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The value of bushmeat and other wild foods to rural households living in extreme poverty in Democratic Republic of Congo

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Abstract

We examine the relationship between poverty and the use of wild foods, namely bushmeat, fish and wild plants, within a Congolese agricultural community. A sample of 121 households were monitored over a 16-month period, using a combination of participatory and quantitative survey techniques, to assess their wealth and their production, consumption and market sales of wild foods. Households varied in wealth but all could be considered subject to extreme poverty (income below US$1 per capita per day). Our analyses indicate that wild foods play a small role in household consumption but a major role in household income. Hence, over 90% of both bushmeat and fish production is sold at market. In addition, the value of wild foods increases in the "lean season" when agricultural production is low. We also find that the poorest households in this community are unable to capitalise on the most valuable wild foods, bushmeat and fish, as a source of food or cash income. We use an entitlements framework to explain the factors that determine such wealth-related variation between households, indicating that household use of wild foods is determined more by social and economic constraints than by resource abundance in this community. Nevertheless, our findings show that overall the small-scale commercialisation of wild foods provides a vital source of income for rural households living in extreme poverty.

Keywords: Bushmeat; Hunting; Fishing; Gathering; Poverty; Congo Basin

1. Introduction

The need to identify the value of wild foods in rural communities in the tropics is gaining importance in both the conservation and development literature (e.g. Godoy and Bawa, 1993; Cavendish, 2000; Pattanayak and Sills, 2001). From the conservation perspective, there is considerable interest in the extent to which rural households utilise wild foods, such as bushmeat, fish and plants. This is partly because the actions of these households can threaten the sustainability of the resource base, but equally because these households can have ownership rights that must be acknowledged in any conservation action. Household use of wild foods has received particular conservation attention in the context of bushmeat due to current concerns over the sustainability of its exploitation (e.g. Wilkie and Carpenter, 1999; Fa et al., 2002).

From the development perspective, interest focuses on those households living in extreme poverty (income below US$1 per capita per day: United Nations Development Programme, 2001) and their use of and dependence on wild foods (e.g. Department of International Development, 2002). The potential value of wild foods to poor households is exemplified by the fact that humanitarian agencies often use household reliance on wild foods as a primary indicator of impending famine (de Waal, 1988; Young, 1992). Ultimately, development practitioners share a common concern about sustainability with conservationists when the depletion of wild foods is seen to exacerbate poverty (Davies, 2002; Mainka and Trivedi, 2002).

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More generally, there has been a convergence of conservation and development concerns with the proliferation of Integrated Conservation and Development Projects (ICDPs). These projects have the potential to simultaneously address issues of poverty and the sustainable use of wild resources, but their success as a conservation tool is still being debated (Oates, 1999; Roe et al., 2000; Hulme and Murphree, 2001). A number of studies have examined the outcomes of community conservation initiatives and have concluded that the value of the resource must be sufficient to serve as an incentive for all community members to actively manage the resource (e.g. Inamdar et al., 1999; Tshombe et al., 2000).

However, the empirical evidence for a significant role of wild foods in the household economy in tropical rural communities is relatively limited (Department of International Development, 2002). Moreover, although households living in extreme poverty are believed to be especially dependent on wild foods for their nutritional needs (Scoones et al., 1992), recent work has questioned this notion (e.g. Wickramasinghe et al., 1996; Chenevix-Trench, 1997). Rather, the evidence suggests that the interactions between wealth and the use of wild foods is likely to be more complex (Godoy et al., 1995; Demmer et al., 2002).

In this paper, we explore three questions to examine the value of wild foods to households in an agricultural community living in extreme poverty in central Africa. First, we ask whether wild foods are valuable in terms of both household consumption and market sales. Second, we investigate whether wild foods are more valuable in the lean agricultural season. Third, we address whether the value of wild foods is greatest amongst the poorest within the community.

2. Methods

This study was carried out in the Azande village community of Kiliwa in northeastern Democratic Republic of Congo (3°56′ N, 28°45′ E). The village of Kiliwa is the *chef lieu* (administrative centre) for the *groupement* Ungua and about 3500 people live permanently in the village (chef Sangbalenze, personal communication). There are approximately 800,000 Azande in central Africa, of which the majority, approximately 500,000, are in Congo (Salmon, 1988). Zande political and administrative structures can be described as a complex mosaic of nested chiefdoms (Evans-Pritchard, 1971) that continue to play an important role in local government (Salmon, 1988).

