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The comparative value of wild and domestic plants in home gardens of a South African rural village

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Abstract. Rural inhabitants make considerable use of wild resources from communal areas around their settlements, as well as from arable and residential plots. These wild resources compete with the main crops planted in arable plots and home gardens, but play a significant economic and nutritional role in rural livelihoods. This paper reports upon a conservative financial evaluation of the wild plant resources harvested from home gardens and arable plots by inhabitants of rural village in the Bushbuckridge lowveld (South Africa), and examines their importance relative to other domesticated crops. On average, each household made use of four to five species of wild plants growing on their residential plot, whereas the mean number of crop plants was 3.4. The total value of all plants was R1694 (US$ 269) per household per year, or approximately R4200 (US$ 667) per hectare of home garden per year. Wild plants represented 31% of the value of all plants grown on residential plots, relative to the 69% for domesticated crops (including fruit trees). Approximately 72% of the total value of all plant products was consumed by the household, and the remaining 28% was sold.

Introduction

Rural inhabitants are strongly reliant on the use of wild resources for local livelihoods (Guijt et al., 1995; McGregor, 1995; Clarke et al., 1996). This includes formal and informal agricultural activities, as well as harvesting of wild resources from arable and non-arable areas. Much of these activities have significant economic value, locally and internationally. Internationally, the recognition of this within policy fora has led to attempts to account for and evaluate such resources in a systematic and replicable manner. This has provided the impetus for a revision of local and national planning initiatives to provide the desired policy frameworks that take cognizance of these informal activities (Prescott-Allen and Prescott-Allen, 1982; Scoones et al., 1992; Cunningham, 1997).

In southern Africa, most of the research effort around this issue has been orientated towards use of indigenous woodlands, especially the communal areas surrounding rural villages and homesteads (e.g. Bradley and McNamara, 1993; Campbell, 1996). A wide range of values have been reported (e.g. Bishop and Scoones, 1994; Shackleton, 1996; Campbell et al., 1997; Shackleton, 1998, Shackleton et al., 1999), as a consequence of (a) different

objectives (to quantify the value used per household, or the potential use value per unit area of woodland), (b) the adoption of different methodologies, and (c) the exclusion of some products in some studies. Much more work is required to overcome these obstacles towards a more coherent understanding for policy development.

At the same time, there has been relatively little research attention in southern Africa on the value and use of the same resources from the more intensively impacted and managed areas within rural settlements, i.e. home-gardens, road verges and small-scale arable plots. It is known that resources such as wild fruits, edible herbs, thatch grass and the like are harvested from such areas (McGregor, 1995). But the absolute and relative value of these products, perhaps better termed secondary products (*sensu* Shackleton, 1996), is unknown in southern Africa. Nevertheless, rural inhabitants are usually advised by extension personnel to remove them from fields and gardens (arguing that they will compete with and reduce the yields of formal crops) with little consideration of their social, nutritional or financial value to rural livelihoods. But, if these values are significant, they need to be taken into account in planning and extension by the relevant government agencies. Moreover, the production and economic value of these resources are not included in indices of regional and national economic production, thereby underestimating the GDP from rural areas. This omission perpetuates the notion that most rural areas in developing regions are simply wastelands of low productivity that need to be developed for greater productivity and supposedly higher economic returns (Prescott-Allen and Prescott-Allen, 1982; Guijt et al., 1995).

Within this framework, the objective of this study was to record and value all plant products derived from household and agricultural land in a rural village, in South Africa. Specific questions addressed were (a) what is the value of standard commercial crops relative to wild edible herbs and fruits growing in the same plot? and (b) what proportion of the value is consumed by households and what proportion is traded?

Study area

The study was conducted in the village of Dingleydale B (24°40′30″ S; 31°8′50″ E) in the Bushbuckridge region of the central lowveld, South Africa. Whilst formally under the Northern Province, this area is disputed, with residents of the region lobbying for it to be transferred of Mpumalanga.

The lowveld year generally consists of a dry, frost free winter, followed by a warmer rainy season. Mean annual rainfall varies from 1200 mm per annum in the south-west to less than 600 mm per annum in the west (Dzerefos et al., 1995). Mean annual rainfall at Dingleydale B is approximately 780 mm, but with considerable variation from year to year. Much of the area is marginal

for agriculture, due to erratic rainfall, frequent droughts, and poor quality soils (Shackleton, 1996).

