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Wild resources and livelihoods of poor households in Democratic Republic of Congo

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Wild foods including bushmeat have long been recognised as important famine foods underpinning coping strategies for poor people. Yet there is mounting pressure from conservation agencies to limit the extraction of wild resources, particularly bushmeat. Attempts to integrate conservation and development aim for ecologically and socially sustainable wild resource use, but there are few detailed studies of the real implications of local use of wild foods for either conservation or development. This paper outlines research on the links between poverty and wild food use in a poor community of Congolese farming households with an average income of less than one dollar per person per day.

Policy Conclusions

- Bushmeat and other wild foods play a vital part in the diets, livelihoods and food security of poor rural households. There are marked seasonal changes in wild food use, with major increases in the hungry season. These facts need to be taken into account in planning conservation strategies.
- Wild foods form a moderately important component of household diets but a very important component of household sales, particularly for the poor. Bushmeat and fish figure as superior goods (in the sense that their consumption increases proportionately with increases in household income). Wild plant foods figure as inferior goods.
- Within a community that is universally poor by regional and international standards, clear differences in access to and use of wild foods are associated with degrees of poverty. The very poorest households are disadvantaged in absolute terms, and are the least likely to benefit from hunting or its proceeds.
- The case study contradicts a commonly held view that banning market sales of bushmeat, and restricting consumption to subsistence use, offers a 'win-win' strategy to the benefit of both conservation and the poor. All but the very poorest are likely to rely on sales. Selling bushmeat benefits the poor relatively more than the rich (though the very poorest may not even benefit from subsistence use).

The importance of wild foods

The value of wild foods to rural communities in the tropics is an increasingly important issue for both conservation and development work. Conservation workers are aware that rural households may have ownership and access rights that must be respected, but are concerned about the sustainability of bushmeat, fish, invertebrate and plant use. Household use of bushmeat is a particular focus given the conservation implications of its wider commercial extraction (Bennett *et al* 2002).

Development interest focuses on those households living in extreme poverty (income below US\$1 per capita/per day). Such households are often found to be heavily dependent on wild foods. Humanitarian agencies often use household reliance on wild foods as a primary indicator of impending famine.

Conservation and development objectives show a potential convergence. There are common concerns about sustainability to the extent that the depletion of wild foods exacerbates poverty (Davies 2002). Integrated Conservation and Development Projects (ICDPs) aim to address poverty and the sustainable use of wild resources in one go, though their success is questionable in terms both of conservation and development (Roe *et al* 2000).

For community members to want to manage the resource sustainably:

- the resource must have sufficient value
- the proceeds must be well enough distributed
- future access and control must be sufficiently well guaranteed.



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Where conservation aims fail to engage with local aspirations and priorities, positive outcomes are unlikely for either conservation or development.

A recent survey of the part played by wildlife in the livelihoods of the poor notes that rather little is known about the role of wild foods in the household economy in tropical rural communities (DFID, 2002). Although households living in extreme poverty are generally believed to be especially dependent on wild foods for their nutritional needs, recent work suggests that the interaction between wealth and the use of wild foods is likely to be more complex.

This briefing paper explores three questions about the value of wild foods to households in an agricultural community living in extreme poverty in central Africa:

1. Are wild foods equally valuable for both household consumption and market sales?
2. Are wild foods more valuable in the hungry season?
3. Are wild foods of greatest value to the poorest people within the community?

Studying Azande wild food use

This study was carried out by Emmanuel de Merode in the Azande village community of Kiliwa, administrative centre for the groupement Ungua in northeastern Democratic Republic of Congo. Zande chiefdoms continue to play an important role in local government, particularly as national administrative structures have deteriorated. Most Zande people are subsistence agriculturalists, cultivating fields of up to 0.8 hectares dominated by Cassava spp. Hunting, fishing and gathering are common activities. The last month of the dry season and the first three months of the wet season represent a lean season prior to the harvest.

Participatory and quantitative household survey techniques were used in a series of field visits over a seventeen month period (March 1995 - July 1996), covering equal numbers of lean and non-lean-season months. Multi-round interviews gave 24-hour recall data on daily household dietary intake and household budgets as well as household composition for 121 households (systematically sampled to cover around 20% of the community). All foods and beverages consumed during the previous 24 hours were recorded, together with their source (foraged/hunted or purchased or received as a gift). All purchases, sales and gifts by any member of the household were also recorded. Quantities were estimated using local measures as used in the home and 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.

The following definitions were used:

- Household production is 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 is the market value equivalent of all foods consumed.
- Household sales is the market value income from all sales.

All measures were calculated as US\$ values for the household per day and per standardized 'adult male equivalents'. All households in this community were living in extreme poverty

(i.e. the production of all households in all wealth groups was estimated at below US\$1 per capita per day). Thus, in this article, notions of 'wealth' and 'poverty' should be treated as purely relative.

