery is valuable as a source of start-up material for new nursery and propagation ventures. In addition, the nursery can propagate species on request for new nursery ventures (or non-nursery clients) that do not have the infrastructure and facilities to do so themselves. The nursery also runs a medicinal plant propagation and nursery management course (compiled by J.E. Smit of the Lowveld College of Agriculture) at a cost of R40 per person (August 2001 price)³⁵. I highly recommend that co-operative ventures in training, nursery establishment and plant supply be established between Phindulwandle, Mpumalanga Parks Board and DACEL. This nursery is more accessible to Gauteng than Silverglen in KZN.
- **Co-operatives aimed at sustainably harvesting selected medicinal plants:** in order to further sustainable resource management within the context of communal land ownership, or lack of ownership, it is recommended that co-operatives be established to investigate and implement the commercial management of medicinal plants [Marshall 1998]. A co-operative would include membership by traditional healers, and be geared towards community-orientated participation in commercial production of plants for individual and market needs. A co-operative already in existence in White River is the 'South African Medicinal Flora Co-operative'³⁶. The co-operative is working towards the reversal of over-exploitation and habitat destruction through making plant material available for introduction into the market. Part of the mission is to create a renewable source of medicinal plants for distribution to a network of traditional healers and end users, and enhance the local economy and community empowerment through reintroducing a sustainable resource. At least five species are currently in production, including *Hypoxis* sp., *Eucomis autumnalis* and *Alepidea amatymbica*. One of their projects is located in Orange Farm, south of Johannesburg. Consultation with this co-operative would be beneficial.

³⁴ The contact person for Phindulwandle nursery is Gerhard Strydom (Mpumalanga Parks Board). Tel: 013 790 4881 or cell 072 254 6503

³⁵ The medicinal plant propagation course runs over a week, and a training manual is provided. The nursery can house up to 10 people at a time, the only requirement being that the participants bring their own bedding and food. The lectures can be conducted in the participant's language of choice, and the trainers include the traditional healers that work in the nursery.

³⁶ Contact details for the 'South African Medicinal Flora Co-Operative': Louis Arthur at email medflora@mweb.co.za

- **Strategies for cultivation:** maintaining biodiversity and sustaining the supply of plants to the market may require a combination of cultivation strategies that include: 1) enrichment planting in protected areas or private property (such as forestry plantations); 2) small-scale cultivation by farmers, co-operatives, nurseries, urban cultivation initiatives etc within the public and private sector domains; and 3) larger-scale commercial plantations. There are varying degrees of capital investment and co-operation required.
- **Commercialisation:** use this market study to identify species-specific cultivation/domestication opportunities for supplying the market demand through commercial ventures. This can be done in conjunction with the private sector. Pursuing the CPPP (Community Public Private Partnership) model would ensure an element of community empowerment. Taylor *et al.* [1996] recommend using PRA (Participatory Rural Appraisal) techniques where necessary to engage the community in developing sustainable resource management strategies. The agency facilitating the process should provide technical support, training and other facilities.
- **Sourcing germplasm for cultivation:** a consideration for cultivation is the sourcing of planting material and germplasm. If cultivation programs are to be set up, then the quality and quantity of material required will need to be determined. The material could be wild collected, sourced from existing medicinal or indigenous plant nurseries, specifically tissue cultured etc. This obviously has certain costs that need to be considered and investigated further.