The population density in the Bushbuckridge region in high, ranging from 146 people km^{-2} in the east, to over 300 km^{-2} in the west. This has resulted in a shortage of land, especially for arable and grazing purposes. In spite of the problems of unsuitable climate and soils, and crowding, most households in Dingleydale B are involved in agriculture to some degree. The four main types of farming are:

(a) Semi-commercial farming on officially zoned irrigated fields (1–3 ha). The primary summer crop is maize. In winter a variety of vegetables are grown. When the irrigation system is operational, it is possible to reap three crops per year. Often a few fruit trees (mainly mangoes) are planted around the periphery of the field. Being a government irrigation scheme, several inputs, notably ploughing and purchasing of goods such as seeds and fertilisers, are coordinated through the extension officers to reduce costs. In the year covered by the study, the main furrow feeding the irrigation system had broken, and many people had abandoned the winter growing season in the fields. Coupled with this, the winter was usually cold, and one informant estimated that fruit yields were down by 25%. Several crops were also reported to have been affected, such as tomatoes and chillies. The effect on the majority of crops is not known, but it can be assumed that conditions were generally less favourable than usual.

(b) Cultivation of the land around each homestead (±0.4 ha) within the residential area of the village, i.e. a home garden. Generally crops are planted only during the rainy season, but some households make use of domestic water supplies to water their gardens. The dominant crop is maize, but usually interplanted with pumpkins and several varieties of beans.

(c) Cultivation of so-called ‘secret fields’ (0.5–2 ha). The secret fields are thus named because they do not have official sanction, although they seem to be tolerated by the extension officers. A similar arrangement was noted by Shackleton et al. (1995) at Tshunelani village just to the north. They are cut out of the veld, and worked in parallel with the household’s other land. The secret fields are often near the official fields; on the edges of the irrigated area, or in the gaps which were left out in the planning of the sanctioned fields because of drainage problems. The fact that many of the secret fields are poorly drained, allows crops such as Morupe (*Colocasia antiquorum*) to be grown.

(d) Grazing of livestock in communal lands around the village. There is also extensive collection of veld products such as fuelwood, edible fruits, thatch grass, insects, etc. from the communal lands, as occurs throughout the region (Shackleton et al., 1995; Shackleton and Shackleton, 1997).

Methods

Field sampling

The primary focus of the survey was the home gardens at each homestead as described above. Four complementary approaches were adopted during the course of the study, namely (a) formal sample interviews with residents of Dingleydale B, (b) direct observation, (c) participant group meetings, and (d) a survey of fields. After some initial visits to several of the villages in the area, an interview schedule was drawn up and a pilot test was run in Dingleydale A, nearby. The original interview schedule was amended on the basis of the results and experiences from the pilot. Administration of the final interview took approximately 45 minutes per household.

The interview schedule comprised of four sections: a general introduction concerning land use and farming practices, a section dealing with domestic plants and their products, another dealing with wild plants, and a final section which treated various socio-economic factors of the household. Not all the questions asked have been used in the analysis. Some did not generate sufficiently homogenous data to be generally useful, and others proved to be less significant than originally thought. The survey was administered to a random sample of 63 out of 248 village households, i.e. 25%.

When the household survey was over, a series of group meetings was held to confirm some of the findings and gather some general background information. There were three meetings, one with an all male group of the village headman's friends, one with a local woman's group and one with an adult high school class.

Building on the experiences of the household survey, a sketch survey of fields worked by twenty households in Dingleydale B was carried out. Although a full, random survey or one paired with the original household survey would have been ideal, resources did not permit it and the fields survey was not as extensive as the home survey. Selection was not random, but instead used 'snowball' sampling (McNeill, 1985) (selecting the first randomly and then letting the respondent identify/recommend the next respondent/sample site). Some of the field surveys took up to two hours, allowing considerable exploration of detail.

Data analysis

Where products were harvested piecemeal, it was difficult for people to estimate how much they produced altogether. This was handled differently for different products. For most, any estimate was made based on the amount of seed used, the area of land planted or the number of trees, and the average yield of the same product, under similar conditions. Where no yield data was calculable, values were obtained from key informants.

In the case of many fruit trees, much of the data were based on the number

of fruiting trees. It was found in the pilot study that many trees did not bear fruit, often because they were young, and therefore the questionnaire distinguished between fruiting and young, non-fruiting trees. Trees which were barren were not included. No information was available for the fruit yield of mulberry trees, nor their value, as the fruit is primarily eaten by children, and isn't sold.

