THE SIGNIFICANCE OF NATURAL RESOURCES TO URBAN HOUSEHOLDS: IMPLICATIONS FOR BIO-CULTURAL DIVERSITY IN SOUTH AFRICA

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Abstract

There is a well documented and growing demand for wild resources in urban areas in South Africa demonstrating that not only rural but also urban people value biodiversity. Still little is known, however, on the precise nature of such urban values regarding biodiversity use. This paper reports on the use and significance of wild plants for urban households under different socio-economic conditions in South Africa. Urban Africans still use wild plant resources not only for practical utilitarian purposes, but also for cultural purposes. In a survey in two urban centres in Eastern Cape Province it was found that almost 78% of the volumes of used wild plant material is used for a variety of cultural practices. Some of these uses were more common amongst poor than wealthier households, but other uses prevailed under all wealth categories. An increased understanding of the resilience of such cultural practices is crucial to fully appreciate the scope of bio-cultural conservation in non-traditional areas.

1. Introduction

Rural conditions are changing rapidly and the livelihood strategies of local communities are diversifying (Ellis, 1998) with many rural families attempting to access multiple sources of income (Wiersum & Shackleton, 2005). One of the options is the harvesting of wild resources (Campbell *et al*., 1997; Cavendish, 1999; Shackleton *et al*., 2001). This activity has increased in importance in response to a growing urban demand for these resources. The increasing network links between rural and urban areas (Ellis, 1998) has facilitated the drawing of natural resources from rural areas to the towns and cities (Cunningham, 2001). This emerging process has mostly been analysed in terms of their implications for rural livelihood strategies (Ellis, 1998) and rural development (Tacoli, 1998). Thus the focus of attention has been on the significance of this process for rural communities, and little attention has yet been given to the question of the significance of this process for urban people.

Recent studies show that significant quantities of wild plant products are used in urban areas by urban consumers, notably in the form of medicinal plant products (Mander, 1998; Williams *et al*., 2000; Williams, 2004; Botha *et al*., 2004; Dold & Cocks, 2002; Cocks & Dold, 2004). Wild plant products are also used for a variety of other purposes by urban people, for instance in the form of wines and jams (Leakey & Izac, 1998), fruit products (Shackleton, 2002) and wood carvings (Shackleton, 2004a). Still little attention has been given to the reasons why such wild plant use is maintained and to the significance that wild resources[1] may hold for urban households. It has often been assumed that increased impacts of urban lifestyle would entail a loss of traditional cultural values, and that the traditional use of wild plants would gradually fade out. However, recent data indicate that this is not necessarily the case. For instance, in a recent South African study in a peri-urban settlement area where many people depend on urban employment or state pensions it was found that wild plant use was still common. Much of this use was not primarily for utilitarian purposes, but for use in cultural practices. It was estimated that the cultural use of wild plants accounted for just over half of the total use values of all wild plant use (Cocks & Wiersum, 2003). This example indicates that many people who have migrated from their rural homes to semi-urbanized areas and who have become engaged in the modern economic sector still used wild plants for cultural-specific purposes such as ritual purification of the body (Cocks & Møller, 2002) or ritual cleansing of the house (Cocks & Dold, 2004). Indeed, many urban dwellers remain in close contact with their ancestral rural homes for generations where they partake in cultural festivities and ceremonies featuring the use of wild resources (Wiersum and Shackleton, 2005). In order to understand the scope and significance of the nature of continuities in cultural practices (Cocks, in

[1] The term wild plants has been used to distinguish between wild and domesticated species and not to suggest that the landscapes where they occur are virgin land or unaffected by human influence or tenure (Cunningham, 2001). The term wild resources has been used in this document to include non timber forest products, and species other than plant material such as animal, insects and marine species.

press) and its impact on biodiversity conservation, it is necessary to collect empirical information on the nature of wild plant use in urban areas.

One of the main factors impacting on the continued use of wild plant material in urban areas as well as on the amounts of material used may be hypothesized to be the wealth status of the urban households. Authors such as Cavendish (2000) and Shackleton (2004b) have demonstrated that wealth significantly influences the amount and value of wild resources used amongst rural households in southern Africa. Thus, poorer households are often more dependent on the natural resource base. The relationship between wealth and wild resource consumption and its significance to users has not yet been examined in urban areas. It might be assumed that the urban use of wild plant material is mainly maintained by poor immigrants who have not yet been incorporated in the modern economic sector and therefore maintain their rural customs.

The purpose of this paper is to assess the role and the significance attached to wild resources used amongst a diverse range of socio-economic urban conditions in the Eastern Cape Province of South Africa. The following questions are posed:

- How many people in two cities are still using wild plant material and how is this use is affected by different wealth categories of the household?
- For what purposes are the wild plants used and what is the influence of wealth status on the different types of use?
- What conclusions can be drawn from this information regarding the impact of enduring cultural values on the use of wild plants?