13.4 Further Recommendations

- **Trade monitoring:** for many species of medicinal plants, conservation efforts to protect them only began once they were already threatened by over-exploitation [Lange 1998]. While this study of the Faraday market indicates trends in species availability and potential risks, the existing temporal variabilities could result in species being overlooked for conservation action. The trade is largely unmonitored on a regular basis. It is, therefore, recommended that Faraday be monitored on at least a monthly basis to detect trends and patterns in the trade, including fluxes in price and volume, to further determine the impact of exploitation and to maintain the good working relationship established with the traders during the course of this survey.
- **Conservation status:** the outdated provincial conservation ordinances, with the exception of KZN, do not adequately protect many species that have come under threat because of harvesting for the medicinal plant trade. Revision of these ordinances is therefore necessary. In addition, a revision of the Red Data List for medicinal plants is advisable to characterise the levels of threat to some species. (A Red Data List for medicinal plants is currently being compiled by J. Victor, N. Crouch and V. Williams)
- **Law enforcement and regulation:** upgrading the conservation status of ethnomedicinals is only constructive if accompanied by more rigorous regulation and enforcement of the legislation. This becomes an intricate task when considering the motives for the involvement of many people in the trade, and the implications of penalising already impoverished people. This does not mean to say, however, that the actions of the commercial gatherers are entirely justified and that no action should be taken. A consultative process for determining the appropriate manner to enforce the law is therefore recommended. In addition, new policies and easier mechanisms to control the trade are needed [Kuipers 1997]. Increased regulation should also be accompanied by stricter adherence to the requisite permit system (as administered more successfully by the KZN conservation authorities³⁷, for example). For this to occur, however, a more enabling environment for permit applications in Gauteng must be established. It is doubtful that any of the gatherers know where and how to apply for such permits in Johannesburg, even though some of

³⁷ According to Steve McKean from KZN Wildlife: “Our permit system is currently very accessible - but very poorly enforced mainly due to lack of capacity. Our permits office cannot cope with the numbers, hence permits are issued to traditional healers organisations. The chairpersons then have authority to issue copies of this permit to their members, provided that the member's ID number appears on the copy. This is proving disastrous as it is being abused beyond belief. We are looking at ways to sort it out - but it will be a medium to long-term thing, will be done in partnership with a host of other organisations, and will require fairly big funding. Our relationship with the traders and gatherers is better than it has been - but is still nowhere near ideal. We do have plans for a long-term strategy to deal with this.”

them are aware of the requirement. For this reason, DACEL must improve its lines of communication with the traders. In addition, a sustained and concerted commitment is required from government to address this national challenge at a regulatory level, and to support the initiatives.

- **Awareness and education:** methods for communicating information to traders, commercial gatherers, traditional healers, rural communities and other stakeholders that are currently ‘managing’ (or mining) the resources must be carefully considered. Improved interface with the stakeholders is beneficial for policy development and creating awareness of DACEL’s intentions, initiatives, and requirements, as well as creating awareness of current plant scarcities (most traders do not believe that plant scarcity is a reality). The success of conservation and sustainable use of resources largely depends on the understanding of the people involved, and their acceptance of the concepts [Bhattarai 1997]. Although much can be gained from improving the basic understanding of stakeholders regarding conservation and law enforcement issues for example, one should be cautioned into thinking that better information and education is a panacea [Tomich 1996]. The means to practically apply the knowledge and deliver tangible end results is often lacking, and there is a need for any capacity building initiatives.
- **Environmental education:** environmental education should focus and teach practical skills to make people more self-reliant and aware of how to use their local resources sustainably and more profitably [Bhattarai 1997]. Harvesting techniques may often exacerbate the threat to plants, by causing unnecessary levels of damage and population depletion [Lange 1998]. Teaching improved harvesting methods could lead to a reduction in post-harvest wastage, unnecessary plant mortality through improved knowledge of the species, and therefore increased potential financial benefits. It is arguable as to whether greater awareness would be advantageous to plant populations, or would inevitably result in ‘educated’ destruction in the longer-term through the gatherer’s knowledge of how to maintain the species for longer.
- **Capacity building:** building the traders’ capacity involves teaching skills to enable their confident participation in other income-generating activities (e.g. crafts, adult education), and teaching plant production and propagation techniques. These options should be explored as means for diversifying their potential. Further examples are discussed below.
- **Development of entrepreneurial and management skills:** basic training in business management practices would help to ensure that advantages to be gained from capacity building programs translates into the maximisation of profits and gains, and the minimisation of penalties and losses. It is recommended that a training program already in existence, and run by Mr B. Wade³⁸, is adapted to the needs of the Faraday traders (including healers and gatherers) and is funded by allied departments within local government. This training program should be developed in collaboration with DACEL, and extended to stakeholders of cultivation and commercialisation initiatives. A potential outcome of the training is a greater awareness of the implications for wastage, and how this can be minimised. Additionally, any traders ceasing to sell medicinal plants would have the advantage of knowing versatile skills that are useful in any new income-generating activity. A point for consideration is that the course is run with some of the Faraday traders prior to their relocation within the redeveloped precinct in order to minimise the impact of potential job losses.
- **Alternative income-generating activities through harvesting exotic plant derivatives:** an alternative to harvesting indigenous medicinal plants is the harvesting of exotic species to supply raw materials for environmentally friendly and economically viable manufacturing and processing initiatives with local and export potential. The initiatives would require gatherers to harvest exotic species in parallel with, or as a replacement for, indigenous species that are currently harvested, without too much disruption to the gatherers’ current harvesting activities. The outcome is a rural empowerment program attendant with a scheme to curb the proliferation of exotic plants. One such program spearheaded by the African Eco Foundation (AEF) is the *Rural Bio-Diesel Project*, which was accepted as the