All edible herbs (*morogos*) were usually treated together for the sake of brevity, rather than each species individually. After establishing which morogos were present, the respondent would generally be asked how many times a week they ate morogo, and for what length of time they were collectively available. Frequency of harvest and availability of the product were used to construct an estimate for the total production. Where the amount of morogo picked on each occasion was known, the estimate was in terms of plastic shopping bags of morogo. Where it was not, the estimate was in terms of the number of meals provided by the morogos to the household, based on the number of people living there. More detailed information was obtained about the individual morogos during the fields survey.

If a range was given as a reply (e.g. two to five times a week, or R5–R10), the mid-point value was used (i.e. 3.5 times a week, and R7.50, respectively). Quantities were usually given in terms of known units, such as sacks, bags and buckets, and these were then converted to standard, metric amounts. Where respondents stated that 'little' or 'few' of a product had been harvested, a zero quantity and value was recorded. Where the quantity of a product was not known and couldn't be estimated, it's presence was noted, and the case excluded from the analysis. Such cases are relatively few, and are not considered very important.

Where extreme outliers in the data were noted, they were investigated. In all but one case they were judged legitimate. In the case of maize yields, two entries appeared to show yields of about 1 tonne of maize grown, for every kilogram planted. This was based on the number of 80 kg bags harvested and their assumed weight. However, it is likely that these particular respondents were talking about bags of corn on the cob, rather than of shucked grain, and therefore these entries were discounted.

The use of market values proved sufficient for the valuation of plants in Dingleydale B. Most products are traded in and around the village, and respondents were able to give the price they asked for products which they sold. The selling price was used to estimate the value of what was kept at home. Where all of a particular product was consumed by the household, the average local market price was used. In many cases the market price in nearby towns (i.e. Acornhoek, Bushbuckridge, etc.) differed from the local one, in which case the local one was used. All monetary values are reported in 1996 rand terms (in late 1996, 1 US$ = R4.00; in July 1998, 1 US$ = R6.30).

A special case was marula beer, which many people make, but no-one sold (contrary to the findings of Shackleton et al., in press). The reason for this is not clear, but could well be cultural (other beers that are made locally are

sold). The value used was 50c per litre, based on Rossiter et al. (1996), and the price of sorghum beer sold at traditional dances near Dingleydale.

Two assumptions were used in the determination of the value of morogo. The value of enough morogo for one meal for one person was assumed to be R0.40. The value per plastic shopping bag (±25 cm × 35 cm) of morogo was taken as R4.00 from local vendors. These are both intended to be conservative estimates. The first assumption was the basis of the most of the values calculated for the household survey, whereas the second was used more for the fields.

In all cases where there was uncertainty about quantities, low values were selected, in order to ensure that the valuation was conservative. Where no price existed, and none could be calculated, the presence of the plant was noted, and a value of zero was assigned. Most of these cases involved very small quantities, e.g. the use of *nthede* for snuff. An important exception is fodder, particularly the use of mulberry leaves and maize stalks to feed cattle and goats, and *madlele*, a wild plant which is fed to pigs. Overall, therefore, the valuation is likely to be an underestimate.

Results

Plants used

The plant products of Dingleydale B can be broadly classified as follows:

(a) Crops – domesticated crop species, usually annuals, although a few such as sweet potato are perennial (but usually replanted every season).
(b) Fruits – fruit from tree species which have either been intentionally planted, or which have self-seeded. This includes commercially available and wild species.
(c) *Morogos* – edible 'spinaches', generally leaves of wild plants, although certain domestic plants such as pumpkin yield morogo too.
(d) Others – everything else. Includes fodder, shade from trees, etc.

A total of 748 plant product items across all households were recorded, comprising 76 different kinds. There were 23 types of crops, 15 *morogos*, 24 fruits and 14 other plant products. Each household used between 0 and 27 products. The mean number of plant products per home garden was 12 ± 5.2 (standard deviation). Only one household had nothing growing, but the family had only been resident on that plots for a few weeks.

The mean value of plant products per home garden was R1694 ± 1362. The highest value recorded for the plant products of a single household was R6329. This family was headed by two women who did not have access to any fields. No-one in the household was employed, and they depended solely on what they could produce from the home garden. The next two highest values (R5050 and R4175) were recorded at households which specialised in a particular

product (mangoes and sugar cane, respectively), of which most was sold, along with additional product from their fields.