2. Study sites and methodology

Information on the use of wild resources by urban households was collected by a survey in two cities, King William's Town and East London, in the Buffalo City regional municipality in the Eastern Cape province of South Africa. For data collection a stratified survey was carried out amongst poor, middle-class and wealthy African households. To ensure a diverse range of economic conditions questionnaires were administered in suburbs perceived to represent high income, middle income and low income classes. Within each type of suburb households were selected through random sampling and a total of 302 households were interviewed; one hundred and fifty one questionnaires in each city. For interviewing a standard questionnaire was used to document information on household's structure and wealth status and on the amounts of wild plant material collected for utilitarian use and for the maintenance of cultural artefacts and practices. Criteria used for documenting the economic wealth status of households included: number of formal jobs in the household, number of pensions/grants in each household and types of household assets and appliances owned (fridges, stoves, cars, etc.). Information regarding the amounts of plant use was collected by recording the quantity and the frequency of collection of different types of resources by each household. The local measurement units for collection were transferred to weight units on the basis of the average weight and dimensions of each unit as determined in the field.

For data analysis first a cluster analysis was made to statistically identify the wealth status of households. Variables used to cluster the households included assets, e.g. motorcar, television, refrigerator, the size of the homes in terms of the number or rooms, the nature of the building (e.g. brick, zinc sheets and wooden structures) and the number of residents, in categories such as the number of adults, children, pensioners, occupying formal jobs, unemployed, etc. For the analysis of the amounts of wild resources used by households for each resource use criteria, only data from the households who cited using the material were used for analysis purposes. Resource use categories representing less then 5% of all households were not considered for further analyses.

Set retail prices exist for standard amounts of specific resources, and these were recorded to determine their direct-use value. Vernacular names of the species were recorded and botanical names for these species were sourced from Dold and Cocks (1999).

In order to assess differences in wild plant use between wealth categories, if the variables were categorical, a Chi-Squared test of independence was used and percentages shown are percentages of rows. For numerical variables the Kruskal-Wallis test for significant differences was used amongst the three wealth groups.

3. Results

3.2 Socio-economic conditions of survey households

The urban households surveyed were mostly female-headed with low-skilled employment, however only 21% of the household heads had no education or only a primary level of education. Households tended to be

dominated by adults of which only 24%, on average, were formally employed. Very few of the households owned livestock, but two-thirds continued to grow crops in home gardens, almost exclusively for subsistence use rather than for resale purposes. Summaries of the socio-economic conditions of the households after clustering according to wealth of the three clusters, are shown in Table 1.

3.2 Overall use of wild plant species

Despite representing a wide range of urban socio-economic conditions, 99% of the households in the survey made use of wild plant species for one use or another. These were collected or, purchased within the urban centre and/or collected and utilized at the rural home of origin as 42% of the urban households retained strong contact with their rural home of origin.

In total 96 plant species were used by households on a regular basis. Twenty two species were cited by more than 10 households. The mean amount of green biomass utilized per user household amounted to 2 301 ± 2 949 kg, equating to $84[2] per annum. The amount collected varied significantly between the households with some households utilizing as little as 0.2 kg while others utilized as much as 15 586 kg per annum. These plants were used for a wide variety of purposes that have been collated into 12 use categories and assigned as having either utilitarian or cultural value, *sensu* Cocks and Wiersum (2003). The percentage of households utilizing each resource and the number of species cited for each category is provided in Table 2. The predominant use of the plants was for cultural purposes, overall 85 % of the total biomass was used for this purpose.

The use of wild plant material differed significantly between the various wealth categories both in respect to biomass used and in respect to the importance of cultural uses.

a) Poor cluster households
   Poor cluster households utilized a mean amount of 3 518 kg ± 3 634 kg of plant material with a financial value of $134 ± $140 per household per annum. Approximately 57% of this material (2 619 kg ± 3 046 kg equating $56 ± $61 per annum) was used for cultural requirements (Table 3c, d). The mean number of species used per household was 6.2 ± 3.4 (0-15). The mean number of resource use categories utilized was 5.4 ± 2.9 (0-11) (Table 4).
b) Middle cluster households
   Middle cluster households utilized a mean amount of 2 163 kg ± 2 732 kg of plant material, equating to $74 per household per annum. Approximately 90% of this material (2 016 kg ± 2 579 kg equating $34 ± $52 per annum) was used for cultural requirements (Table 3c, d). The mean number of species used per household was 5.8 ± 2.8 (1-13). The mean number of resource use categories utilized was 4.9 ± 2.5 (1-11) (Table 4).
c) Wealthy cluster households
   Wealthy cluster households utilized a mean amount of 1 561.1 kg ± 2 284 kg of plant material, equating to $56 per household per annum. Approximately 90% of this material (1 401 kg ± 1 991 kg equating $34 ± $52 per annum) was used for cultural needs (Table 3c, d). The mean number of species used per household was 4.6 ± 2.8 (1-13). The mean number of resource use categories utilized was 3.9 ± 2.0 (1-9) (Table 4).

