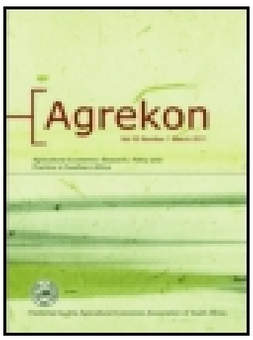

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Direct-use Values of Non-Timber Forest Products from two areas on the Transkei Wild Coast

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Abstract

It is now widely appreciated internationally that rural communities make extensive use of wild resources, and that this use has significant direct use value. The number of case studies in South Africa that have valued the use of such resources are small, albeit growing. Yet none of them have been from coastal sites, which would include use of marine resources, nor have previous studies included the non-biological resources of sand and clay for building purposes. This paper addresses this gap, through examination of the role and value of wild resources in rural livelihoods of households in the Ntubeni and Cwebe areas of the Transkei Wild Coast in the Eastern Cape.

Households used a wide range of resources collected from the surrounding communal lands and the Dwesa Cwebe Nature Reserve. Major differences between the sites were the widespread use of bushmeat, shellfish and building sand at Ntubeni compared with relatively small use of these three resources at Cwebe. These differences resulted in a markedly higher, gross, annual, direct-use value at Ntubeni than at Cwebe. The gross, annual, direct-use value averaged across all resources (excluding medicinal plants) and all households (user and non-users) was over R12 000 at Ntubeni, compared to R4 858 at Cwebe. At Ntubeni over half of the total annual direct-use value was contributed by fish and shellfish, indicating the need for more studies in coastal areas. A similar pattern was not evident at Cwebe, because residents did not have access to a rocky shoreline outside of the marine reserve. Local trade was highly variable, both between resources and between households. Averaging the value of trade across all households (i.e. traders and non-traders), gave a total gross, annual value of R1 660 and R600 at Ntubeni and Cwebe, respectively.

1. Introduction

There is growing international acknowledgement of the importance of natural resources to rural households in contributing to their livelihood needs (Byron & Arnold, 1999; Kaimowitz, 2003; Shackleton & Shackleton, 2004a). These

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natural resources serve a number of functions, including daily subsistence, income-generation, cash saving (Shackleton & Shackleton, 2004a), safety nets during times of adversity (Arnold & Ruiz Pérez, 2001; Shackleton & Shackleton, 2004b; Paumgarten, 2006), and meeting spiritual and cultural needs (Cocks & Wiersum, 2003). It is now widely appreciated that analysis of rural livelihoods cannot be complete without inclusion of the natural resource component (Campbell *et al*., 2002), although the number of case studies from southern and South Africa is woefully low. Most of the literature is based on work in tropical ecosystems (Shackleton *et al*., in 2007). Of the few studies to date in southern Africa, natural resources have been shown to contribute between 15 % and 28 % of total livelihood accruals (Shackleton *et al*., 2007), frequently equaling, if not surpassing, the contributions from arable agriculture and livestock (Shackleton *et al*., 2001; Dovie *et al*., 2002; Ngwenya & Hassan, 2005). This finding needs to be tested across a variety of settings in South Africa.

The broader aspects of the role of natural resources in rural livelihoods and national accounts overlaps with debates around poverty alleviation strategies (Arnold & Ruiz Pérez, 2001; Wunder, 2001; Sunderlin *et al*., 2005). If a significant proportion of livelihood accruals come via natural resources, then two questions arise. Firstly, are rural households as poor as portrayed if certain benefit streams are excluded from livelihood analyses and formal statistics measuring their well-being and wealth, and hence national GDP? Secondly, if natural resources do make up such a significant proportion of livelihoods, should they not be considered as a possible vehicle for poverty alleviation interventions? The corollary of the second question is that if use of natural resources became ecologically unsustainable at a particular site or region, then poverty will deepen but the causes will go undetected via formal statistics and economic measures at both the local and national levels (Ngwenya & Hassan, 2005). This requires longitudinal surveys of a specific site, in which the natural resource component is considered along with other livelihood streams.

Considering the limited suite of case studies in southern Africa, and the need for longitudinal work, an opportunity arose to include natural resource valuation in the repeat longitudinal poverty survey of two areas in the Transkei region of the Eastern Cape. The original survey in 2000 profiling livelihoods did not include a systematic survey and valuation of natural resource use (Palmer *et al*., 2002), but was deemed necessary in 2004 because it was clear from direct observation that local people made widespread use of the natural resources around them. Moreover, this not only added to the number of case studies in South Africa, but because of the coastal location of

the two study areas it also allowed for the inclusion of marine resources, which had not been done before. This paper presents the results and empirical findings in this regard.

2. Study area

The following summary of the study area is adapted from Timmermans (2004). The Dwesa Cwebe area is located on the south-eastern coast of South Africa in what was previously the homeland of Transkei (now part of the Eastern Cape Province). Situated between the Nqabara River (32˚ 12' S; 28˚ 58' E) and the Ntlonyana River (32˚ 20' S; 28˚ 48' E) it comprises a mix of communal land and State conservation land, roughly 235 km^2 in extent. The closest towns to Dwesa are Willowvale and Dutywa, 50 and 75 km inland respectively, while the closest towns to Cwebe are Elliotdale and Mthatha, 50 and 100 km away respectively.

