Folk and formal, local and national - Damara knowledge and community conservation in southern Kunene, Namibia

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This paper explores aspects of culturally-mediated knowledge and uses of natural resources among contemporary Damara farmers in southern Kunene Region, and considers the potential relevance of these for current 'community' approaches to conservation. Two possibly ancient resource-use practices, the harvesting of seeds and honey, are considered in detail, illustrating several parallels between folk and formal ecological knowledge. These case studies indicate that a deeper awareness in policy and planning of local knowledge and practice may foster culturally-resonant, ecologically appropriate and socially inclusive dialogue regarding resource-use issues. Grounding national conservation objectives in local contexts implies a shift in approach which acknowledges the existence and value of cultural knowledge relating to a range of natural resources other than large mammals.

INTRODUCTION

In post-independence Namibia the conservation of biodiversity is dominated by national recognition of the need to transfer decision-making and management power over natural resources to local communities. This mirrors a global trend to reassess the value of Common Property Resource Management (CPRM) practices (*vide* Arnold n.d. 1993; Cousins 1993; Turner 1996), and to use so-called 'community-based management' as the basis for resource conservation and rural development (*vide,* for example, Bishop *et al.* 1994; Hartley & Hunter 1997; Leader-Williams *et al.* 1995; Metcalfe 1995; Wild & Mutebi, 1996). As a backlash against the alienating processes associated with the past creation of national parks, and based on the premise that resources will be harvested and utilised non-destructively **only** if their benefits are harnessed effectively by the users themselves, these approaches are considered the most socially acceptable and long-term strategy for natural resources conservation.

This type of more liberal conservation-thinking has led to the establishment of several 'community-based conservation' initiatives in Namibia, under the umbrella programme of Community-Based Natural Resources Management (CBNRM). Projects which fall under the CBNRM rubric include those by the USAID-funded LIFE programme (Living in a Finite Environment) and the Namibian Non-governmental organisation (NGO) IRDNC (Integrated Rural Development and Nature Conservation), of which the latter has been operating in north-west Namibia since 1982; the conservancy initiative for communal areas of the Ministry of Environment and Tourism (MET); and a new project plan for Wildlife Integration for Livelihood Diversification (WILD), which again focuses partly on north-west Namibia (drawn-up by Ashley 1997). Related research agendas include the resource economics programme of the Directorate of Environmental Affairs, MET (*vide* Ashley *et al.* 1997), and the natural resources component of the research programme of the Social Sciences Division, Multi-disciplinary Research Centre, University of Namibia. Implementation and research regarding environmental management is also informed by concerns regarding environmental degradation through human misuse of resources as articulated by Namibia's Programme to Combat Desertification (NAPCOD) (*vide* Seely 1998; Seely & Jacobson 1994; Wolters 1994).

Particular attention has been paid to creating pathways, primarily in the form of conservancies, whereby benefits from non-consumptive and consumptive uses of animal wildlife can devolve to communities at the local level, particularly through local control over tourism revenue (*vide* Ashley *et al.*, 1994; Ashley & Garland 1994; Ashley & LaFranchi 1997; Jones 1995, 1997, 1998a, 1998b; Turner 1996). The 'conservancy' concept emerged from commercial farmland where individual farmers, who have had legal rights since 1968 to use animal wildlife on their farms consumptively, "... realised that it is advantageous to pool their land and financial resources to make available a larger unit on which integrated management practices can be carried out" (Jones 1995: 4; *vide* also Barnes & de Jager, 1995). This concept has been taken by the MET and developed as a 'conservancy policy' (MET 1992). In recent years it has been debated and transformed to increase its relevance for the conservation of natural resources, primarily animal wildlife, by farmers on communal land. As such, it reflects a post-independence agenda to reinstate African rights to land and resources in the wake of the alienating policies of this century's imposed colonial and apartheid administrations. Key requirements for the establishment of a conservancy are that its membership and spatial boundaries be defined (Jones 1998a). Namibia's Communal Area Conservancy Programme was officially launched in September 1998 and four conservancies have been gazetted by parliament to date. Two of these are located in Khorixas District, southern Kunene Region, and several more are planned in the Region (MET n.d.).

Not surprisingly, the actual implementation of these initiatives is potentially hampered by several interrelated areas of complexity, including:

- a perhaps cavalier and opaque use of the label 'community' to describe heterogenous groups of rural farmers;
- an emphasis on animal wildlife, which obscures wider dependence on other natural resources and, in the conventional association of men with animal resources (both domestic livestock and wildlife), may act to marginalise women who, as gatherers and cultivators, are typically linked with plant resources (*vide* Sullivan in press a);
- and an uncertain land policy framework defining and supporting access and use rights to natural resources on communal land.