3.3 Specific uses of wild plants

3.3.1 Utilitarian use of wild resources

a) Wild fruits
   Wild fruits represented the highest utilitarian resource use category, with 65% (Table 5a) of households citing a single plant species (*Opuntia ficus-indica*). Of these households, only 5% collected their own wild fruit compared to 95% who purchased these from street vendors.

   The wealth of the household is strongly related to whether or not a household purchased wild fruit (χ^2 = 9.634, df = 2, p = 0.008). Similarly, wealth influenced the mean amount collected/purchased per annum (H = 8.3686, df = 2, p= 0.015). The households in the wealthy cluster only purchased a mean amount of 79 kg, equating to $22 per annum per household, whilst the poor cluster households purchased 140 kg, equating to $29 per annum (Table 3a, b).

[2] These values have been converted at exchange rate of $1=R5.83, February 2005.

b) Fuel wood

Thirty five percent (n=107) of the households made use of wild resource material for fuel wood purposes (Figure 1a). The majority, 82%, purchased fuel wood from vendors in their neighbourhood. Only 16% collected their own fuel wood from surrounding natural vegetation. Two percent both collected and purchased their fuel wood. Although five species were cited, *Acacia karoo and Acacia mearnsii* were the most frequently used.

Surprisingly the wealth of the household was not significant in determining if the household made use of fuel wood (χ^2 = 3.69, df = 2, p = 0.158). The wealth of the household did however significantly influence the amount used (H = 27.97, df = 2, p<0.001). The poor cluster households used significantly more material, 1 864 kg equating to the mean amount of $134 per annum. Only a slight households tended to use fuel wood for heating followed by cooking purposes, whereas the wealthy cluster used fuel wood predominantly for recreational cooking purposes such as barbecuing, and for heating purposes.

3.3.2 Cultural use of wild resources

a) Amayeza

Sixty four percent of the households used wild plants for *amayeza* purposes (Figure 1b). Of the 292 use occurrences recorded, forty seven percent were used to fulfil cultural needs. This is because amongst the *amaXhosa* illness and disease are commonly attributed to either natural or supernatural causes with the idea of "contamination" entering from both the physical and the spiritual plane. A cure therefore often requires as much a restoration in the balance of supernatural forces and social relationships as the use of therapeutic medicine. In the study site this may call for certain forms of ritual purification in the form of a body wash, purgative, spraying, fumigating or steaming as counteractive and protective measures often involving the use of plant material. These actions are imbued with symbolism (Cocks *et al*., submitted; Cocks & Dold, submitted).

Sixty percent of the *amayeza* plants utilized were purchased from various vendors such as herbal street traders, herbal stores and traditional healers. The remaining 40% were collected by a household member either from their garden, the surrounding vegetation or when they visited rural areas.

The wealth status of the household was significant in determining if the household made use of *amayeza* (χ^2 = 10.003, df = 2, p = 0.007). The wealth of the household also influenced the amount of material used (H = 2.40, df = 2, p = 0.302). The mean amount of material utilized by the poor cluster households amounted to 4.0 kg and equating to $17 per annum versus only 1.9 kg equating to $7 by wealthy cluster households (Table 3c,d).

b) Material for rituals

Material for use in rituals was the third most commonly cited wild resources category, 56% (Table 5b). Rituals are performed on specific occasions to elicit ancestral blessings and protection from malevolent forces such as sorcery. A ritual invariably involves the slaughter of a domestic animal, usually an ox or a goat (Wilson *et al*., 1952; Poland *et al*., 2003). The most commonly used species cited for ritual purposes included *Olea europea* subsp*. africana* and *Ptaeroxylon obliquum.* Both these species are selected for their cultural significance (Cocks and Wiersum, 2003; Cocks *et al*., submitted). The host family invites extended members of the family, neighbours and friends to attend and large quantities of food and traditional beer are prepared for which large quantities of fuel wood are required (Cocks & Wiersum, 2003) Seven species were cited, the most frequent being: *Acacia karroo*, *Acacia mearnsii* and *Noltea africana.* Seventy one percent of the urban households preformed their rituals in their rural family home where the ancestral spirits reside. Only 28% preformed rituals within their urban homestead.