The study area is generally characterized by wet summers and dry winters. Mean annual rainfall is approximately 1 200 mm. The hilly landscape is dominated by houses, gardens, and extensive grasslands, interspersed with woodland and forest patches (Timmermans, 2002). Both the marine and terrestrial environments are considered highly productive and contain high levels of biodiversity (DEAE&T, 1999). The vegetation is classified as Coastal Forest and Thornveld (Acocks 1988). Forest cover is highest in the nearby Dwesa Cwebe Nature Reserve and in the riparian zones of the rivers and streams. The Dwesa Cwebe Nature Reserve ($\pm$ 57 km^2), comprises two State forest reserves and a national marine reserve. Most (68.5 %) of the reserve comprises indigenous forest, the remainder being coastal grassland and other habitat types.

Seven villages occur immediately inland of the nature reserve. These are (from north to south) Cwebe, Hobeni, Mendwane, Ntlangano, Ngoma, Mpume and Ntubeni. The number of households in these villages ranges from 81 (Ntlangano) to 612 (Hobeni). Together they comprise approximately 2 270 households, accommodating 14 700 people (Department of Land Affairs, 1998). *De facto* population densities are approximately 107 people km^{-2} in the Ntubeni area and 133 people km^{-2} at Cwebe (Timmermans, 2004).

A Statistics South Africa (2000) survey revealed that the Willowvale and Elliotdale districts were the two poorest districts in the country. Mean monthly expenditure among households in Elliotdale was estimated at R746 per month and at Willowvale, R792 per month (Stats SA, 2000). A more localised study conducted by the Agriculture and Rural Development Research Institute

(ARDRI, 2001) found that 93% of households in rural Elliotdale and 91% of households in rural Willowvale had incomes below a poverty line set at R533 per adult equivalent per month. Between 70% and 77% of the households were classified as 'ultra-poor'. The area is further characterised by high levels of temporary urban migration, and reliance on remittances and state welfare grants. Despite the absence of many adults, the majority of households continue to pursue an agrarian orientated lifestyle based on livestock husbandry, cropping and the use of 'wild' natural resources (ARDRI, 2001).

Many of the key natural resources in the area are concentrated in the Dwesa Cwebe Nature Reserve. Through the years different management regimes have held different views on the issue of natural resource harvesting with the result that the reserves have been opened and then closed to local use on various occasions. For the period 1903-1976 harvesting was permitted in terms of local forestry regulations which included, *inter alia*, the payment of forestry tariffs (Vermaak & Peckham, 1996). From 1976 to 1994, Dwesa and Cwebe were combined and managed as a National Wildlife Reserve and access by local communities was terminated. Soon after the new dispensation came into being in South Africa in 1994, growing anger against the continued closure of the reserve culminated in a local protest action. Following the protest the government agreed to partially reopen the reserves to harvesting of forest resources (medicinal plants, weaving and thatch grasses), but not marine resources) (DEA&T, 1999).

Immediately following the reopening, harvesting rates, particularly of construction timber, were high. According to Timmermans (2000) this was due in part to a backlog in the maintenance of agrarian infrastructure (i.e. kraals and garden fences) that had arisen as a result of the forests having been closed for the previous eighteen years. In 2001 a decision was taken to 'temporarily' close the forests once again, presumably to allow for regeneration to take place. To date the decision has not yet been revisited. At the time of the survey, much of the harvesting of natural resources was therefore restricted to the smaller forest patches and woodlots situated in and around the villages, and to a stretch of rocky shoreline outside and to the south of the reserve. Weaving and thatch grass could evidently still be harvested from the reserve.

The protest action unified the Dwesa and Cwebe communities politically, but that has not over-ridden the significant ethnic and socio-economic differences between the populations on either side of the river. A key difference between the Ntubeni and Cwebe communities is that field cultivation has all but been abandoned at Ntubeni in favour of enlarged home gardens (Andrew, 1992). *Acacia karroo* is rapidly reestablishing in the former field sites here. At Cwebe,

field cultivation continues to be practiced in combination with home gardening. This is symptomatic of the more conservative and agrarian approach of the Bomvana on the Cwebe side as compared with the generally better-educated, more Western-orientated Mfengu of the Dwesa side; it is also a reflection of the greater access to economic alternatives to agriculture on the Dwesa side (Palmer & Fay, 2002; Fay & Palmer, 2002).

3. Approach

Household interviews were conducted with those randomly selected households that had participated in the original survey of Palmer *et al*. (2002). There were 40 households in Ntubeni and 40 at Cwebe, constituting a 20 % and 10 % sampling intensity, respectively. Each interview was conducted by trained field workers from the area, with one or more adult household members, covering all aspects of natural resource use, such as types, quantities and trade. The interview schedule followed that of Shackleton *et al*. (1999, 2002) with minor modifications. The household interviews were complemented by group and PRA sessions to investigate further areas of uncertainty or seeming contradiction. All group sessions were conducted in the local language, i.e. isiXhosa.