The Zande economy is predominantly agricultural, but, as in most central African rural cultures, their modes of subsistence also include hunting, fishing and gathering. These broad based landuse systems are generally referred to as *terroires* (de Schlippé, 1954). Most are subsistence agriculturalists cultivating fields dominated by *Cassava* spp. which vary in size between 0.01 and 0.76 ha (de Merode, 1998). Agricultural production is subject to a lean season prior to the harvest, corresponding to the last month of the dry season and the first three months of the wet season. Hunting is carried out primarily on foot during the day with shotguns, although some additional hunting takes place with snares and, less commonly, nets. Mammals comprise the bulk of the bushmeat harvest (>90% of biomass) and a list of species commonly hunted at Kiliwa is provided in Appendix. Fishing takes place on rivers using nets from the shore. Catches commonly include airbreathing catfish (*Clarias* spp.), Nile perch (*Lates niloticus*) and tilapia (*Oreochromis niloticus*). Gathering of wild plants for food, and less commonly for medicinal purposes (not considered further in this study), is carried out without specialist tools. de Schlippé (1954) provides a detailed account of plant use in this locality. All of these activities take place within the village terroir, which stretches for a distance of about 8 km around the settlement. Wild foods obtained from hunting, fishing and gathering are either eaten, given away, or sold at the village market. Most wild foods sold at the market are purchased by non-residents, often for resale in nearby urban markets.

Data were collected between March 1995 and July 1996, following a detailed pilot study (April–June 1994), using a combination of participatory and quantitative household survey techniques. This study period encompassed an equal number of lean-season and non-lean-season months. Two Zande research assistants assisted with data collection: both were trained in household monitoring techniques during the pilot study. Households were defined in terms of a resident kinship group that carries out domestic functions (following Bender, 1967). An optimum sample size of 128 households was identified (on the basis of data variance in the 32 households surveyed during the pilot study: see Barnett, 1991), although this sample declined to 121 households by the end of the study due to emigration and mortality. These 128 households were identified using a systematic sampling scheme (selected along footpaths at intervals of five households), to produce an estimated household sampling intensity of 19% of the community. Household composition (age, sex and kin relations) was continually monitored through repeat interviews.

2.1. Measuring wild food use

Data on both daily household dietary intake and household budgets were collected through daily interviews, using a 24-h recall technique (Bingham, 1987). Questions were addressed to the member of the household who had prepared the food. When this member

was not present, the researcher would return later in the day, or the following day. Recordings that could not be made within 48 h of consumption were omitted. Detailed descriptions were made of all foods and beverages consumed, across all snacks and meals during the course of the previous 24 h, together with their mode of procurement (foraged/hunted, purchased or received as a gift). All items purchased, sold or given away by any member of the household were recorded in the same way. Quantities of foods were made in local household measures, the same measures that are used in the market, and subsequently converted to metric weight (kg) and economic value (US$) based on market weights and prices over the study period. In total, each household was monitored on 56 days: 28 times by each of the two assistants, 28 times in each season (i.e. lean season and non-lean season), and 8 times on each day of the week.

In order to understand the relative values of wild foods in the household, we explored the household economy along three axes: the production, consumption and sales of agricultural products and wild foods (non-agricultural products, such as salt and oil, make a negligible contribution to the household economy). *Household production* was defined as the market value equivalent of agricultural products and wild foods produced by the household, plus net profits on market activities, plus gifts received. *Household consumption* was defined as the market value equivalent of all foods consumed. *Household sales* was defined as the market value income from all sales. All measures were calculated for the household on a daily basis. In order to control for variation in household size and composition, household membership was standardised to adult male equivalents using the standard tables provided by World Health Organisation (1985). Each measure of the household economy is thus expressed in "daily US$ value per adult male equivalent (hereafter standardised US$"). Mean values across the full sample of households are given in Table 1. The figures for production indicate that all households in this community were living in extreme poverty (i.e. below US$1 per capita per day).