The wealth of the household was not significant in determining if the household made use of material for rituals (χ^2 = 0.56, df = 2, p = 0.764) consequently demonstrating the cultural importance of these activities. The wealth of the households did however influence the amount of material used per household (H = 9.09; df = 2, p = 0.011). In this instance the wealthy cluster households used significantly more material, averaging 668 kg and equating to $12 per household per annum, compared to 494 kg ($9) for middle cluster households and 574 kg ($11) for poor cluster households (Table 3c, d). This example represents one of the few resource use categories where the wealthy cluster households utilized a greater quantity then the poor cluster households. This can be attributed to the wealthy cluster households being economically in a better position to host larger and more elaborate rituals.

c) Material for kraals

Fifty three percent of the urban households contributed towards the maintenance of a *kraal* (Figure 1b). As demonstrated by Cocks and Wiersum (2003) and Cocks *et al.,* (submitted), a *kraal* is foremost a venue to host traditional Xhosa rituals and where family members can communicate directly with their ancestors, but can also be a livestock enclosure for the family herd. Of the households who maintained a kraal, 82% were located at the rural family home. The remaining 18%, having no rural home, constructed a temporary *kraal* within their urban homestead yard.

Urban households contributed towards the maintenance of the family *kraal* either in the form of assisting with the physical collection of the material when they returned to their family home (80%), or by providing a financial contribution to the purchase of material when it is required (8%). Twenty five species were cited, the most common being *Acacia karroo*, *Coddia rudis* and *Ptaeroxylon obliquum.*

Regarding the maintenance of a *kraal* the wealth of the household was not significant in determining if the household did so or not (χ^2 = 0.72, df = 2, p = 0.698). The wealth of the households did however influence the amount of material used. In this instance poor households utilized significantly greater amounts of material as the mean amount of material utilized was 2 662 kg ($34) per annum per household compared to 1 901 kg ($28) by middle cluster households and 1 396 kg ($29) by wealthy cluster households (Table 3c, d).

d) Traditional grass brooms

Forty two percent of urban households owned a traditional grass broom – *umtshayela* (Table 4b). Grass brooms have an important cultural significance attached to them (Cocks & Dold, 2004). Several species were cited as being used to produce a broom: *Cymbopogon validus*, *Cyperus* sp. and *Phoenix reclinata*.

The wealth of the household was not significant in determining if the household owned a grass broom or not (χ^2 = 3.62, df = 2, p = 0.163) nor did it influence the quantity of material utilized (H = 1.66, df = 2, p = 0.437) (Table 3c), as households owned only one or two brooms.

e) Imifino

The consumption of *imifino* remained relatively high, as 42% of the households still cited collecting and consuming *imifino* (Figure 1b). All *imifino* species were collected from either their home garden or the neighbour's garden as the majority represent common ruderal species (Dold & Cocks, 2000). *Imifino* is either boiled in water and served as a vegetable, or mixed and cooked with other foods such as maize (Cocks & Wiersum, 2003). Seven species were cited as being collected as *imifino* and the dominant three species cited included: *Amaranthus hybridus*, *Sonchus asper* and *Chenopodium album*.

In terms of collecting *imifino* the wealth of the household was only slightly significant in determining if the household did so or not (χ^2 = 8.34, df = 2, p = 0.015), thus demonstrating that the consumption of *imifino* is not solely determined by the economic conditions of the household. The wealth of the household did however influence the amount of material collected significantly (H = 9.65, df = 2, p = 0.008). Poor cluster households collected the highest mean quantity per user household, 41 kg ($6) per annum, and the middle and rich clusters collected similar quantities 25 kg ($3) and 29 kg ($4) respectively per annum (Table 3c, d).

f) Material for an igoqo

Twenty seven percent of the urban households contributed towards the maintenance of an *igoqo* (Figure 1b). An *igoqo* is a stock pile of firewood kept outside the homestead. The wood is seldom used for fuel purposes because the structure has important cultural value, particularly for the women of the household as it is where the female ancestral spirits reside (Cocks & Wiersum, 2003; Cocks *et al.,* submitted). Ten species were cited for the construction and maintenance of an *igoqo.* The three most common species collected included: *Acacia karoo*, *Rhus dentata* and *Tarchonanthus camphoratus.*

As with the kraal, urban households contribute towards the maintenance of the *igoqo* at the family's rural ancestral home. In contrast to the kraal the maintenance of an *igoqo* is significantly influenced by the wealth status of the household (χ^2 = 18.45, df = 2, p < 0.001). The wealth of the household did however not influence how much material was used (H = 2.51, df = 2, p = 0.285). For example, the poor cluster households utilized the mean amount of 1 807 kg equating to $31 per annum versus 1 799 kg equating to $30 by the wealthy cluster households and 1 511 kg equating to $35 by the middle cluster households (Table 3c, d). The material required for the maintenance of

the *igoqo* was primarily collected by household members whilst they were visiting the family homestead in the rural area (84%).

g) Traditional wooden sticks

Ten percent of the male members of the households still continued to make use of a traditional carved stick (Figure 1b). In historical literature the carrying of a wooden walking stick by men was described as being a part of traditional dress. From the age of five boys begin carrying a stick (*intonga*) when they are away from the homestead and when they reach manhood they usually carry one or more knobbed sticks (Shaw & Warmelo, 1981). Two species, *Olea europaea* subsp. *africana* and *Brachylaena ilicifolia*, were cited.