Wealth status was measured using two different approaches: a qualitative participatory wealth ranking and a quantitative numerical assessment of wealth based on analysis of four indicators that could be measured on a continuous scale: field size, expenditure, disposable income, and non-monetary income. Both methods produced four groups which were closely correlated and effectively interchangeable. Statistical tests were conducted across households using generalised linear models.

Importance of wild foods in the household

Wild foods comprise a substantial proportion - around one-third of household production (Figure One). Crops account for around one-half. However, wild foods make up only a small proportion of household production consumed (10% compared to almost 50% for crops). Bushmeat, fish and wild plants contributed 3%, 6% and 10% respectively to the total value of the food consumed in the household, corresponding to 0.04kg/day for bushmeat, 0.06kg/day for fish and 0.11kg/day for wild plants. On average, households consumed bushmeat on 6 days per month.

An important part of the household production that is sold at the market is derived from wild foods. These make a much more important contribution to household sales than they do to household consumption. They also contribute twice as much to household sales as crops. Wild foods comprise one-quarter of the total value of household sales, while crops make up only one-eighth.

There is a major distinction between different wild resources used predominantly for household consumption and those that are sold. Of the total value of crops and wild foods sold, bushmeat comprised one-quarter, fish over one-third and wild plants only 2% of sales (see Fig. 1). Over 90% of production of both bushmeat and fish is sold at market. Less than 25% of production of either wild plants or crops are sold at market.

Finally, the economic value of gifts entering or leaving the household is mostly negligible, except for bushmeat which makes a small but still significant contribution.

Wild food use and Seasonality

The lean season is marked by a major decline in the availability of agricultural produce, and consumption falls by 50%. The value of all wild foods consumed increases to compensate. Bushmeat consumption doubles, while fish increases by as much as five or six times the non-lean month values.

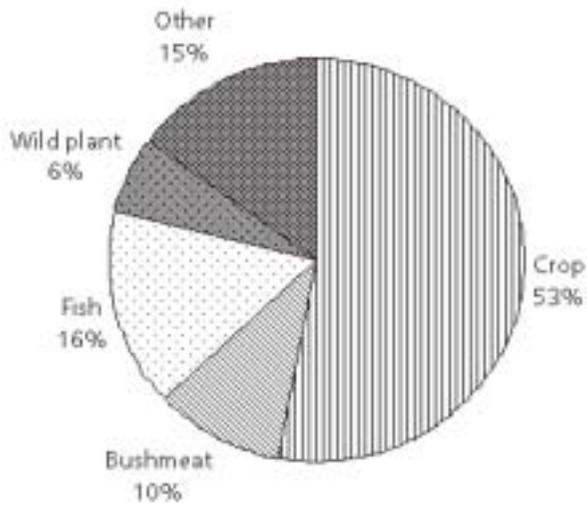
As is the case for consumption of wild foods, the value of wild foods sold increases significantly during the lean season by between double (wild plants, bushmeat) and four times (fish) their non-lean season values, while the sales of agricultural produce decline by nearly one half in this period.

Wild food use and degrees of poverty

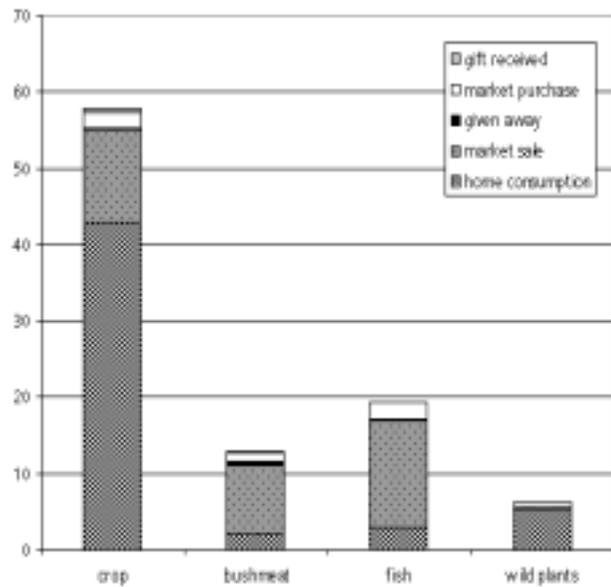
The value of wild foods consumed is dependent on household wealth. The value of bushmeat consumed is significantly less for the poorest group of households compared to other groups, and fish consumption also increases significantly with wealth. By contrast, the importance of wild plants in household

Contribution of wild and cultivated foods to household economy

Percentage contribution to total value of household production



Household consumption, sale and gifts



consumption decreases with increasing wealth.

Marketing of wild foods also differs significantly across households of different wealth, with the importance of sold bushmeat greatest in the wealthier households, and wild plants showing the converse pattern. Bushmeat and fish are predominantly sold at the market rather than consumed, and it is predominantly better off households which trade bushmeat and fish. Poorer households are involved to a much lesser extent both in consuming and in selling these commodities. More detailed analysis shows market activities (purchases and sales) are associated with household disposable income for bushmeat and fish but not for wild plants. Half the poorest households do not have sufficient disposable income to purchase bushmeat daily at the market and one-quarter lack sufficient income to buy fish.