Gross annual direct-use value was determined from the empirical data as the product of quantity used per household per year and the local (farm-gate) price. For the few resources without any local trade, and hence no local price, we used the prices reported by Shackleton *et al*. (2002) from another rural region of the Eastern Cape province. Local units of collection, e.g. a headload, or a bucketful were converted to standard units after further fieldwork. For bushmeat, the mass of individual animals was taken from Skinner & Smithers (1990). The dressed weight of the full carcass was taken as 55 % (Botha & van Rooyen, 1989). For some resources the amounts used differed on a seasonal basis. In such instances, we took summer to be eight months long, and winter to be four months. Where respondents provided a range in response to a particular question, we took the mid-point of the range. Prices are in 2004 Rand values. In areas of uncertainty in the data, we always took the most conservative estimate, and hence the final direct-use values should be regarded as under-estimates. All values are gross values as no costs, primarily opportunity costs of labour, were deducted.

4. Direct-use values

4.1. Fuelwood

All households in both areas used fuelwood. The mean annual use was 4 725.3 kg and 4 073.5 kg at Ntubeni and Cwebe, respectively. The local unit price, determined from four bundles, was 77.5c/kg, resulting in an annual, gross, direct-use value of R3 662 per household at Ntubeni and R3 257 at Cwebe, respectively. There was relatively little trade in fuelwood with only a few households in each area doing it on an *ad hoc* basis.

4.2. Thatch Grass

Thatch grass is widely used as a roofing material in both Ntubeni and Cwebe, with 96 % of households having one or more thatched structures, with a mean of 2.0 ± 0.1 structures across all households (Table 1). Rondavels were, on the whole, larger at Ntubeni than at Cwebe. They are also proportionately fewer, because there were more oblong, zinc-roofed structures at Ntubeni relative to Cwebe. The size of thatch bundles between the villages also differed markedly, probably due to respondents at Ntubeni reporting bunches (*isipha*), whilst those at Cwebe reported the larger headload unit (*isithungu*). Despite this, the costs per unit area of thatched roof were reasonably similar at R23.92 m^2 and R27.89 m^2, at Ntubeni and Cwebe, respectively.

Table 1: Dimensions and associated costs of thatched roofs (± SE).

	Ntubeni	Cwebe	Combined
No. of thatched structures per hh	1.5 ± 0.13	2.4 ± 0.15	2.0 ± 0.11
Mean diameter (m)	6.1 ± 0.45	5.7 ± 0.16	5.5 ± 0.22
Bundles/m^2 of roof	36.2 ± 4.11	12.3 ± 3.12	22.9 ± 2.76
Cost/roof (R)	509.81 ± 43.39	307.96 ± 11.85	394.23 ± 21.61
Cost/m^2 (R)	23.93 ± 3.27	27.83 ± 6.69	25.98 ± 3.83
Standing value of thatch (R)	764.72	739.10	788.46
Longevity of a thatch roof (yrs)	10.9 ± 0.9	7.0 ± 0.6	8.9 ± 0.6
Annualised, direct-use value (R)	70.15	105.59	88.59

Just less than one-quarter of households (24.3 %) at Cwebe sold thatch grass, and only 5.3 % at Ntubeni, represented by two households. Mean income to selling households was R334 ± 80 across the two areas. The current price was R0.60 per small bundle. All of them sold thatch to neighbours within their respective villages. No direct costs were incurred in selling thatch, other than labour time. Those engaged in selling, harvested thatch from around the village as well as the reserve, and usually carried it home or to the buyer's homestead.

4.3. Sand and clay for building and plastering

The majority of residents (92.1 % at Ntubeni and 100 % at Cwebe) collected clay from the local environment to make unfired bricks for new building structures within the homestead (Table 2). They also collected clay several times per year to plaster the outside walls of the clay brick structures. The mean age of structures was 11.6 $\pm$ 0.8 years at Ntubeni and 10.3 $\pm$ 0.6 years at Cwebe. The oldest structure was 34 years old, but all the rest were less than 25 years old. A conservative estimation of mean longevity was taken as 30 years in order to annualize the capital cost. The annual value attributed to upkeep through plastering exterior walls was small relative to the annualized capital value of R419 across both areas.

Sand was also collected for building purposes, to mix with cement for floors, or making of cement bricks at home, or used in general construction. Nearly all households at Ntubeni (90.9 %) used locally collected sand for these purposes, whereas only 10 .8 % of households at Cwebe did so. They said that they rather bought building sand from contractors. Because of the multiple uses of sand at Ntubeni we could not calculate the value of the capital stock. The average demand was determined as 0.8 $\pm$ 0.16 tractor loads per household year. The loading of sand was usually done by family labour, or by hired labour for which food or small payment was made. The cost of transport was R95.57 $\pm$ 10.30, which is the price we used to determine annual direct-use value, giving a value to user households at Ntubeni of R76.46 per year, and across all households R69.50.

Whilst the majority of households collected clay for themselves and made their own bricks there was some small-scale trade in Ntubeni, but none at Cwebe. However, at both sites a common approach was to organize workparties to assist in making bricks, for which participants were 'paid' with food and or drinks, as has been noted elsewhere (McAllister, 2001). In Ntubeni 40 % of households using clay bricks said that at times they had bought clay bricks from other people in the village. Three respondents stated that they sold clay bricks to order, but only once or twice per year, with a total of approximately 300 bricks. The mean, gross annual income from such sales was approximately R180 per selling household.