The ownership of a traditional sticks is somewhat influenced by the wealth status of the household ($\chi^2 = 7.34$, df = 2, p = 0.025). The wealth of the household did however not influence how much material was used as the amount of material used to make a stick is relatively standard (H = 3.23, df = 2, p = 0.199) (Table 3c).

4. Discussion and conclusion

The continued use of wild resources remained high amongst urban households with 99% still utilizing these resources. The mean amount of wild material utilized is 2 300 kg per household per annum, thus clearly demonstrating that the use of wild resources is still prevailing in urban areas. Approximately 1 401 kg of wild material collected or purchased per annum was utilized for cultural purposes. This equates to about 85% of all wild material utilized per household. The high cultural value attached to natural resources was further demonstrated by the fact that the cultural types of use were not restricted to the poor households only. Even amongst the cluster of wealthy households all the cultural resource use categories were maintained by at least 10% of the households. This included the use of *imifino* demonstrating that the use of *imifino* does not simply represent a resource which is utilized by the poor as a form of nutrition. Furthermore three of the seven cultural resource use criteria were not significantly influenced by the wealth of the household, i.e. the use of material for the performance of rituals, the maintenance of the *kraal* and the ownership of grass broom. The cultural use categories which were significantly influenced by wealth included the maintenance of an *igoqo*, the use of *amayeza*; the ownership of a traditional stick and the collection of *imfino*. The latter however was only slightly significant. With regards to the maintenance of an *igoqo* the same statistical relationship was found, regarding wealth and maintaining an *igoqo* amongst rural communities (Cocks *et al*., submitted).

Clearly, the utilitarian uses of wild plants were much smaller than the cultural uses. All five categories of utilitarian use earlier recorded for rural communities (2003) were also present in the studied urban communities. However, this use was mostly restricted to the poorer households and three use categories, namely utensils, fence poles and timber. The finding that the use of wild plants for cultural purposes is more enduring than that for utilitarian purposes is in accordance with observations of Cocks and Wiersum (2003) that schoolchildren in peri-urban communities believed that the cultural uses of wild plant resources would continue in the future, while more utilitarian uses such as fuel wood would be replaced by commercial goods.

The majority of wild plant resources documented in the urban study were purchased from vendors. The only expectation is *imifino* which, being common ruderals, were collected by users. This finding demonstrates that urban dwellers' ability to sustain cultural practices is largely facilitated by the increase in rural to urban linkages and the diversification in rural livelihood strategies (Wiersum and Shackleton, 2005). These factors represent the key driving forces behind the continued use of wild plant resources by communities living in urban centres (Cocks, in press). Such insights need to be factored into new equations for predicting future market demands for natural resources as well as to assess the impact of increased modernization on the cultural use of wild resources.

The findings presented here also reveal that the flow of culture and wild resources is not simply from the rural areas to meet the demands in the urban centres but that there is also a reverse flow from the urban areas to the rural areas. Urban dwellers return to their ancestral homes with cash and invest time and effort in the maintenance of the family *kraal* and *igoqo* and the hosting of rituals.

These findings add support to the notion put forward by Cocks (in press) that the concept of culture must be understood as a dynamic process of trans-cultural exchange with constant re-articulations of tradition resulting in the persistence of certain cultural practices amongst groups of people. Even people who have migrated to (peri)urban areas and have become involved in modern economic sectors still perform certain cultural practices for maintaining a sense of well-being and expressing their identity (Cocks in press).

An increased understanding of this process is crucial so as to fully appreciate the scope of bio-cultural conservation in developing countries.

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Addendum

Table 1. Demographic profile of the three wealth cluster groups

		Poor	Middle	Wealthy	Test Statistic
1. Household Head:					
Gender: (n=297)					^{2}=5.48; df = 2; p = 0.065
Female		41 (33%)	44 (34%)	41 (33%)	
Male		41 (24%)	52 (30%)	78 (46%)	
Education Level: (n=252)					^{2}=76.96; df = 6; p<0.001
None or Primary		25 (39.1%)	28 (43.8%)	11 (17.2%)	
Secondary		16 (33.3%)	19 (39.6%)	13 (27.1%)	
Higher Secondary		25 (31.6%)	26 (32.9%)	28 (35.4%)	
Further		1 (1.6%)	6 (9.8%)	54 (88.5%)	
2. Household Income (n=298)					
Formally Employed	0	42 (55%)	18 (24%)	16 (21%)	^{2}=67.97; df = 6; p<0.001
	1	39 (26%)	59 (39%)	53 (35%)	
	2	3 (6%)	10 (19%)	40 (21%)	
	3 or 4	0 (0%)	8 (44%)	10 (56%)	
Informally Employed	0	47 (22%)	71 (43%)	100 (36%)	^{2}=22.6; df = 4; p<0.001
	1	28 (43%)	19 (29%)	18 (28%)	
	2	9 (60%)	5 (33%)	1 (7%)	
Pensions or Grants	0	70 (30%)	70 (30%)	94 (40%)	^{2}=4.45; df = 4; p=0.348
	1	11 (22%)	21 (43%)	17 (35%)	
	2	3 (20%)	4 (27%)	8 (53%)	
3. Agricultural Involvement (n=298)					^{2} = 14.0; df = 2; p<0.001
Yes		41 (22%)	72 (39%)	72 (39%)	
No		43 (38%)	23 (20%)	47 (42%)	
4. Livestock (n=300)					^{2}= 3.2; df = 2; p = 0.120
Yes		4 (44%)	4 (44%)	1 (12%)	
No		80 (27%)	93 (33%)	118 (40%)	