Discussion and Conclusion

Wild foods are a recurrent but not a major component in the diet of the Azande farming households studied. For example, bushmeat consumption (at an average of only 0.04 kg per day) is relatively low in comparison to previous studies of agriculturalists in the Congo Basin. By contrast, Wilkie & Carpenter (1999) estimated consumption at 0.13 kg per day for rural dwellers in the region. 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 nor the disposable income necessary to hunt or 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. The wild food most responsive to seasonality is fish, reflecting improved fishing conditions during the lean season which 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 by the absence of rain (making animals harder to track). Due to the scarcity of

agricultural produce during these lean months, households are most vulnerable to food shortages. These findings substantiate the view that the availability of wild foods can be a critical component of survival strategies in the 'hungry season'.

Overall though, wild foods appear to be much more important as a source of income than as a source of food. This is especially true of bushmeat and fish, for which over 90% of production is sold at market. High value wild foods help enable households to purchase important commodities, such as medical supplies, and to enhance their livelihood strategies with equipment such as fishing nets. The few comparable studies of bushmeat hunters in the Central African Republic and People's Republic of Congo have also found that hunting generates a substantial cash income (Robinson and Bennett 2000). Other studies have also observed that wild foods become an even more important source of cash income during the lean season (see references in De Merode *et al* in press).

Poverty and household entitlements

This study clarifies the role of wild foods as a component of the diet and as a source of income for poor households. It also indicates 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 better off (though still poor) households.

The received wisdom, supported by some empirical studies, is that wild foods are most important to the poorest households in a community. The present briefing paper adds to the growing evidence that among communities of poor households, the poorest are not necessarily those best placed to extract wild foods, particularly high value items such as bushmeat and fish. Various studies have shown household dependency on wild foods was greatest for middle-income households in a mixed-subsistence community in Nicaragua, that relative wealth did not affect the level of reliance on wild resources amongst pastoralists in Northern Kenya, and that there was no relationship between household wealth and resource use amongst agriculturalists in Sri Lanka. These findings may be partly due to different definitions of

poverty, but they are also likely to reflect the complex array of social and economic factors that determine differential access to wild resources both within and between communities.

The entitlements approach

An 'entitlements' approach provides a useful framework for explaining the differential access of households to wild foods along the wealth continuum. This approach usefully emphasises that rural households differ considerably in their access to wild resources, whatever the abundance of wild foods in their environment. At Kiliwa, entitlements include the ability to harvest wild foods from the environment (determined by access to specialized equipment such as shotguns and nets), 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 whose collection does not require specialised tools. Consumer choice analysis (de Merode *et al* in press) shows the best-off households have an income nearly double that of the poorest. They consume more than double the value of bushmeat and more than treble the value of fish, and these 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, better-off households consume only around half the value of wild plants used by the poorest, indicating that wild plants can be considered inferior goods.

Two apparent anomalies can be understood in terms of entitlements. Fish production and sales in Kiliwa are monopolised by a small number of households who possess not only nets but also, more importantly, socially defined exclusive access through their membership of a "guild" of fishermen. By contrast bushmeat extraction and sales in Kiliwa depend on possession of weapons but not on membership of any formal guild. In fact, all but the very poorest group of households share or receive gifts of bushmeat, and despite its higher value per unit weight, consumption of bushmeat is less stratified than that of fish.

Across the Kiliwa community, more bushmeat was given as a gift than any other wild food. There are three reasons for this:

1. Since successful hunts yield large amounts of bushmeat that are difficult to store, hunters often give away the surplus thereby increasing their social capital.
2. Bushmeat is given by hunters to those who help track and kill the prey and carry the carcass back to the village.
3. Excessive good fortune is not perceived well. Suspicion and animosity from other members of the community following a string of successful hunts is most effectively curbed by distributing meat.

However, the poorest households are so marginalized they are not reached by this redistribution.

In conclusion, these results suggest that households in a poor rural community on average consume rather limited amounts of wild foods. However, consumption of wild foods increases significantly in the lean season when agricultural products are scarce. Most importantly, poor households rely

heavily on wild foods for their cash income in the year.

These results have important implications for both conservation and development policy. Commercial hunting is usually seen as a greater conservation threat than subsistence hunting. Among the Kiliwa Azande of DRC, market sales of wild foods are most important to the livelihoods of households living in extreme poverty, rather than the nutritional value of wild food consumption. This confounds the view that banning market sales but permitting subsistence production is inherently 'pro-poor'. However, it is also important to recognise that in this community the extent to which different households can capture the value of these commercialised wild foods decreases with increasing degrees of poverty, and the returns are not enough to raise the income of any household above the extreme poverty threshold.

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