The total value of plant products observed by the survey for home gardens in the village was R105,054. Using the 95% confidence interval (using a *t*-distribution on the mean value per household) for the value of plant products produced on home gardens, then the extrapolated value for the whole village is R333,000–R504,000.

Given that the approximate area of the residential section of the village is 1 km^2, then the mean value per hectare of plant products from household land is between R3330 and R5040 per annum. However, not all the village land is planted, and the true value per hectare per year for arable land is probably much higher than this (Table 1).

The mean value of domestic plants was R1173 ± 1103 per household. Thus, domestic plants are worth R220,000–R358,000 to the village, or R2200–R3580 ha^{-1} per year. In the case of wild plants, the mean value per household was R521 ± 473, and the value to the village was between R99,000 and R158,000 per year, giving a per hectare value of between R990 and R1580.

Crop plants

Altogether 23 crops were recorded growing in Dingleydale B (Table 2). The mean number of crops per home garden was 3.4 ± 2.2. The mean value of crops grown per household was R676 ± 700. Extrapolation to the whole of Dingleydale B, as before, gives a 95% confidence interval for the total value of crops grown in Dingleydale B in the 1995/1996 season, of R123,000 to R211,000, equivalent to R1230–R2110 ha^{-1}.

Table 1. Summary values of different categories of plant products grown in home gardens in Bushbuckridge region, South Africa.

Category	Mean value per household (R)	%	Range in estimated value per hectare (R)	
			Minimum	Maximum
Crops	676	40	1230	2110
Fruit	392	23	970	1870
Morogo	626	37	1220	1870
Total value	1694	100	3330	5040
Total value of domestic plants	1173	69	2200	3580
Total value of wild plants	521	31	990	1580
Value of plants sold	354	22	510	1240
Value of plants consumed	1324	78	2565	3980

Table 2. The value of each crop grown in home gardens at Dingleydale B in Bushbuckridge region, South Africa.

Local crop name	Botanical name	No.	Total mean value (R)	Mean value sold (R)	Mean value consumed (R)
Bean	*Phaseolus vulgaris*	12	69	4	57
Beetroot	*Beta vulgaris*	5	9	4	5
Cabbage	*Brassica oleracea*	5	491	46	445
Carrot	*Daucus carota*	2	15	15	0
Cassava	*Manihot esculenta*	9	306	10	296
Cauliflower	*Brassica oleracea*	1	100	0	100
Chilli	*Capsicum frutescens*	6	61	13	48
Dinawa	*Vigna unguiculata*	3	62	10	31
Dintlo	*Phaseolus* sp. (?)	9	254	109	124
Green bean	*Phaseolus* sp.	14	60	14	45
Ground nut	*Arachis hypogaea*	16	236	41	184
Madanda	*Hibiscus esculentus*	2	60	0	60
Maize	*Zea mays*	40	319	42	267
Maranga	*Unknown*	1	Values unknown – see methods		
Ndotjie	*Unknown*	2	Values unknown – see methods		
Onion	*Allium cepa*	9	40	10	30
Pumpkin	*Cucurbita pepo*	11	52	0	52
Sorghum	*Sorghum bicolor*	1	Values unknown – see methods		
Spinach	*Sinacea oleracea*	9	116	24	92
Sugar cane	*Saccharum offinicarum*	13	493	217	277
Sweet potato	*Ipomoea batatas*	32	182	7	175
Tomato	*Lycopersicon esculentum*	9	126	0	126
Walter melon	*Citrullus vulgaris*	1	35	0	35

(Mean values are for those households growing that particular crop). Any residual value between total value, and that consumed or sold, is the value of the crop that is stored as seed for the next season.

Morogos

The most commonly occurring and used morogos in home gardens in Dingleydale B were nkuše (*Corchorus tridens*), thepe (*Amaranthus hybridus*), nkaka (*Momordica balsamina*), and lerote (*Cleome gynandra*), along with pumpkin leaves and mositsa (*Bidens bipinnata* and *B. pilosa*) (Table 3). Mositsa is regarded as being available throughout the year. Altogether, 15 types of morogo were recorded in Dingleydale B, of which 12 were wild morogos, two were domestic (pumpkin & madanda), and the last was a dried morogo mixture of several species. Pumpkin is usually planted to supply leaves and flowers for morogo, rather than for its fruit. On average 4.5 ± 2.15 morogos were found at each home garden.