Table 2. Summary of resource use utilization by urban households

Resource use	Percentage of households utilizing each resource use category	Number of species utilized per resource use category
Utilitarian use		
Wild fruits	65%	1
Fuel wood	35%	5
Utensils	6%	4
Fencing	3%	2
Timber	3%	6
Cultural use		
Amayeza[3] (traditional medicines)	64%	56
Rituals	56%	9
Kraal material	53%	25
Traditional grass brooms	425	2
Imifino (wild vegetables)	42%	7
Igoqo[4]	27%	10
Traditional sticks	10%	2

[3] As advocated by Cocks and Dold the use of term *amayeza* is used rather then medicinal plants as it has been revealed that a large percentage of plant species are used to fulfil cultural, spiritual, and ritual purposes and are not medicines *sensu stricto* (submitted).

[4] An *igoqo* refers to the wood stockpile collected by women. These woodpiles are not kept solely for fuel purposes but have high cultural value, particularly for the women of the household. The species used for maintaining an *igoqo* differs to those collected solely for fuel purposes (Cocks and Wiersum, 2003; Cocks *et al*. submitted).

Table 3a. Biomass (kgs) utilized per household per year according to wealth status for utilitarian resource use categories

				Wealth Cluster									
	Overall use			Poor cluster			Middle cluster			Wealthy cluster			
Resource Use	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	Test Statistic
Complete utilitarian use (kg) per annum	238	564 ±1390	114 ±123	72	1058 ±1921	232 ±299	80	354 ±909	91±67	86	347 ±1115	69 ±68	H = 28.07, df = 2, p < 0.001
Wild fruits (kg) per annum	196	102±147	61±56	65	140±205	91± 68	64	88±127	61± 52	67	79±75	61± 56	H = 8.37, df = 2, p = 0.015
Fuel wood (kg) per annum	106	1079 ±1891	392 ±565	36	1864 ±2374	1148 ±1121	32	710 ±1246	213 ±254	38	647 ±1614	70 ±87	H = 27.97, df = 2, p <0.001
Utensils (kg) per annum	19	0.08 ±0.05	0.07 ±0.05	10	0.06 ±0.03	0.03 ±0.04	7	0.09 ±0.05	0.10 ±0.01	2	0.17 ±0.06	0.17 ±0.05	H = 6.37, df = 2, p = 0.041

Table 3b. Biomass ($) utilized per household per year according to wealth status for utilitarian resource use categories

				Wealth Cluster									
	Overall use			Poor cluster			Middle cluster			Wealthy cluster			
Resource use	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	Test Stat.
Complete utilitarian economic value per annum ($)	235	54±90	29±28	70	95± 127	54±56	79	38±61	25±18	86	35±62	14±16	H = 31.4, df = 2, p < 0.001
Wild fruits economic value per annum ($)	189	24±27	14±15	61	29±28	25±15	62	22±31	13±12	66	22±21	14±15	H = 5.28, df = 2, p = 0.0711
Fuel wood economic value per annum ($)	106	76±106	41±53	36	134±133	110±82	32	51±63	27±31	38	42±83	10±13	H = 31.67 df = 2 p <0.001
Utensils economic value per annum ($)	19	0.10 ±0.20	0.04 ±0.03	10	0.007 ±0.006	0.005 ±0.003	7	0.027 ±0.051	0.007 ±0.006	2	0.093 ±0.112	0.093 ±0.117	H = 4.80, df = 2, p = 0.09

Table 3c. Biomass (kgs) utilized per household per year according to wealth status for cultural resource use category