Table 2: Use of clay for building and plastering.

	Ntubeni	Cwebe	Combined
% of hhs using bricks	92.1	100.0	96.0
No. of clay brick structures per hh	2.5 ± 0.16	2.7 ± 0.17	2.6 ± 0.12
No. of clay bricks per structure	988 ± 41.4	788 ± 44.4	878 ± 31.5
Local price per brick (R)	0.06	0.05	0.055
Capital stock of clay bricks per hh (R)	14 820	10 635	12 555
Gross, annual, direct-user value averaged of over 30 years (R)	494	355	419
Plastering frequency (/yr)	2.1 ± 0.14	6.1 ± 2.13 *	4.1 ± 1.09
Amount used (wheel barrows)	5.0 ± 0.56	3.0 ± 0.62	4.0 ± 0.44
Annual direct-use value (R)	9.45	13.73	13.53
Total, annual, direct-use value for clay to user hhs (R)	503.45	368.73	432.53
Total annual, direct-use value across all hhs (R)	463.68	368.73	415.53

* *one outlier omitted*

4.4. Fencing poles for fields, kraals and residential sites

Most households harvested poles from the local forests for fences or kraals. A wide variety of construction materials were used including indigenous poles, blue gum (*Eucalyptus* spp.) poles, wire mesh, wire strands, thorn branches and so on. Only the indigenous poles are valued in this exercise. Thorn branches were used as packing between the poles by only eight households and with no price nor counts of branches per unit length, they were not valued. The longevity of poles was taken as eight years as recorded by Shackleton *et al*. (2002) from the Kat River valley. The proportion of households using, and the dimensions of fences and kraals were reasonably similar across the two areas (Table 3). But with a higher unit price at Ntubeni, the gross annual direct use value was higher there than at Cwebe. Across the interviewed households there was nobody that sold indigenous poles, or admitted as such.

Table 3: Use of indigenous poles for fencing and kraals.

	Ntubeni	Cwebe	Combined
% of hhs using for : - fencing	89.5	97.3	93.3
- kraals	81.6	81.1	81.3
- granaries	18.4	0	9.3
FENCES			
No. per hh	1.5 ± 0.09	1.1 ± 0.07	1.3 ± 0.06
Length (m)	238.6 ± 13.5	161.2 ± 11.8	205.6 ± 10.1
No. of poles per fence	25.1 ± 2.0	18.8 ± 2.0	21.6 ±1.5
Unit price (R)	10.89 ± 0.24	8.50 ± 0.76	10.15 ± 0.35
Annual direct-use value to users (R), assuming a longevity of eight years	51.25	21.97	35.63
Total annual, direct-use value across all hhs (R)	45.87	21.38	33.24
KRAALS			
Length (m)	23.6 ± 2.8	25.2 ± 1.8	24.4 ± 1.7
No. of poles per kraal	50.5 ± 10.0	43.8 ± 8.1	47.3 ±6.5
Unit price for main poles(R)	10.89 ± 0.24	8.50 ± 0.76	10.15 ± 0.35
Annual direct-use value to users (R), assuming a longevity of eight years and subsidiary poles at half unit price	45.71	30.95	39.91
Total annual, direct-use value across all hhs (R)	37.30	25.10	32.45

4.5. Wooden utensils

Eleven different wooden utensils or tools were listed by the respondents across the two areas (Table 4). The majority of households used at least one such tool or utensil. The most widely used were fighting sticks, axe- and hoe-handles and spoons. Given the range in items it was not unsurprising that quantities varied for different items. For example, households may possess several fighting sticks, but generally only one pipe. Similarly, longevity of the different items was variable, from approximately two years for a sledge or hoe-handle to over eighteen years for a ceremonial stick. There was some trade in every type of utensil and hence local prices were used to calculate direct-use value. The items having the greatest value across all households (users and non-users) were sledges, fighting sticks, hoe-handles and yokes, which together accounted for over 80 % of the total value.

Table 4: Use and value of wooden utensils.