2.2. Measuring wealth status

Wealth was assessed using participatory wealth ranking: a qualitative approach that captures the combined aspects of its social, political and economic dimensions. These include factors such as patronage and authority, as well as access to wider resources such as education and other services (Chambers, 1983). This is the standard participatory approach to wealth assessment used by development practitioners (e.g. Grandin, 1988; Scheafer, 1992). However, a quantitative numerical assessment of wealth was also carried out to corroborate the results obtained using the participatory method. Since wealth is notoriously difficult to measure accurately, we describe both approaches in some detail here (further information is provided in de Merode, 1998).

The participatory wealth ranking approach used a group of key informants, familiar with the community (a teacher, an assistant health worker and two agriculturalists), to assist in defining appropriate wealth-rank criteria. During the pilot study, each household in a sample of 32 was visited and marked on a card. While moving between households, the group discussed the wealth characteristics of the previous household and its position in relation to those previously visited. When all the households were completed, each informant individually placed the cards into one of four groups of similar wealth status on the basis of their own criteria. All the informants then met and the differences between their respective groupings discussed until a consensus was reached. Finally, a list of attributes characterising each of the four wealth ranks was compiled and used to determine the wealth rank of all subsequent households in the study. Broadly speaking, the poorest households in the community were occupied by the old and the disabled, and were dependant on other households for food, while the wealthiest possessed substantial material goods (including livestock and large fields), sold agricultural produce at the market, and lent money and equipment to poorer households.

The quantitative survey focused on four indicators of household wealth that could be measured on a continuous scale: field size, expenditure, disposable income, and non-monetary income. Field size, an indicator of agricultural production, was measured using a survey wheel and a magnetic compass. Household budgets were taken from the 24-h recall data: this included total monetary expenditure and disposable (monetary) income to the household from all of its members. Data on non-monetary income were calculated based on the

Table 1
Three measures of the household economy (in standardised US$), across all households and according to wealth rank[a]

Measure	All households ($n = 121$)	Wealth rank 1 ($n = 25$)	Wealth rank 2 ($n = 30$)	Wealth rank 3 ($n = 42$)	Wealth rank 4 ($n = 24$)
Household production	0.29 ± 0.17 (0.006–0.86)	0.10 ± 0.05	0.27 ± 0.06	0.35 ± 0.16	0.72 ± 0.41
Household consumption	0.14 ± 0.07 (0.04–0.49)	0.09 ± 0.05	0.15 ± 0.06	0.13 ± 0.50	0.31 ± 0.19
Household sales	0.12 ± 0.08 (0–0.51)	0.008 ± 0.005	0.11 ± 0.07	0.19 ± 0.11	0.39 ± 0.28

[a] Means, standard errors (SE), and ranges (for all households only) are given. Sample size (n) is listed in parentheses.

market value of goods produced or foraged by the household, supplied in exchange for labor (there are few local opportunities for financial earnings from wage labor), or given as a gift by other households.

To verify the qualitative wealth rankings, a cluster analysis was applied to the four quantitative measures of wealth. This analysis produced four household groupings that could be placed on a wealth continuum. These four groups are strongly correlated with those obtained from the qualitative rankings (Spearman's rank: $r = 0.26$, $n = 121$, $p < 0.01$), supporting our use of these ranks as a measure of household wealth. A summary of the differences in the household economy (production, consumption and sales) between the four wealth ranks is given in Table 1.

2.3. Data analysis

Statistical tests were conducted across households. In comparisons between seasons, the value of wild foods was expressed in standardised US$ value. In comparisons between wealth ranks, the value of wild foods consumed/sold was expressed either in standardised US$ value or as a percentage of the standardised US$ value of all household consumption/sales. Since the results were similar in both cases, only the results obtained using the percentage of household consumption/sales are presented here. Statistical tests were carried out using generalised linear models. Poisson errors and a log link function were applied to analyses of variance to ensure that the predicted values were always positive, and constant error variance was maintained by normalising the variance so that it was equal to the mean. Where proportions were analysed, models were applied using a logit link function and binomial errors because proportions are strictly bounded between zero and one, and the variance is not constant. A repeated-measures design was used where appropriate. All statistical tests are two tailed.