				Wealth Cluster									
	Overall use			Poor cluster			Middle cluster			Wealthy cluster			
Resource use	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St.Dev	Median ±MAD	n	Mean ±St Dev	Median ±MAD	Test Statistic
Complete cultural use (kg) per annum	283	1954 ±2557	1433 ±2122	81	2619 ±3046	1433 ±2122	91	2016 ±2579	312 ±461	111	1401 ±1991	345±510	H = 4.88, df = 2, p = 0.087
Amayeza (kg)	189	2.9±5.1	1.7±1.5	61	4.0±6.6	1.7±1.5	65	2.8±5.1	1.7±1.7	63	1.9±2.3	1.7±1.2	H = 2.40, df = 2, p = 0.302
Rituals (kg)	168	582 ±617	442 ±288	46	574 ±433	442 ±288	58	494 ±795	343 ±254	64	668 ±544	514 ±457	H = 9.09, df = 2, p = 0.011
Kraal material (kg)	160	1937 ±1817	2649 ±2830	46	2662 ±907	2649 ±2830	56	1901 ±1883	1348 ±1934	58	1396 ±1500	784 ±1096	H = 10.71, df = 2, p < 0.005
Traditional grass broom (kg)	126	0.6±0.3	0.7±0.0	40	0.6±0.2	0.7±0.0	44	0.7±0.3	0.7±0.0	42	0.6±0.2	0.7±0.0	H = 1.66, df = 2, p = 0.437
Imifino (kg)	127	31±27	36±23	37	41±31	36±23	51	25±22	20±15	39	29±27	20±23	H = 9.65, df = 2, p = 0.008
Igoqo (kg)	82	1689 ±961	1320 ±664	34	1807 ±884	1768 ±1097	31	1511 ±990	1028 ±1087	17	1799 ±1080	1028 ±213	H = 2.51, df = 2, p = 0.285
Traditional Sticks (kg)	30	0.14 ±0.10	0.10 ±0.06	12	0.15 ±0.10	0.10 ±0.06	13	0.16 ±0.11	0.12 ±0.09	5	0.07 ±0.05	0.06 ±0.04	H = 3.23, df = 2, p = 0.199

Table 3d. Biomass ($) utilized per household per year according to wealth status for cultural resource use category

				Wealth Cluster									
	Overall use			Poor cluster			Middle cluster			Wealthy cluster			
Resource use	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St. Dev	Median ±MAD	n	Mean ±St.Dev	Median ±MAD	n	Mean ±St Dev	Median ±MAD	Test Statistic
Complete cultural economic value per annum ($)	271	45±58	49±60	79	56±61	49±60	87	34±52	23±28	105	34±52	16±15	H = 7.52, df = 2, p = 0.023
Amayeza ($)	189	12.3 ±29.6	3.4 ±5.1	61	16.6 ±37.6	4.1 ±6.1	65	13.0 ±31.9	0.4 ±0.6	63	7.3 ±13.7	4.2 ±6.2	H = 0.33, df = 2, p = 0.847
Rituals ($)	168	10.9 ±11.1	6.9 ±4.6	46	11.2 ±9.0	7.2 ±4.5	58	9.0 ±12.9	6.3 ±4.1	64	12.3 ±10.6	8.6 ±5.7	H = 8.51, df = 2, p = 0.014
Kraal material ($)	160	30.0 ±44.8	14.2 ±17.5	46	33.9 ±38.4	21.3 ±20.8	56	28.0 ±45.9	14.6 ±16.9	58	28.9 ±49.1	8.9 ±10.5	H = 8.70, df = 2, p = 0.013
Traditional grass broom ($)	126	0.76 ±0.38	0.86 ±0.08	40	0.77 ±0.37	0.86 ±0.10	44	0.80 ±0.40	0.86 ±0.51	42	0.70 ±0.36	0.86 ±0.00	H = 1.69, df = 2, p = 0.430
Imifino ($)	127	4.23 ±3.72	2.80 ±3.11	37	5.65 ±4.26	4.94 ±3.17	51	3.42 ±2.97	2.80 ±2.08	39	3.94 ±3.76	2.80 ±3.11	H = 9.65, df = 2, p = 0.008
Igoqo ($)	82	32.2 ±30.6	28.9 ±17.3	34	31.3 ±16.1	28.8 ±17.3	31	34.8 ±45.8	24.0 ±14.2	17	30.0 ±17.7	18.9 ±6.6	H = 1.02, df = 2, p = 0.601
Traditional Sticks ($)	30	0.012 ±0.010	0.007 ±0.005	12	0.010 ±0.007	0.007 ±0.004	13	0.012 ±0.007	0.010 ±0.009	5	0.015 ±0.021	0.007 ±0.005	H = 0.810, df = 2, p = 0.667

Table 4. Number of species and resource use categories utilized according to wealth status

			Wealth cluster						
	Overall use (n=302)		Poor cluster (n=84)		Middle cluster (n=99)		Wealthy cluster (n=119)		Test Statistic
Description	Mean ±St. Dev	Median ±MAD	Mean ±St. Dev	Median ±MAD	Mean ±St. Dev	Median ±MAD	Mean ±St. Dev	Median ±MAD	
Species cited	5.4±3.0	5.0±3.0	6.2±3.4	6.0±3.0	5.8±2.8	6.0±3.0	4.6±2.8	4.0±3.0	H=16.82,df = 2, p <0.001
Resource categories	4.6±2.5	4.0±3.0	5.4±2.9	5.0±4.4	4.9±2.5	5.0±2.9	3.9±2.0	4.0±3.0	H=16.13,df = 2, p < 0.001