³⁸ Mr B. Wade is contactable through the author. He has run training courses on basic business skills across the literacy levels from large private sector companies, to informal traders in KwaZulu-Natal. A salient feature of the training program is revealing where losses/penalties are occurring, and how this can be reversed through awareness and minor adjustments in actions taken. The author has been an observer to one of his training courses aimed at workers within a small company manufacturing pharmaceuticals and phytomedicines.

World Summit Legacy Project. The program was created to develop a sustainable model for the introduction and production of renewable sources of bio-energy in South Africa. The Bio-Energy Program is aimed at rural upliftment, and intends to train previously disadvantaged communities to build rural infrastructure and promote the growth of agri-businesses to produce a down-stream bio-diesel product and its co-products in South Africa. Gatherers would be required to harvest the seeds of the following species: *Jatropha curcas*, *Moringa oliefera* and *Ricinus communis*. A second alternative venture proposed by AEF is the harvesting of *Bidens pilosa* (black jack) stems. The feasibility of these projects as they relate to the Faraday gatherers should be investigated by DACEL and supported financially if found to be viable.

- **Investigation of the species harvested by the Friday Traders:** the species harvested by the Friday Traders warrant further investigation, and could be the focus of a resource management initiative in Gauteng. Many plants sold by these traders (primarily by their Sotho vernacular name) were not identified. In the interests of documenting common names for future research, this information is fundamentally important. The recommendation is for further research to be initiated with the Friday Traders to investigate the species they sell and the common names, in addition to determining localities within Gauteng where the plants are harvested. Considering the traders' proximity to Faraday, participatory cultivation programs could be initiated as both a means for conservation and supplying plants to the market. Mrs Noelline Kroon is proposed as member of the research team because of her experience³⁹ with traditional healers and the horticultural potential of medicinal plants in southern and western Gauteng, as well as the Sasolburg/Heidelberg region. Because most of the Friday Traders are permanent residents of Gauteng, the initiative is seen to be advantageous for associated rural communities. A potential hurdle to working solely with the Friday Traders is the disgruntlement of the Faraday committee and permanent traders who might not accept to be sidelined. If possible, a way of working with the traders through the committee should be sought.
- **Investigation of the commercial gatherers that do not sell at stalls in Faraday:** Mander estimated that of the 8000+ gatherers selling material in Durban, about 670 traded their produce in the street markets [Mander 1998]. In Faraday, 18.3% of the traders sell plants they have gathered themselves. The remainder either buy from the gatherers or both buy and harvest the plants they sell. There are, therefore, a large number of gatherers who remain largely unwitnessed. Relevant and effective remedial action (e.g. training, cultivation programs etc) can only really be undertaken if the appropriate people are targeted. Further investigation to identify and understand the network of commercial gatherers who supply Faraday is therefore warranted.
- **Future research:** first, DACEL should regularly update research on trade in, and conservation of, medicinal plants within Gauteng. This would include updating the trade information and identifying knowledge gaps – such as surveying the demand for medicinal plants in Pretoria where the market dynamics are expected to be different for many reasons. Second, surveys (trade and field) of specific threatened plant taxa identified by this study should be undertaken to determine and promote appropriate remedial measures. Third, further understanding of the costs of plant production is necessary before there is investment in commercial cultivation on a larger scale.
- **Collaboration and co-ordination:** efforts to conserve and manage plant resources used medicinally to ensure protection and future supply should be undertaken on the basis of coordinated and collaborative work at both the public and private sector levels. Ideally, this would require establishing workgroups composed of scientists, conservationists, private and public sector representatives (including other nature conservation authorities), traders and other stakeholders. Collaboration is also very necessary for assessing the conservation status of threatened taxa due to the interspersed nature of the available information amongst researchers and others with the relevant expertise. It is also recommended that national/inter-provincial/inter-departmental working groups on medicinal plants are established that also include the relevant private sector role players.