Item	Village	% using	No. hh^{-1}	Longevity (yrs)	Annual demand	Price (Rands)	Value (Rands)	
							Users	All
Spoon	Ntubeni	62.1	2.0	4.8	0.42	7.73	3.25	2.99
	Cwebe	57.9	1.2	3.5	0.34	5.79	1.97	1.14
	Combined	75.0	1.7	4.3	0.40	7.05	2.82	2.12
Mortar	Ntubeni	28.9	1.0	13.3	0.08	14.71	1.18	0.34
	Cwebe	28.9	1.0	6.6	0.15	25.71	3.86	1.11
	Combined	28.9	1.0	9.7	0.10	18.76	1.88	0.54
Fighting stick	Ntubeni	92.1	3.5	1.9	1.84	9.29	17.09	15.74
	Cwebe	68.4	2.5	3.4	0.74	16.67	12.34	8.44
	Combined	80.3	3.1	2.5	1.24	11.50	14.26	11.45
Walking stick	Ntubeni	31.6	1.6	7.8	0.21	11.00	2.31	0.73
	Cwebe	23.7	1.2	14.2	0.08	12.14	0.97	0.23
	Combined	27.6	1.4	11.0	0.13	11.50	1.50	0.41
Cerem. Stick	Ntubeni	10.5	1.3		0.07	14.57	1.02	0.11
	Cwebe	50.0	1.9	18.6	0.10	12.50	1.25	0.63
	Combined	30.3	1.8	18.1	0.10	13.82	1.38	0.42
Pipe	Ntubeni	11.0	1.0	6.0	0.16	26.67	4.27	0.47
	Cwebe	26.0	1.0	17.0	0.06	33.17	1.99	0.52
	Combined	18.0	1.0	14.6	0.07	30.38	2.13	0.38
Coop	Ntubeni	13.2	1.0	5.3	0.19	3.50	0.67	0.09
	Cwebe	28.9	1.0	4.7	0.21	40.00	8.40	2.43
	Combined	21.1	1.0	4.8	0.21	21.75	4.57	0.96
Axe handle	Ntubeni	94.7	1.5	2.8	0.54	9.07	4.89	4.64
	Cwebe	71.1	1.2	4.3	0.28	15.00	4.20	2.99
	Combined	82.9	1.4	3.5	0.40	9.80	3.92	3.25
Hoe handle	Ntubeni	97.0	1.8	2.4	0.75	8.08	6.065	5.88
	Cwebe	95.0	2.2	1.9	1.16	18.75	21.75	20.66
	Combined	96.0	2.0	2.1	0.95	10.75	10.21	9.80
Yoke	Ntubeni	42.1	1.9	7.2	0.26	58.11	15.11	6.36
	Cwebe	42.1	2.4	4.3	0.56	52.00	29.12	12.26
	Combined	42.1	2.1	5.7	0.37	55.93	20.69	8.71
Sledge	Ntubeni	26.3	1.1	2.2	0.50	114.00	57.00	14.99
	Cwebe	28.9	1.4	1.5	0.93	60.00	55.80	16.13
	Combined	27.6	1.2	1.7	0.71	105.00	74.55	20.58
Total gross, annual direct-use value to user hhs (R), assuming use all utensils		Ntubeni		112.85	Total gross, annual direct-use value across all hhs (R)		Ntubeni	52.34
		Cwebe		125.96			Cwebe	66.54
		Combined		119.41			Combined	58.62

4.6. Weaving reeds

Over 80 % of households at both Ntubeni and Cwebe possessed reed products that they had bought or made themselves (Table 5). The most prevalent product was reed sleeping mats of various sizes, most typically 0.7 – 1.2 m wide and 2 – 3 m long. Generally, there were approximately four or five of these mats per household, which were replaced on a biennial or triennial basis. Other reed or grass fibre items included grain baskets, beer strainers, trays and

small place mats. Sleeping mats, however, contributed over 80 % of the annual direct-use value of reed items. The annual direct-use value of the other reed items to user households was less than R25.00. Total annual direct-use value to user households ranged from R61 at Ntubeni to R155 at Cwebe, with a mean of R105.69 across the two areas.

Table 5: Use of weaving reeds.

		Ntubeni	Cwebe	Combined
% of hhs using reed products		84.2	89.5	86.8
Sleeping mats	% hhs using	84.2	89.5	86.8
	No. per user hh	4.4 ± 0.7	4.0 ± 0.3	4.2 ± 0.4
	Longevity per mat (yr)	3.3 ± 0.6	1.8 ± 0.2	2.6 ± 0.3
	Local price (R)	36.67 ± 5.34	61.88 ± 10.67	55.00 ± 8.09
	Annual direct-use value (R per user hh)	48.89	137.51	88.85
Grain baskets	% hhs using	42.1	60.5	51.3
	No. per user hh	2.9 ± 0.9	1.7 ± 0.2	2.2 ± 0.4
	Longevity per basket (yr)	2.0 ± 0.2	1.8 ± 0.2	1.9 ± 0.2
	Local price (R)	14.57 ± 1.74	23.79 ± 3.93	21.31 ± 3.00
	Annual direct-use value (R per user hh)	21.13	22.47	24.67
Beer strainers	% hhs using	5.3	10.5	7.9
	No. per user hh	1.5 ± 0.5	1.0 ± 0	1.2 ± 0.2
	Longevity per strainer (yr)	2.0 ± 0.2	1.8 ± 0.2	1.9 ± 0.2
	Local price (R)	10.00 ± 0	16.75 ± 1.97	15.40 ± 2.04
	Annual direct-use value (R per user hh)	7.50	9.31	9.73
Serving tray	% hhs using	15.8	10.5	13.2
	No. per user hh	1.0 ± 0	1.0 ± 0	1.0 ± 0
	Longevity per tray (yr)	2.0 ± 0.6	1.1 ± 0.9	1.8 ± 0.5
	Local price (R)		16.25 ± 2.39	16.25 ± 2.39
	Annual direct-use value (R per user hh)	8.13	14.77	9.03
Total annual, direct-use value per using hh (R)		61.45	155.52	105.69
Total annual, direct-use value across all hhs (R)		51.74	139.19	91.74

There was a thriving trade in woven products, especially sleeping mats, baskets and place mats. There were relatively few input costs other than own labour although some weavers did pay for bundles of the raw resource. The gross annual income from selling woven products was highly variable per selling household (R772.44 ± 387.47 at Ntubeni; R2 864.00 ± 2 664.00 at Cwebe). Some respondents only sold a few items a year earning perhaps R100 - R200, whereas for others it was a primary livelihood activity with incomes of several thousand rand per year. The primary market was within the local

villages to neighbours and friends, although a few did sell further afield, and to tourists. At Ntubeni 13.2 % of households stated that they bought woven products, and the corresponding figure at Cwebe was 59.5 % of households.