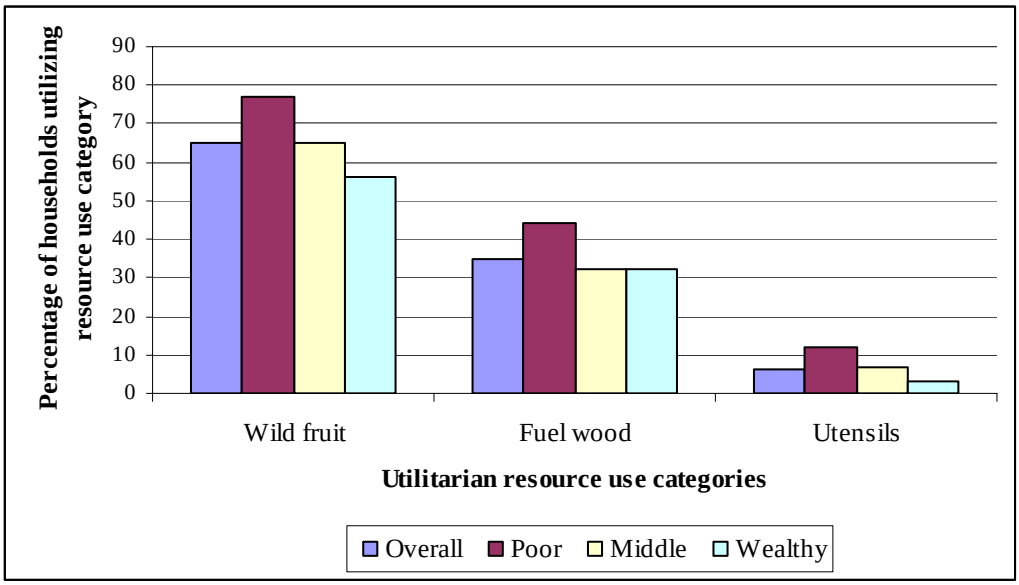

Figure 1a. Frequency of resource usage amongst the wealth clusters for utilitarian use categories.

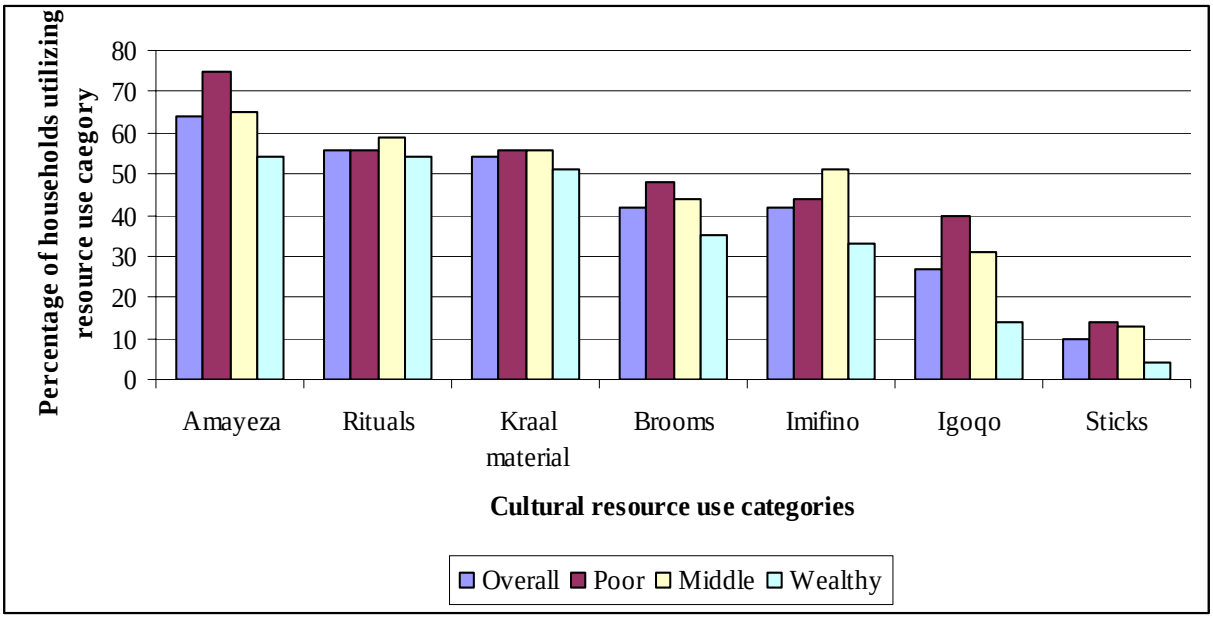

Figure 1b. Frequency of resource usage amongst the wealth clusters for cultural use categories.