³⁹ see Kroon [1999]

- **Eco-tourism:** Faraday traders should take advantage of ‘urban eco-tourism’ ventures, and be assisted with developing their capacity as guides, chaperones or translators to tourists who arrive at the market⁴⁰. The Johannesburg City Slicker Bus passes by the market on a regular basis (Figure 13.1), but never stops – primarily because of security fears and the nearby taxi rank. Much interest in visiting the market has been expressed by both locals and international visitors, however their reluctance to stop is based on not knowing where to park, whom to trust, where to go, or whether there is anyone who can answer their questions. The traders are quite happy to receive visitors to the market, yet there is an obvious language barrier amongst the older traders. Consideration to accommodating tourists and visitors to the Faraday should be given in the redevelopment of the precinct.

(Note: subsequent to the April 2002 draft of this report, the author was involved in training four people as SATOUR registered guides – specifically for the Faraday Precinct. The initiative was motivated by the Earth Summit and the potential for tourists to the site. One of the trained site guides includes a young trader from the market, chosen by the Faraday committee. Faraday now has an officially registered site guide capable of conducting tours around the market and escorting visitors. The three other site guides were former research assistants to the author. In the long-term, the site guides will be linked to tourism initiatives planned for Johannesburg.)



Figure 13.1 The Johannesburg City Slicker bus, with tourists, driving past the market

⁴⁰ The author has taken several groups of interested visitors into Faraday. These visitors included Swedish Rotarians, the Parktown Heritage Association, academics, filmmakers and general interest groups. Language is a barrier among the older traders who speak little or no English. The younger generation of traders and trader's assistants are more fluent, and the chairman of the market has frequently asked them to escort the groups, and to assist where necessary.

14 CONDITIONS IN THE PRECINCT, & IMPROVEMENTS RECOMMENDED BY CUSTOMERS, TRADERS, COMMUTERS AND TAXI OPERATORS

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In anticipation of the plans to redevelop the Faraday precinct, the street traders and customers were queried on what could be done to improve the trading conditions and/or circumstances for the people trading within the precinct (Supplement 1: Q18 & Q13). The independent study conducted by the consultants to the redevelopment of Faraday [ICDA & SPDC 2001] highlighted the perceptions and needs of the commuters to the area, and the taxi drivers. As described in Section 3.4, the negative perceptions of the commuters towards the muti traders would seem to indicate that the majority of the medicinal market customers are derived from people (traditional healers, patients or retailers) who travel to the market especially to buy plants.

A general complaint by all users of the market is the shortage and availability of ablution facilities. The toilets in Block A (see Figure 1) are council run and are only open between 07h00 and 18h00, hence people operating from or living under the bridge have no access from evening to morning, and neither do taxi commuters arriving during the start of peak morning traffic. In addition, there is no water and the traders and taxi drivers have to purchase it from nearby shops and garages at a cost.

The interviewers for the SPDC survey observed the following conditions within the market:

- An apparent social organisation and cohesiveness operating in the area;
- People know each other and newcomers are observed
- Sites are well designated;
- Stalls are tidy and well kept;
- There is a process for entry into the market group;
- The pavements are clean, but there is no security at night.

All these factors (recommended improvements and perceptions) are being taken into consideration in the redevelopment and design of the precinct. Several consultative meetings, workshops and briefings have been held with the stakeholders to consider their needs.