The average value of morogos per home garden was R626 ± R516. The mean total value of the morogo which was sold per household was R109 ±

Table 3. Morogo species used in Dingleydale B in Bushbuckridge region, South Africa.

Morogo	Botanical name	% of households using	% consumed	% sold
Lerokwa	*Cleome monophylla*	9.7	100	0
Lerote	*Cleome gynandra*	91.9	61.1	39.9
Madanda	*Hibiscus esculentus*	1.6	100	0
Masuping	*Chenopodium album*	3.2	100	0
Mositsa	*Bidens spp.* (cf. *bipinnata*)	51.6	100	0
Ngwakhoza	*Galinsoga parviflora*	4.8	100	0
Nkaka	*Momordica balsamina*	32.3	100	0
Nkuse	*Corchorus tridens*	91.9	75.7	24.3
Pumpkin	*Cucurbita pepo*	51.6	100	0
Thepe	*Amaranthus hybridus*	75.8	100	0
Thotho	*Solanum nigrum*	1.6	100	0
Thleso	*Tribulus terrestris*	1.6	100	0
Tsembyane	*Sida rhombifolia*	1.6	100	0
Dried morogo	various	27.4	100	0

The last two columns are based on the field survey, as the individual morogos were not usually separated.

R256 and the total mean value of the morogos consumed by a household for the year was R517 ± R492.

Fresh morogo generally becomes available around October or November, with most species being available for four to six months (Table 4). Most households have fresh morogo of one kind or another available for about eight months of the year (based on group meetings). The two species available most of the year, nkaka (*Momordica balsamina*) and mošitša (*Bidens* spp.), are not generally favoured. Some people don't like their taste, and several people stated that mošitša caused bad body odour.

In the fields survey, the respondents were asked whether they ever actively planted wild morogos. Five (25%) had at one time or another, with the two main species being nkaka and lerote. This question was often used in the household survey as an 'extra', our impression was that at least 25% of respondents had done so.

Fruits

Almost all households planted domestic fruit trees. These have almost completely supplanted wild fruit species with the exception of nkanyi (*Sclerocarya birrea*). The mean number of fruit species per household was 3.7 ± 2.3. The average value per household was R392 ± R759. The large variation is because a few households have a very large number of productive trees, usually mangoes. The largest value observed was R4244, at a household where most

Table 4. Length of seasonal availability of the more common morogo species in Bushbuckridge region, South Africa.

Morogo	Botanical name	No. of months available (Mean ± sd)	N
Lekhuse	*Corchorus tridens*	6.6 ± 0.85	15
Lerokwa	*Cleome monophylla*	4.5 ± 1.73	4
Lerote	*Cleome gynandra*	4.1 ± 1.04	16
Mositsa	*Bidens* spp. (cf. *bipinnata*)	10.9 ± 2.09	7
Nkaka	*Momordica balsamina*	12.0 ± 0	8
Thepe	*Amaranthus hybridus*	5.1 ± 2.08	10

Data from the field survey.

Table 5. Mean value of fruits grown and consumed by 62 households in Dingleydale B in Bushbuckridge region, South Africa.

Fruit	Botanical name	Mean value across all households in sample (R)	% of sample households actually growing	% consumed	% sold
Apple	*Malus domestica*	unknown	3.2	100	0
Apricot	*Prunus armeniaca*	40	3.2	100	0
Avocardo	*Persea americana*	1080	33.9	100	0
Banana	*Musa* spp.	49	19.4	100	0
Dinkosi		unknown	4.8	100	0
Dintlo		unknown	1.6	100	0
Granadilla	*Passiflora edults*	225	4.8	100	0
Guava	*Psidium guajava*	2481	19.4	100	0
Mgwagwa	*Strychnos madagascariensis*	100	4.8	80	20
Mango	*Mangifera indica*	14757	82.3	56	44
Nkanyi	*Sclerocarya birrea*	699	40.3	100	0
Mosapoti		unknown	1.6	100	0
Motlelepo	*Annona senegalensis*	unknown	1.6	100	0
Motsoma	*Diosypros mespiliformis*	unknown	3.2	100	0
Mulberry	*Morus alba*	30	21	100	0
Mutlepo		unknown	1.6	100	0
Nut		unknown	1.6	100	0
Orange	*Citrus sinensis*	3	4.8	100	0
Pawpaw	*Carica papaya*	3961	64.5	66	34
Peach	*Prunus persicus*	840	43.5	100	0
Pear	*Pyrus communis*	unknown	1.6	100	0
Pineapple	*Ananus comosus*	15	1.6	100	0
Pomegranate	*Pumica granatum*	18	3.2	100	0

of the land is under mangoes. The total value of fruit production within the village was R97,000–R187,000, or R970–R1870 per hectare.