3. Results

First we explored the importance of wild foods in the household. In order to do this, we examined the value of both wild foods and agricultural produce entering and leaving the household (expressed as the percentage of household production) according to their mode of procurement (obtained as gifts, purchased from the market, or extracted from the wild) and to their final use (consumed, given away, or sold) (Fig. 1). Three points emerge from this breakdown: (1) wild foods comprise a substantial proportion of household production (31% compared to 53% for agricultural production), (2) only a small proportion of the household production consumed is made up of wild foods (10% compared to 43% for agricultural production) and (3) an important proportion of the household production that is sold at the market is derived from wild foods (24% compared to 12% for agricultural production).

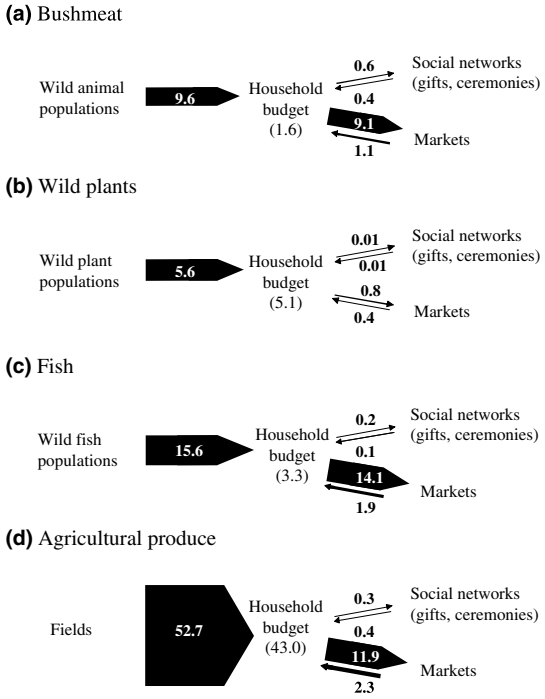

Fig. 1. Flow of wild foods and agricultural produce through the household: (a) bushmeat, (b) wild plants, (c) fish and (d) agricultural produce. Arrow width is weighted according to the volume of flow, and the direction indicates either inflows (from wild populations, gifts/ceremonies, purchases) or outflows (gifts/ceremonies and sales). Consumption by households is shown in parentheses. All values are expressed as a percentage of household production (mean values across $n = 121$ households). The 16% of production that relates to industrial products (such as salt and oil) is not shown.

Two further points merit comment. First, gifts entering or leaving the household are mostly negligible, except in the case of bushmeat (although the figures are still relatively low). Second, and more importantly, there is a clear distinction between those resources that are predominantly used for household consumption, and those that are used for household sales: less than 25% of production of either wild plants or agricultural produce are sold at market, whereas over 90% of production of both bushmeat and fish is sold at market.

3.1. Household consumption of wild foods

Bushmeat, fish and wild plants contributed 3.1%, 6.2% and 9.6%, respectively to the total value of the food consumed in the household. In terms of weight, this corresponds to 0.04 kg/day for bushmeat, 0.06 kg/day for fish and 0.11 kg/day for wild plants. On average, households consumed bushmeat on 5.8 ± 5.1 days per month.

Table 2
Consumption and sales of wild foods and agricultural produce (in standardised US$) in the lean and non-lean seasons[a]

Food item	Use	Non-lean season value	Lean season value	% change in lean season	p
Bushmeat	Consumed	0.008 ± 0.003	0.014 ± 0.005	75	<0.05
	Sold	0.044 ± 0.031	0.112 ± 0.062	155	n.s.
Wild plants	Consumed	0.004 ± 0.002	0.012 ± 0.004	200	<0.01
	Sold	0.0006 ± 0.0002	0.002 ± 0.001	233	<0.01
Fish	Consumed	0.004 ± 0.001	0.023 ± 0.004	475	<0.01
	Sold	0.031 ± 0.005	0.144 ± 0.022	365	<0.01
Agricultural produce	Consumed	0.152 ± 0.043	0.081 ± 0.032	−46	<0.01
	Sold	0.042 ± 0.014	0.023 ± 0.008	−45	<0.01

[a] Means and standard errors are given. Sample size is 121 households in each case. Statistical significance (p) determined from one-way analysis of variance (n.s. = non-significant).

To explore the effects of seasonality on the household consumption of wild foods, we compared the value of wild foods and agricultural produce consumed in the lean and non-lean season. The results (Table 2) indicate that in the lean season, when the consumption of agricultural produce is reduced by nearly one half, the value of all wild foods consumed shows an increase ranging from 75% (bushmeat) to 475% (fish).