14.1 Customer's Recommendations

The customers to the market were generally satisfied, but felt that there was a need for improved trading conditions for the traders in the form of shelters (Figure 14.1). The potential health hazards and degradation in the condition of the plants being sold on the street was hardly mentioned. Cleanliness was mentioned in the context of keeping the pavements free of dust and litter. Instead, some customers felt that proper consulting rooms ought to be built for more privacy between the patient and traditional healer.

14.2 Street Trader's Recommendations

The provision of individual shelters, trading areas and stalls was foremost on the list of improvements recommended by the street traders (Figure 14.2). The term 'shelter' was usually used to describe an individual, covered trading space that protected the plants and traders from the environmental elements (rain, sun and ambient temperature variations), and had storage facilities and accommodation. Traders without lockers described 'shelter' in this way, whereas traders with lockers tended to define the space as *covered*, and requested additional consulting rooms.

In the study by ICDA & SPDC, foremost on the mind of the muti traders in terms of improvements to the market that would better the quality of their lives were: water; houses; equipped consultation/treatment rooms where they could

consult 24 hours a day; shelter for shops/stalls; licences and professional certification; a crèche; adult school for training purposes and HIV courses; toilets; shops in the vicinity for food; and an increase in income. Many of these recommendations have been addressed in the design and construction of the new precinct, including the provision of ablution facilities for patients.