Every house has fruit trees growing, although not all trees were productive (Table 6). Less than a quarter of all fruit trees recorded actually gave fruit. Of those that did not bear fruit, most were newly planted, and are expected to start giving fruit within the next few years. Once these come into production, the potential value of the crop per household and for the whole village will be substantially higher (Table 6).

Other plants

There was a vast range of other plant products and uses found in the village. These included fodder for livestock (madlele, mulberry leaves, maize stalks and grass), snuff, mosquito repellent (manukane), fibre for hat making (lebipo) and kindling (husks of *Sclerocarya birrea* fruits). Firewood is collected in the communal lands. Kindling may be collected from trees in residential plots or arable fields. Twenty-seven plant products were recorded which were not food products for humans. No medicinal species were recorded in home gardens. The values were not generally available, but will be low in comparison to the major food species discussed earlier.

Plants grown in the arable fields

Seventy nine percent of those interviewed had access to an arable field (considerably higher than for the Bushbuckridge region as a whole). The average time taken to get to the field was just under an hour (53 ± 40 minutes; median

Table 6. Ratio of productive to unproductive trees, and potential future value of the crop (at current prices), once non-bearing trees reach maturity in Bushbuckridge region, South Africa.

Fruit	% of trees currently bearing fruit	Mean value of fruit per bearing tree (R)	Current value of entire crop	Prospective value of entire crop
Avocardo	7.6	156	1092	14352
Banana	17.2	4	44	256
Granadilla	75	75	225	300
Guava	43.3	191	2483	5730
Mango	17.3	102	14688	84864
Nkanyi	69.6	44	704	1012
Mulberry	85	2	34	40
Orange	13.3	2	4	30
Pawpaw	32.8	28	4004	12208
Peach	13.5	42	840	6216
Pomegranate	75	6	18	24
All species	22.7		24136	125032

= 30 minutes), but with some respondents having to walk for three hours to reach their fields.

Fields provided an average of R6658 of produce for sale, compared to R354 for the household land. However, fields are generally three to five times larger than areas cultivated around the homestead plot. In fact, in most respects the fields provide more value to the household, probably because they are larger and there are economies of scale of effort involved. Anecdotal evidence indicates that this is not the case for costs, as many households buy inputs such as seed, fertiliser and then split them between the homestead and the field.

There was little difference in the value of crops and fruits occurring in fields and residential plots that were harvested for home consumption, although more morogo was consumed from the fields than from the home gardens. This substantiates the general impression that morogo from the fields in preferred, possible because it gets more water (when the irrigation is operational), and hence grows bigger and tastes fresher. The mean watering frequency in the fields was 3.2 times per week (by flood irrigation), whereas it was 1.6 times per week in home gardens (carried in drums from local stand pipes or streams).

Comparing the responses to the household survey of those who own fields with those who don't, showed that households which have no fields tend to be significantly smaller (t = 2.1, P = 0.04). Furthermore, the difference was not the number of people at home (t = 1.59, P = 0.12), but the number of people living away from home. The number of jobs per household was the most striking difference, with households with fields having significantly more employed members (t = 2.25, P = 0.03).

Discussion

The results of this project indicate that a considerable array of plant species are nurtured or actively cultivated in home gardens on residential plots, and that they have a significant cash and home consumption value. Home consumption, and then sale of surpluses has been identified as the primary motivation for people seeking land to grow crops in South Africa's rural areas (Marcus et al., 1996). Whilst domestic crops had a higher value, the contribution of wild plants to the diet is significant (31% of the total value), as well as to direct forms of income generation, and in savings of cash to purchase alternative foodstuffs if the wild plants were not available. These findings corroborate those of other studies also indicating the importance of wild herbs and fruits to rural communities (e.g. Fleuret, 1979; FAO, 1988; Zinyama et al., 1990; Shackleton et al., 1995; Shackleton and Shackleton, 1997; Shackleton et al., 1999). Placing a value to the role of these wild foodstuffs is necessary in debates on land use practices and changes, as well as adjustments to data and indices pertaining to regional economic output. This has led to a worldwide trend to highlight their importance (FAO, 1988;

Cunningham, 1997). Simultaneously, there have been efforts to domesticate and cultivate species for which there is a large existing demand, as a means of both improving yields and potential incomes to rural farmers, as well as contributing to the conservation of species under high demand. In southern Africa this has included indigenous fruit trees, especially through efforts of ICRAF and others (e.g. Mwamba, 1996; Simmons, 1996; Taylor et al., 1996), along with other species such as medicinal plants (Mander et al., 1996) and weaving fibre (Heinsohn, 1991).