This paper, however, emphasises a fourth issue affecting CBNRM objectives: a lack of focus on the details of how people currently use and manage natural resources, and the consequent value for biodiversity conservation of associated local knowledge regarding these resources.

LOCAL RESOURCE MANAGEMENT: SOME PERCEPTIONS

> "Not even the tribal area is regarded as the property of the tribe [the Damara]. All that is claimed is freedom of hunting and gathering of *veldkos*[1] with which to supply daily wants, ... landed property was unknown to them.... This almost lawless state can only be explained by the fact that ... he did not yet feel firmly established in his area to have evolved property rights" (Vedder 1928: 71).

> "Another factor of major importance is the absence of any effective system of land and resource rights resulting from the breakdown of **systems of common property resource management**, ... As a result there is a situation of open access to common lands, under which vulnerable and scarce resources have no effective protection ..." (Quan *et al.* 1994: 5).

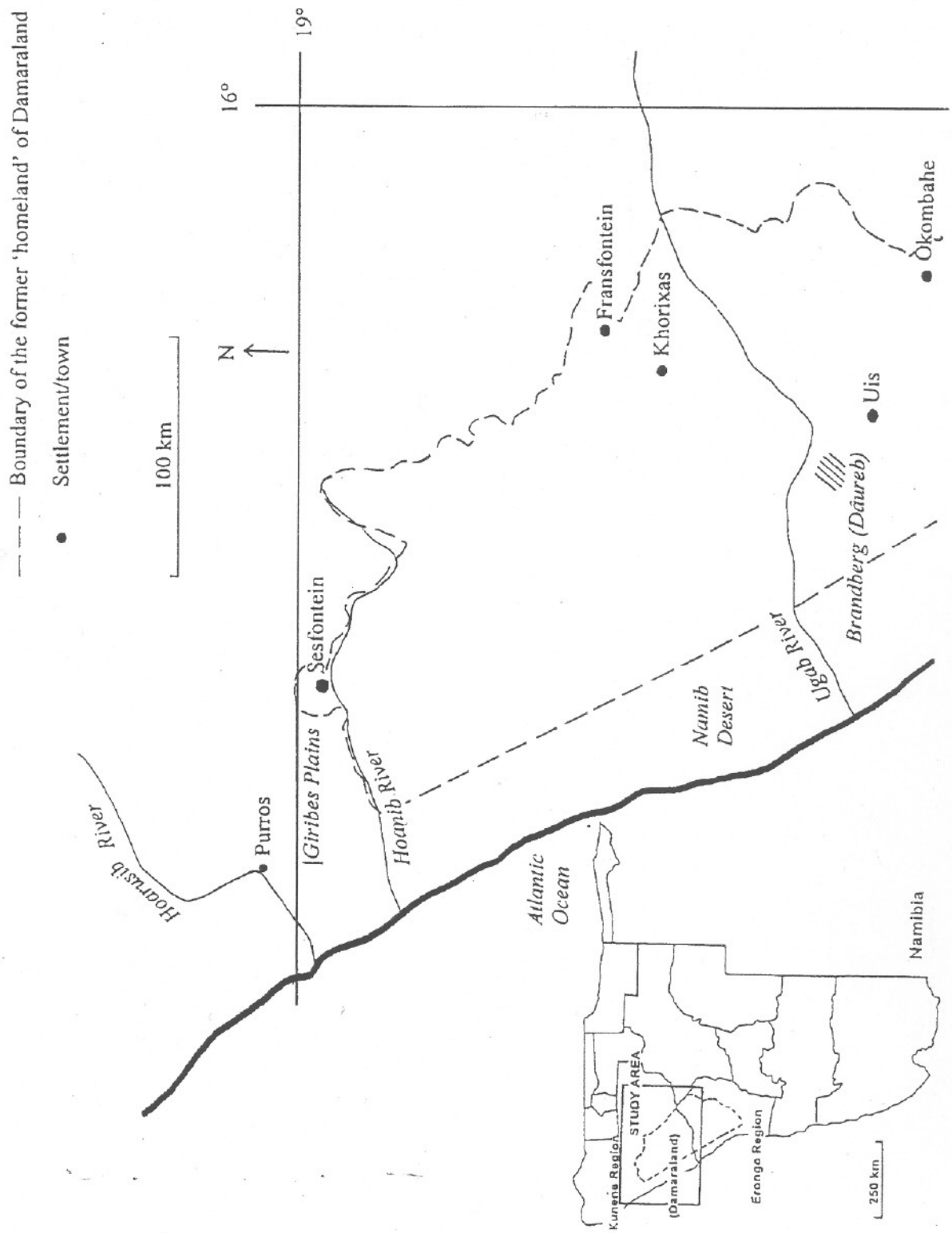

Figure 1. Map showing the location of the study area in central and southern Kunene Region, and its relationship to the former 'homeland' of Damaraland.