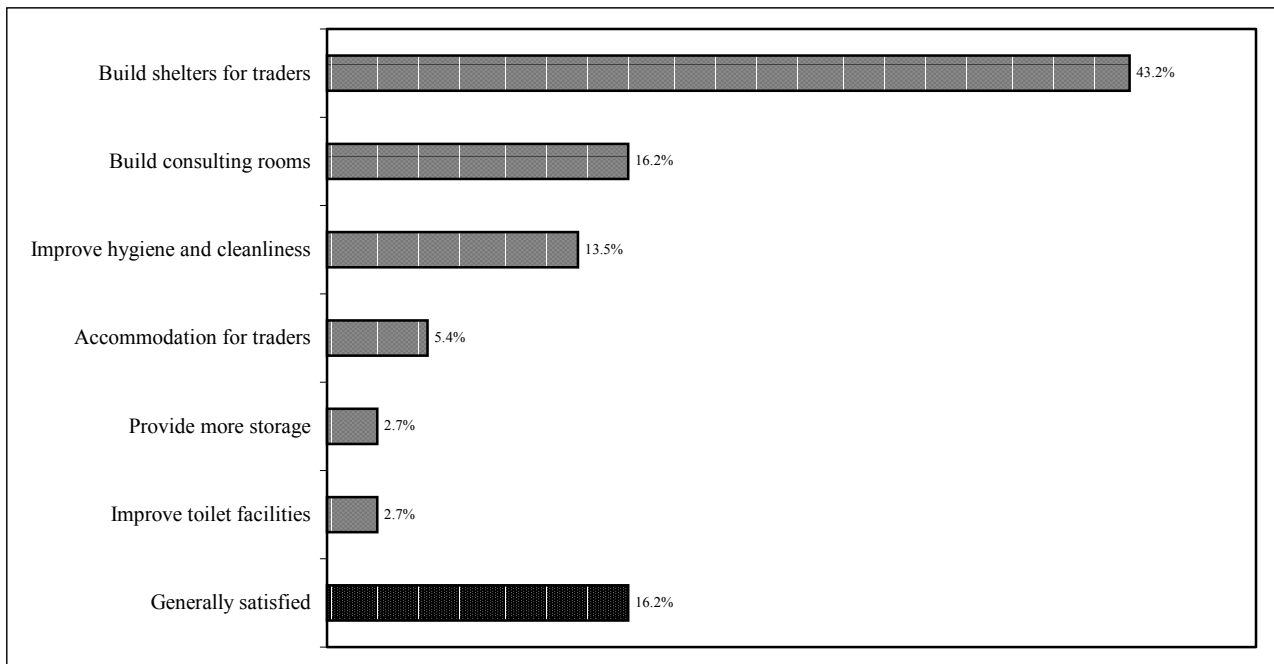


Figure 14.1 Customer's recommendations for improvements to the market

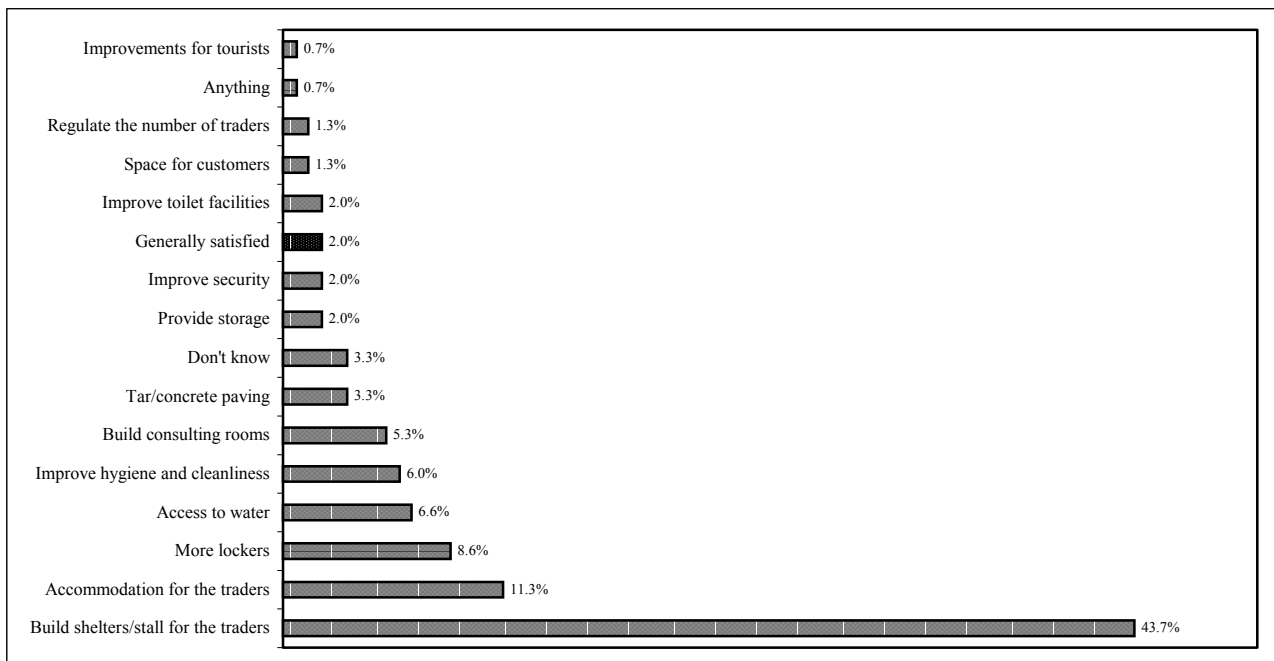


Figure 14.2 Street traders' recommendations for improvements to the market

14.3 Taxi Operators/Drivers

According to SPDC survey, the taxi operators and drivers interviewed disliked the lack of water, lighting at night, absence of waiting rooms or facilities for drivers and commuters, and the dirt within the ranks. Recommended improvements to the precinct included the reversal of aspects that they disliked, repair and car washing facilities, and proper facilities for the muti traders. Interestingly, some drivers said that they liked Faraday because the muti market attracted tourists – something that does not affect them economically at all. As there is no apparent relationship between the taxis and the traders (apart from language and occasional transport of stock), there therefore seems to be a protective overseeing of the traders and concern for their general well-being.

14.4 Commuters

The commuters were very disdainful of the muti market traders, and considered them unclean and dirty [ICDA & SPDC 2001]. Regarding their recommendations for the market, the commuters believed that Faraday could be improved by:

- The addition of shops (mainly for afternoon shopping because of time constraints in the morning);
- Adding toilets
- Constructing pedestrian crossings, because of the taxi behaviour and the pavements occupied by the street traders.
- Improve security after 18h00, after which there are no lights, the shops close and muggings and theft take place.
- Removal of the muti people
- General upgrading of the area.

15 CONCLUSIONS

The Faraday Street market is a significant trade and distribution node for tonnes of medicinal plants destined for consumption by thousands of multi-ethnic consumers on the Witwatersrand. The annual trade is estimated to be 491 – 851 tonnes, valued at around R4.7 million in retail sales. Additionally, the trade is a subsistence level income-generating opportunity for thousands of mainly rural indigent people from KwaZulu-Natal, Eastern Cape, Mpumalanga, Limpopo and certain areas of Gauteng and the Free State. Most traders earn less than R200/week before living expenses and plant purchase costs.