Most of the morogo species consumed or traded are regarded as weedy species in the agricultural sense, and several are not indigenous to South Africa. Yet they have been integrated as a vital component of the local diet and economy. Similarly, McGregor (1995), in Zimbabwe, recorded a shift away from collecting edible plants in communal lands to collecting more weedy species associated with disturbed sites closer to and within residential areas. Whilst most of the trade in Dingleydale is within the village or within the region, there is a growing supply and trade to larger regional centres further afield (Shackleton and Shackleton, 1997). A similar pattern is evident for other resources harvested from rural areas of South Africa such as medicinal plants (Mander, 1998), carving timber (Shackleton, 1993), weaving materials (Heinsohn, 1991) and the like.

Almost all households planted domestic fruit trees. These have almost completely supplanted wild fruit species with the exception of nkanyi (*Sclerocarya birrea*), although they are still valued, and retained within the communal lands around the village. In the residential parts of Dingleydale B wild tree species are retained largely for shade purposes, if at all. A common example of such is silver cluster-leaf (*Terminalia sericea*). The high proportion of young fruit trees suggests many people have planted within the last few years. This was pursued in the group interviews, and two explanations were offered. Firstly, the agricultural extension workers were encouraging it so that children should not steal fruit from the fields or from neighbours. Secondly, in the words of one of the men of the village, 'Since we've had our freedom, we've been able to sell our fruit. Now it's worth growing them.' Thus, it seems as though the new political dispensation on South Africa is providing an incentive for small growers to participate more in the local economy.

The staple crop in Dingleydale B, as in much of South Africa, is maize. In the 1995/1996 season the estimated harvest in South Africa was 9,928,000 tonnes, produced on 3.7 million hectares of land (Maize Board, 1996). The average yield in developing areas was 0.98 t ha^{-1}, whereas in areas covered by commercial farming, the average yield was 2.86 t ha^{-1}. It is not clear whether the figures for developing areas include grain that is consumed at home.

The figures found here for the duration of availability of the different morogos differ somewhat from those reported by Dzerefos et al. (1995), where a question was asked about the availability of morogos. It was suspected by those authors that many respondents to that survey answered with the number

of months in which either fresh or dried morogo was available. This is probably correct, as generally the results given above indicate shorter growing seasons than those found by the previous survey.

Extrapolation of these results to other villages in the area, or similar areas, must take cognizance of the fact that we consider the values derived here to be conservative. This was because (a) respondents perceived yields to be low in 1995/96 due to adverse weather, and (b) our approach of always using the lower values in instances of doubt. However, this needs to be balanced against the greater availability of water in Dingleydale B than surrounding villages. The total economic value of plant products from home gardens was R420,216, or R4202 per hectare. This is not accounted for in regional and national statistics. The value per household of R1694 represents just over R280 per month over a six month growing period, or R140 per month across the entire year. With endemic high unemployment levels in the rural areas, this is a considerable contribution to local household livelihoods, and the value over six months (R280 per month) is comparable to, or better than, the mean wage paid to agricultural labour on commercial farms in the vicinity (Sender and Johnston, 1996). Our survey results revealed that households in Dingleydale B spent between R846,000 and R1,185,000 (95% confidence interval) on food during the year. In comparison, the estimated value of plant products of between R333,000 and R504,000 (95% confidence interval) is not negligible. Only 28% of this value is in the form of cash income, but the value of produce which is consumed is important too, as many of the alternatives to growing one's own food are more expensive, particularly as formal employment is scarce. Thus, the growing of crops for home consumption represents a considerable cash saving.

This work complements others demonstrating the multifaceted nature of rural livelihoods. Along with extraction of resources from adjacent communal lands it indicates the importance of small-scale activities and secondary resources in contributing to food security, household well-being, and the informal economy.

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