4.7. Wild spinaches

The majority of households at both Ntubeni (92.1 %) and Cwebe (97.1 %) made regular use of wild spinaches (Table 6). Frequency of consumption was approximately double in summer than what it was in winter. Whilst most people did eat wild spinaches in winter, a few households claimed that it was not available during winter. Although the average frequency of consumption was lower in Ntubeni than at Cwebe, the amount consumed per meal, and hence per week and per year was greater. Assuming a four month winter period (17 weeks), the total amount consumed per household was approximately 156 l of wild spinaches per year. All households collected their own wild spinaches. There was no buying or selling in either area. Because there was no trade, there was no local price with which to calculate direct-use value. Consequently, a replacement value was used, corresponding to the cost of a cabbage as per Shackleton *et al*. (2002), which at the time of the survey was R4.00. This provided an annual value of approximately R432 to user households across the two areas.

Table 6: Use of wild spinaches.

		Ntubeni	Cwebe	Combined
Proportion of hh using (%)		92.1	97.1	94.4
Frequency of consumption (times per week)	Summer	2.0 ± 0.17	2.9 ± 0.40	2.5 ± 0.22
	Winter	1.0 ± 0.12	1.5 ± 0.13	1.2 ± 0.09
Amount consumed per hh (l per week)	Summer	4.4 ± 0.5	2.7 ± 0.53	3.6 ± 0.38
	Winter	2.1± 0.33	1.6 ± 0.27	1.8 ± 0.22
Annual, gross replacement value (R)		348.000	508.00	431.60

4.8. Wild fruits

The majority of households at Ntubeni (63.2 %) used wild fruits, whereas only 24 % at Cwebe did so (Table 7). A total of 22 different species of wild fruit were mentioned by one or more respondents. The most popular wild fruits, in terms of proportion of households mentioning them, were *Harpephyllum caffrum, Rubus rigidus* and *Scutia myrtina*. Actual amounts and frequency of consumption were hard to gauge. Many respondents stated that wild fruits were only eaten by children whilst they were playing outside or herding cattle. Some also said that whilst adults did eat wild fruits, they were not collected in containers and brought home; they were simply eaten opportunistically when encountered. Consumption in winter was estimated to be approximately half of that in summer. There was no trade in wild fruits

in either village, i.e. there was no buying or selling. Therefore, we used the unit price from that recorded by Shackleton *et al*. (2002) for three rural villages elsewhere in the Eastern Cape, which was R1.46/l. This provided a mean annual gross direct-use value to user households of R40 at Ntubeni and R63 at Cwebe.

Table 7: Use of wild fruits.

		Ntubeni	Cwebe	Combined
Proportion of hh using (%)		63.2	24.3	44.0
Frequency of consumption (times per month)	Summer	4.1 ± 0.85	17.0 ± 13.0	6.1 ± 2.12
	Winter	Approximately half as often		
Amount consumed per month (l)	Summer	2.8 ± 2.20	4.3 ± 2.12	3.5 ± 2.41
Annual, gross direct-use value to user hh (R)		40.88	62.78	51.10
Annual, gross direct-use value to all hh (R)		25.84	15.26	22.48

4.9. Bushmeat

Exactly half of the households at Ntubeni made use of bushmeat trapped in the local vicinity, whereas only three households (8.1 %) at Cwebe did so. Because of the low frequency at Cwebe no further analysis was possible. Within user households at Ntubeni there was large variation in trapping effort and hence the mass of bushmeat consumed. Some households consumed bushmeat only once or twice a year, whilst other households did so several times per month. The mean mass consumed per year was 210 ± 119.8 kg per user household. Additionally, there was no locally reported trade in bushmeat, and thus no local price. Consequently, we used the unit price from that recorded by Shackleton *et al*. (2002) for three rural villages elsewhere in the Eastern Cape, which was R9.00/kg. This gave a mean annual, direct-use value to user households of R1 890, or R945 across all households. Eleven different species were reported as eaten, but most by only one or two households. The most widely consumed species were bushbuck (*Tragelaphus scriptus*) (8 hhs), bushpig (*Potamochoerus pocus*) (5 hhs), monkey (*Cercopithecus aethiops*) (13 hhs) and common duiker (*Sylvicapra grimmia*) (6 hhs).