The market has a mainly wholesale function, acting as a source of supply for many thousands of traditional healers resident within Gauteng and the *muti* shops distributed throughout the Witwatersrand. While 45% of the traders are traditional healers supplementing their trading income by consulting with patients, the prescriptive nature of the market is generally limited to commuters from the nearby train station and taxi rank passing through the market.

Through the survey it became apparent that selling medicinal plants was not the occupation of choice for many traders. However, the lack of a broader education and skills, the failure of the rural economy in many areas and competition for jobs has retarded the opportunities for employment. Ninety-five percent of Faraday's traders are the breadwinners in single-income households, a trend exacerbated by previous political unrest in KZN leaving many of the female traders as widows.

A feature of traditional health systems is that they span a diverse range of policy issues that extend beyond the immediate domain of health [Bodekar 1997]. Similarly, it has become a feature of unsustainable resource use that it spans a diverse range of policy areas that extend beyond the immediate domain of nature conservation. It is vital that conservation authorities accept this principle because they are challenged with having to conserve resources that are being exploited through factors external to their immediate regulatory portfolios. Additionally, being aware of the scenarios affecting unregulated resource use means that conservation authorities have the responsibility of creating awareness and co-ordinating multi-disciplinary strategies within appropriate divisions of the public and private sector. A clear understanding of both the supply-side issues and the factors driving demand in the medicinal plant trade is a vital step towards planning for both conservation and sustainable use of the habitats of these plants as well as ensuring continued availability of the resources to address health needs [Bodekar 1997].

Investment is necessary for the development of appropriate conservation, cultivation and harvesting strategies. A concurrent requirement is the development and extension of skills amongst the Faraday traders to broaden their employment prospects. Also vital is training in elementary business skills to maximise the advantages to be gained from the capacity building programs. While this training would be beneficial to people who, if given the opportunity, may move out of the trade in medicinal plants, the business skills training is still necessary for those who don't intend to change occupations or who are stakeholders in community nursery initiatives, for example. An awareness of where to minimise losses and penalties, including plant wastage, is a potential advantage to be gained in this investment.

Formalisation of the trade in Faraday would involve increased regulation of the trader's activities, and the development of contractual relationships in production and supply. Currently, the trade is extensive and largely unmonitored such that wild collection (especially from KZN) dominates the supply market. Cultivation is difficult to establish when prices for wild-collected material are so low that there is little incentive for investment in noteworthy horticultural programmes. Market conditions seem to work against environmental need [Bodekar 1997]. With the redevelopment of the Faraday precinct comes the opportunity to improve relationships with the traders, create awareness and implement collaborative resource management strategies. These measures will only be a temporary success however unless supported by government and linked to other broader provincial and national initiatives. Enrichment planting and community nurseries are just two of the many strategies for resource management and conservation. Improved monitoring and better management of species identified to be high risk is imperative, especially those species already known to be vulnerable.

The primary health care service is provided because there is a market. Where there is a market there is a salesman. Where there is a salesman there is a product. How do we ensure that there is a sustainable supply of that product, and how have we failed in adequately protecting the source of the raw materials? Cultivation and conservation programs for plants must be linked with sustainable job creation and rural agricultural programs within the rural economy, and remove the incentive of commercial gatherers to harvest unnecessary quantities of medicinal plants. Any program must also target the appropriate people. Eighty-two percent of Faraday's traders utilise, to a greater or lesser extent, the services of a vast network of almost unwitnessed and invisible commercial gatherers. The Faraday Street hawkers of health are resource brokers, and the most visible in the supply chain. Solutions lie outside of the old 'preservation' paradigm, and within sustainable utilisation through community based natural resource management. Additionally, there are resolutions through the empowerment of communities, healers, gatherers and traders to manage their own businesses and take ownership and responsibility for the resources they are currently mining – a 'renaissance' of communal responsibility and ownership of biodiversity.

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