To investigate the effects of household wealth on wild food consumption, we then compared the value of wild foods consumed in each wealth rank. The results (Fig. 2a) indicate that the importance of consumed bushmeat appears to be consistent across all wealth ranks except the poorest, who show substantially lower consumption. In contrast, the importance of wild plants decreases with wealth, while the importance of fish increases with wealth. However, only bushmeat and fish consumption differ significantly according to wealth rank: bushmeat $X^2 = 2.31$, df = 3, $p < 0.05$; fish $X^2 = 4.71$, df = 3, $p < 0.05$; wild plants $X^2 = 2.53$, df = 3, $p =$ n.s. (non-significant due to overdispersion).

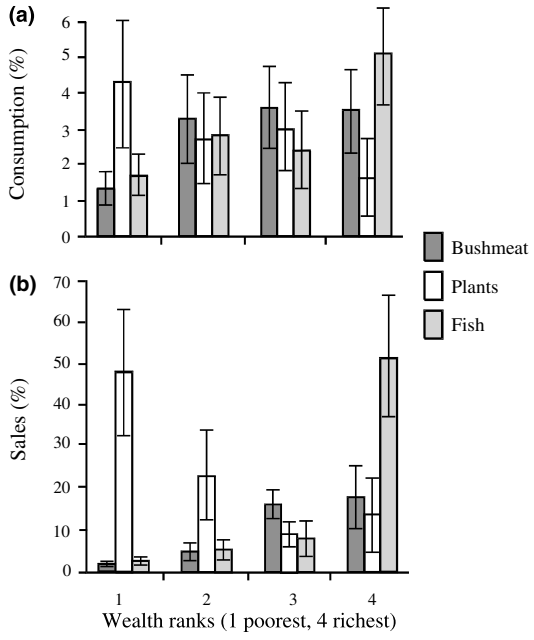

Fig. 2. The value of wild foods (bushmeat, wild plants and fish) expressed as a percentage of (a) household consumption and (b) household sales across wealth ranks. Mean values are shown with standard error bars (for sample sizes in each wealth category, see Table 1).

3.2. Household sales and the commercialisation of wild foods

The contribution of wild foods to household sales is much greater than its contribution to household consumption. Bushmeat comprised 25% of household sales, fish comprised 39% and wild plants comprised 2% of sales.

To explore the effects of seasonality, we compared the value of wild foods and agricultural produce sold in the lean and non-lean season. The results (Table 2) indicate that the value of plants and fish sold increases significantly during the lean season by between 233% (plants) and 365% (fish), while the sales of agricultural produce decline by nearly one half in this period. Although mean bushmeat sales also increase substantially during the lean season (155%), the difference is not statistically significant.

We then examined the marketing of wild foods across households of different wealth. The household value of each wild food sold in each wealth rank is shown in Fig. 2b. The importance of sold bushmeat and fish appears to be greatest in the wealthier households, while wild plants show the reverse pattern. Analysis of variance indicates that the sales of all wild food differ significantly according to wealth rank ($X^2 = 2.28$, df = 3, $p < 0.05$ for bushmeat, $X^2 = 4.58$, df = 3, $p < 0.05$ for wild plants and $X^2 = 2.71$, df = 3, $p < 0.05$ for fish).

4. Discussion

Our analyses indicate that wild foods are not a major component in the diet of the households in the study community of Kiliwa. In the case of bushmeat, for example, the per capita consumption of bushmeat is only

0.04 kg per day. This is relatively low in comparison to previous studies of agriculturalists in the Congo Basin which indicate that a figure of 0.13 kg per day may be typical for rural dwellers in the region (Wilkie and Carpenter, 1999). There are two possible explanations for this difference. First, all of the Kiliwa households are living in extreme poverty and many cannot afford the equipment necessary to hunt meat nor the disposable income necessary to purchase meat. Second, those households that can afford the equipment to hunt tend to sell the meat because there are relatively few alternative sources for income generation, due to the remoteness of this village and political instability in the region.