4.10. Fish

Fish was consumed a great deal more widely in Ntubeni than in Cwebe, where 86.8 % and 10.8 % of households used it, respectively. The actual mass of fish consumed was not calculated because of the large range in size of fish and species. However, the mean number of fish consumed per meal was 4.9 ± 1.27 per meal, with a local price of R15.83 ± 1.57 per fish. The frequency of consumption of fish was approximately three times greater in summer (2.4 ± 0.5) than in winter (0.9 ± 0.3). The gross, annual direct-use value per

consuming household was R1 641.06 in Ntubeni and R3 282.13 in Cwebe. Averaged across all households it was R1 424.44 at Ntubeni and R354.47 at Cwebe.

There was a well developed trade in fish in Ntubeni, but not at Cwebe. Approximately one-third of households (35.1 %) at Ntubeni stated that they purchased fish from friends and other people in the area at one time or another – many on a frequent basis. Only one respondent in Cwebe stated that they purchased fish. Similar figures were obtained regarding the proportion of households selling, with 27.8 % of households at Ntubeni selling fish, but none at Cwebe. Fish were sold primarily to local villages (70 %), but also tourists (40 %) and direct to a local hotel (20 %). Of those selling, there was a wide range of incomes, from less than R100 per year to over R20 000 per year. This reflects fishing effort, with some only fishing rarely, and others several times a week. Some sold only surplus catch. Of the ten households engaged in selling fish, four of them had a gross income of greater than R3 000 per year. The mean gross, annual income across the ten selling households was R4 513 $\pm$ 2 225.87. This equates to R1 253.61 across all households.

4.11. Shellfish

Paralleling several other resources, shellfish were most widely used at Ntubeni (94.7 %), with relatively few households doing so at Cwebe (10.8 %) (Table 8). Many people at Cwebe said that it was illegal to collect shellfish. Because of this illegality, it is possible that a larger proportion of households did collect, but were not willing to say so. However, the low number of households collecting shellfish at Cwebe could also relate to the absence of a rocky shore within reasonable proximity. This is unlike at Ntubeni, where residents have access to a one kilometre stretch of rocky shore outside of the nature reserve. A number of types of shellfish were consumed, the most common being mussels and abalone. Winter collection rates were less than a quarter of summer collection rates. The unit price was different for the different shellfish, but respondents could not estimate the relative proportions of the different types per collecting trip. Therefore, we averaged the local price across all types (R3.18 $\pm$ 0.64 per litre) after omitting the two highest outliers.

Table 8: Use of shellfish.

		Ntubeni	Cwebe	Combined
Proportion of hh using (%)		94.7	10.8	53.3
Frequency of collection (times per month)	Summer	9.9 ± 1.35	4.7 ± 2.30	9.5 ± 1.28
	Winter	2.0 ± 0.45	1.3 ± 1.33	1.9 ± 0.42
Amount collected per trip (l)	Summer	22.4 ± 2.32	6.6 ± 2.14	20.5 ± 2.21
	Winter	7.7 ± 0.90	10.0 ± 5.00	7.9 ± 0.89
Annual, gross direct-use value to user hh (R)		5 837.46	954.51	5 145.37
Annual, gross direct-use value to all hh (R)		5 528.07	103.06	2 742.48

4.12. Minor resources

There were a number of resources that were used infrequently and/or in relatively small quantities, such that it was either very difficult to determine the direct-use value, or the direct use value was only a few rand each year. This included the opportunistic harvesting of wild mushrooms and wild honey. The use of indigenous poles for housing was found to be very low, as was also reported in the work of Lieberman (1997) and Shackleton *et al*. (2004a), but contrary to that of Ngwenya and Hassan (2005) in Swaziland. Grass brooms were widely used (97 % of households), but had a direct-use value of less than R10.00 per annum (Shackleton *et al*., 2004a).

5. Discussion

5.1. Gross, annual direct-use values

Residents at each of the two study areas made use of a wide range of wild resources collected from the surrounding communal lands and, when permitted, the Dwesa Cwebe Nature Reserve. However, patterns of use differed between the two areas. The most striking differences were the widespread use of bushmeat, shellfish and building sand at Ntubeni compared with relatively small use of these three resources at Cwebe. These differences resulted in a markedly higher, gross, annual, direct-use value at Ntubeni than at Cwebe (Table 9).

The gross, annual, direct-use value averaged across all households (user and non-users) was over R12 000 at Ntubeni, compared to R4 488 at Cwebe. These are considerably higher than other areas of the Eastern Cape province reported by Hassan & Haverman (1997) and Shackleton *et al*. (2002). They are also towards the upper end of the range of values summarized by Shackleton & Shackleton (2004a, b), with a mean of R3 121 per year. Of particular interest

is the fact that across all households at Ntubeni 44 % of the total annual, direct-use value is contributed by shellfish. None of the previous studies in South Africa have been at a coastal site and hence in areas where shellfish are used. An additional 11 % of the total at Ntubeni is attributed to fish, which, in this case were largely marine fish. Thus, marine resources at Ntubeni contributed over half of the total value. This requires that more studies take place in coastal areas. That said, a similar pattern was not evident at Cwebe, where unlike at Ntubeni, residents did not have access to a rocky shoreline outside of the marine reserve. In this village, shellfish and fish contributed only 9.5 % to the total annual direct-use value.

Table 9: Gross, annual direct-use values (R)

Resource	To user households			Across all households		
	Ntubeni	Cwebe	Combined	Ntubeni	Cwebe	Combined
Fuelwood	3 662.11	3 157.00	3 377.92	3 662.11	3 157.00	3 377.92
Thatch grass	70.15	105.59	88.59	67.34	101.37	85.05
Building clay & sand	579.91	368.73	474.32	533.18	368.73	450.96
Fence poles	51.25	21.97	35.63	45.87	21.38	33.24
Kraal poles	45.71	30.95	39.91	37.30	25.10	32.45
Wooden utensils	112.85	125.96	137.91	52.34	66.54	58.62
Weaving reeds	61.45	155.52	105.69	51.74	139.19	91.74
Grass brooms	8.68	13.03	9.11	8.68	12.34	8.86
Wild spinaches	348.00	508.00	431.60	320.52	493.28	407.44
Wild fruits	40.88	62.78	51.10	25.84	15.26	22.48
Bushmeat	1 890.00	0	1 890.00	945.00	0	945.00
Fish	1 641.06	3 282.13	1 764.92	1 424.44	354.47	870.11
Shellfish	5 837.46	954.51	5 145.37	5 528.07	103.06	2 742.48
Total	14 350	8 786	13 550	12 702	4 858	9 127

** Totals exclude (i) the negligible use of wild honey, wild mushrooms, and indigenous wood for housing poles, and (ii) medicinal plants, which were not included in the survey.*

Fuelwood was a high contributor to the total value, being the highest resource at Cwebe and second-highest at Ntubeni. This is typical of previous studies (Dovie *et al.*, 2002; Shackleton & Shackleton, 2004a, b; Ngwenya & Hassan, 2005). Because of the high demand and value it is imperative that the fuelwood resource be appropriately managed. In particular, the increased pressure on the local pocket forests around the villages due to the ban on harvesting in the reserve might require examination.

5.2. Trade in wild resources

Local trade was highly variable, both between resources and between households. For some resources there was no reported trade, and hence we had to use alternative ways of valuing resource use. For example, bushmeat, wild fruits and spinaches. For the majority of resources, trade was relatively undeveloped, with just a few households selling particular resources on an *ad hoc* basis, or on demand from a specific customer. Thus, local prices were known, but we could not capture any data relating to frequency of sales or mean incomes to traders as the sample size was too small. This applied to resources such as fuelwood, poles, and utensils. Lastly, there were a number of resources for which either there was well developed trade in terms of a large proportion of households buying and selling, or that perhaps only a few people sold a specific resource, but cash incomes from trade were high for those that pursued it as a primary livelihood strategy. The key resources in this category were thatch grass, grass brooms, weaving reeds or woven products and fish (at Ntubeni only).

For those resources with significant trade, the mean income per household was highly variable. This was because some households expended relatively little effort in trading, perhaps only selling their surplus collection or catch now and again. In comparison, some respondents actively engaged in trade several hours a day, several days a week. For example, the range in incomes from selling fish was from a low of R100 per year to over R20 000 per year. The latter trader was actively selling fish to tourists as well as local villagers. There was a similar range for grass brooms, ranging from R200 per year to approximately R3 600 per year. Thus, natural resource trade does allow some rural households to escape poverty (Shackleton 2005, Shackleton *et al*., 2007), with consumption and trade being particularly important for the poorer households in rural communities (Twine *et al*, 2003; Shackleton & Shackleton, 2006). In terms of the proportion of households participating, reeds and woven products were the most commonly traded item (28.2 % of households across the two areas combined), followed by thatch grass (14.7 %). Averaging the value of trade across all households (i.e. traders and non-traders), gives a total gross, annual value of R1 660 and R600 at Ntubeni and Cwebe, respectively.

6. Conclusions

Residents of Ntubeni and Cwebe extract multiple resources and species from the surrounding communal lands, and, when permitted, from the Dwesa-Cwebe Nature Reserve. Use of these resources is largely for home consumption, although there is some local-level trade in a few. The gross

annual, direct-use value of the consumption of wild resources is high, thereby allowing local households to direct their scarce cash incomes (mainly State grants) to other, externally sourced goods. The value at Ntubeni was double that at Cwebe, largely because the residents of Cwebe can no longer legally harvest shellfish since the closure of the reserve to harvesting. The imbalance with respect to marine resources may be redressed in the future if a current application to Marine and Coastal Management for the lifting of these restrictions succeeds.

The values are high relative to those from other areas of South Africa (see summary in Shackleton & Shackleton, 2004b), none of which were obtained from coastal locations and include shellfish harvesting. Relatively high values in Ntubeni for bushmeat and sand probably reflect local conditions; the Dwesa reserve is much larger than the Cwebe reserve, providing both a refuge and a source for larger quantities and variety of game; and there is a very convenient sand mine with access road in Ntubeni.

There was some local level trade in a number of resources, but in most instances at a low level in terms of effort expended and income earned. However, for a few households that adopted trade as a primary livelihood activity, the income earned was several thousand Rands per annum, and certainly prevented those households being counted amongst the poverty stricken. This was mainly for trade in fish, woven products and grass brooms. Should the projected post-settlement ecotourism development of the area succeed, the local market for these and other craft products will expand accordingly.

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