However, wild foods do become important in the diet for the four months of the lean season when agricultural products are scarce and households are at their most vulnerable to food shortages. A similar pattern has been described in several previous studies. In Central Mali, for example, poorer households procure more wild foods in the lean season to ensure that their food supplies are sufficient until the next harvest (Toulmin, 1986), while in rural Ghana, household consumption of wild foods more than doubles during the lean season (Dei, 1989). In this study, the wild food most responsive to seasonality is fish: this reflects improved fishing conditions during the lean season because this period coincides with the end of the dry season when rivers are low. Bushmeat consumption also increases in the lean season, but to a lesser extent, probably because hunting is somewhat impaired during this period due to the absence of rain (making animals harder to track). Overall, these findings substantiate the conclusion of previous studies that the availability of wild foods can prove to be a critical component of household survival strategies in the "hungry season" (Chambers, 1997; de Garine and Koppert, 1988; Vaughan, 1987).

Nevertheless, wild foods appear to be much more important as a source of income than as a source of food. This is especially true in the case of bushmeat and fish, for which over 90% of production is sold at market. Thus, wild foods help to enable households to purchase important commodities, such as medical supplies, and to procure assets, such as fishing nets, that enable them to enhance their livelihood strategies. Although comparable data are limited, two recent studies of bushmeat hunters in Central African Republic and People's Republic of Congo (Noss, 2000; Eves and Ruggiero, 2000; respectively) have also found that hunting generates a substantial cash income. The importance of wild foods as a source of cash income becomes even more accentuated during the lean season. Again, a similar pattern was observed by Dei (1989), who reported that the economic contribution of wild foods to rural Ghanaian households more than doubled during the lean season.

One issue that has not been addressed in this paper is the extent to which the current use of wild foods in the Kiliwa community is biologically sustainable. While such an analysis is beyond the scope of this paper, two lines of circumstantial evidence suggest that current levels of extraction are sustainable. First, all wild foods – bushmeat, fish and wild plants – are harvested in close proximity to the village. The absence of local depletion would suggest a sustainable harvest, particularly since the village is well established and the use of wild foods has a long tradition in the locality. Second, previous analyses of the spatial distribution of human activity and wildlife populations in the study area (de Merode et al., 2000) indicate that local agricultural communities, including Kiliwa, are not associated with low animal abundance. This observation similarly suggests that bushmeat hunting, at least, is currently sustainable.

4.1. The wealth continuum and household entitlements

The findings of this study not only elucidate the role of wild foods as a source of nutrition and income to poor households; they also indicate highly differentiated access to wild foods within the community. Most importantly, our results show that the value of wild foods for both consumption and (especially) market sales is greatest in the wealthier households.

The received wisdom is that wild foods are most important to the poorest households in a community (Scoones et al., 1992): a view that has been supported by some empirical studies such as those of Dei (1989, 1991). In contrast, our results are more in concordance with the growing evidence that the poorest households are not necessarily the most dependent on wild foods. Godoy et al. (1995) reported that household dependency on wild foods was greatest for middle-income households in a mixed-subsistence community in Nicaragua, while Chenevix-Trench (1997) showed that wealth did not affect the level of reliance on wild resources amongst pastoralists in Northern Kenya. Similarly, Wickramasinghe et al. (1996) found no relationship between household wealth and resource use amongst agriculturalists in Sri Lanka. The divergent findings of these studies may be partially attributed to different definitions of poverty. Nevertheless, they are also likely to reflect a complex array of social and economic factors that determine differential access to wild resources both within and between communities.

An "entitlements" approach provides a useful framework for explaining the differential access of households to wild foods along the wealth continuum. The concept of entitlements and endowments, drawn from development theory, refers to the rights and resources that community members can draw on to achieve wellbeing (Sen, 1981; Leach et al., 1997). This

approach usefully emphasises that rural households differ considerably in their access to wild resources, whatever the abundance of wild foods in their environment (de Waal, 1988). Entitlements can be defined along many axes. At Kiliwa, they include the ability to harvest wild foods from the environment (determined by access to tools such as shotguns and nets), the ability to sell wild foods at the market (requiring a food surplus beyond the needs of the household), the ability to purchase wild foods at the market (limited by disposable income), and the ability to receive gifts (determined by the household's social networks).

Poorer households at Kiliwa make proportionately less use of bushmeat and fish, despite sharing the same environment as wealthier households, because they are unable to afford the high-capital tools (such as shotguns and nets) necessary to exploit these resources. The costs of these tools contribute towards making bushmeat and fish high-value commodities, unlike most wild plants that do not require specialised tools. The high value of bushmeat and fish can be demonstrated through an analysis of consumer consumption patterns (following Wilkie and Godoy, 2001): the difference in average household income between the poorest and wealthiest households (ranks 1 and 4) is 179%, while the difference in the consumption of bushmeat and fish are 223% and 339% respectively, implying that they can both be considered superior goods (i.e. the consumption of the commodity increases by more than 1% for every 1% increase in wealth). In contrast, the difference in wild plant consumption is −64%, indicating that wild plants can be considered inferior goods.

There are also two further aspects of variation in the use of bushmeat and fish that can be explained by household entitlements (see Fig. 2). In the first case, fish appears to be proportionately more valuable than bushmeat amongst the wealthiest households. This is because fish production and sales in Kiliwa are monopolised by a small number of households whose entitlements are not only determined by their possession of nets but by socially defined exclusive access through membership of a ''guild'' of fishermen. The same is not true of bushmeat production and sales: while the possession of a weapon is essential, no member of the community is able to claim exclusivity to this activity.

In the second case, the consumption of bushmeat in the relatively poor households (rank 2) is surprisingly similar to that seen in wealthier households (ranks 3 and 4), despite the fact that their market sales are so much lower and they are unable to afford shotguns. These households achieve this level of consumption through the receipt of bushmeat gifts. Across the community, more bushmeat was given as a gift than any other wild food, for three reasons. First, because successful hunts result in the acquisition of large amounts of bushmeat that are difficult to store, hunters often give away the surplus thereby increasing their social capital (Mauss, 1952). Second, bushmeat is given by hunters to those who accompany them (assisting with the tracking and killing of the prey and the carrying of the carcass back to the village). Third, excessive good fortune is not perceived well, and is even thought to bring misfortune to particular families (Evans-Pritchard, 1972): suspicion and animosity from other members of the community following a string of successful hunts is most effectively curbed by distributing portions of meat (Guyer, 1993). Notably, these gifts were not distributed in the same way to the poorest households (rank 1), due to their high degree of marginalisation in the community.

In conclusion, these results suggest that households in a poor rural community make limited use of wild foods for general consumption. However, they derive substantial consumption value from wild foods in the lean season when agricultural products are scarce, and rely heavily on wild foods for their cash income throughout the year. An important implication of these results, for both conservation and development policy, is that while commercial hunting is usually perceived as a greater conservation threat than subsistence hunting, it is the market sale and not consumption of wild foods that can be most important to households living in extreme poverty. Nevertheless, it is also important to recognise that in this community the value of these commercialised wild foods is not captured equally by all households, and still remains insufficient to increase the income of any household above the threshold of extreme poverty.

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Appendix

Mammal species commonly hunted with shotguns for bushmeat by the Kiliwa Zande community

Order	Family	Latin name	Common name
Artiodactyla	Bovidae	*Alcelaphus buselaphus*	Hartebeest
		Cephalophus dorsalis	Bay duiker
		Cephalophus rufilatus	Red-flanked duiker
		Cephalophus monticola	Blue duiker
		Redunca redunca	Bohor reedbuck
		Tragelaphus scriptus	Bushbuck
	Suidae	*Hylochoerus meinertzhageni*	Giant forest hog
		Phacochoerus africanus	Common warthog
		Potamochoerus porcus	Bushpig
Carnivora	Viverridae	*Civettictis civetta*	African civet
Lagomorpha	Leporidae	*Poelagus marjorita*	Uganda grass hare
Rodentia	Hystricidae	*Hystrix cristata*	Crested porcupine
Primates	Cercopithecidae	*Cercocebus agilis*	Agile mangabey
		Cercopithecus (aethiops) tantalus	Tantalus monkey
		Cercopithecus (cephus) ascanius	Red-tailed monkey
		Cercopithecus (erythrocebus) patas	Patas monkey
		Cercopithecus (mona) denti	Dent's monkey
		Cercopithecus neglectus	De Brazza's monkey
		Colobus guereza	Guereza colobus
		Papio anubis	Olive baboon
	Hominidae	*Pan troglodytes*	Chimpanzee

Taxonomy follows Kingdon (1997).

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