Common perceptions regarding natural resource management in Namibia's communal areas are infused with the sentiments expressed in the above quotes. These voice surprisingly similar concerns given the distance in both time and political environment separating the authors, i.e. that there is a lack of effective local institutions constraining access to, and use of, natural resources. In Vedder's colonial ethnography this is because he erroneously treats the Damara as too primitive to have developed such institutions (*vide* critique of Vedder's work in Lau (1979, 1987) and Fuller (1993)). For Quan *et al.* it is because indigenous resource management practices have been eroded into non-existence by the exigencies of colonial rule and apartheid administration.

It is argued here, however, that the latter liberal (or progressive) perspective, which simply states that traditional systems of resource management have been so transformed by historical factors that they are now no longer effective, fundamentally undermines recognition of either the resilience of culturally-informed ecological knowledge and resource-use practice, or the relevance of this for the conservation of biodiversity in a contemporary context. At worst, this justifies intervention by development and conservation 'experts' in ways which, by overlooking subtle and complex areas of local knowledge and practice, may be ecologically and socially inappropriate[2]. As documented exhaustively for situations elsewhere (*vide* Carney 1988; Joekes & Pointing 1991; Lane & Swift 1989; Monimart 1989; Waters-Bayer 1985; Whitehead 1990), this process has the potential to exacerbate the very problems which intervention was designed to solve.

AIMS AND METHODS

Given this context, my aim in this paper is to illustrate aspects of local ecological knowledge among Damara farmers in north-west Namibia (*vide* Figure 1) and to highlight the possible role that local knowledge and resource-use practice can play as a basis for dialogue and participation in contemporary conservation initiatives. Discussion is linked to two suites of gathered food resources, seeds and honey, as examples of possibly ancient resource-use practices which are guided by enduring cultural knowledge. The emphasis throughout is on drawing general principles from these examples and assessing their implications for both the strengthening of 'community-based' approaches to resource management and the development of appropriate policy related to land and resources in an arid communal area[3]. The information presented here is based on data accumulated during two years of anthropological and ecological field-work in north-west Namibia from 1994 to 1996. The style of the paper is necessarily qualitative and descriptive; quantitative analysis regarding the frequency of use of specific natural resources by Damara farmers and the relationship of this use to factors such as rainfall-driven variable productivity, access to alternative resources, and land tenure and settlement history can be found in Sullivan (1998).

CASE STUDIES OF RESOURCE MANAGEMENT: RELATIONSHIPS BETWEEN FOLK AND FORMAL ECOLOGICAL KNOWLEDGE

SEEDS FROM HARVESTER ANT NESTS

"ǁGaises ai ge sâu-e ra ǁgarahe.
!Oaxaseb ge ǀnanuba ra ǀawi,
ǁnanub gera ǀawi.
Khoetoma daibas ta aba?
Xoa ǂ ga tara h"a tao danaba da !gau
!nara tara h"a tao !nuriba da !gau.
!Naidadama ǁnaisore! Ho-ai!"[4]

"At ǁGaises we winnow
sâu-i (grass-seeds).

Figure 2. Damara couple harvesting grass seeds, in this case ≠ **haa** or *Kaokochloa nigrirostris* from a harvester ant nest in calcrete hills north-west of Sesfontein, central Kunene Region.

The rain that we've been
longing for is falling, the
rain is falling.
Khoetoma, why are you
crying?
Collecting (the **sâun**) and
putting it in (the ≠**goub**)
is making my head break
(in the sun)
moving from place to place
(nest to nest) is making my
back break.
The giraffe nation are
singing
(because they are successful
in collecting **sâun**).
Ouch! (The ants bite my
hand when I reach into the
nest)."

(!Narab and Purros Damara
'**Arus**' or rhythmic song
recorded in Sesfontein).

Harvester ant nests (i.e. '≠**goburun oms**' or 'ants' house') provide an important source of seeds for both food and for the production of beer and liquor. The extent of contemporary use of seeds, both those gathered from the nests of seed-harvesting ants and directly from the plant, is indicated by a recent diet-survey, which recorded foods consumed and stored by 45 'households'[5] in the former 'homeland' of Damaraland (primarily Khorixas District, Kunene Region) during 7 repeat-visits between February 1995 and July 1996. Data from this survey show that, of 348 household diet-days seeds were consumed on 10% of those days, and were recorded as currently stored by the household on 25% of those days (Sullivan 1998).

Figure 3. Seeds collected from harvester ants nests: **Sâun** or *Stipagrostis* spp. on the left and **bosu** or *Monsonia umbellata* on the right.

Such a utilitarian description of seed-use, however, does not convey the full flavour of the importance of this resource-use practice. For example, the traditional value placed on this food resource is apparent in the naming of an ancestral leader of the Damara as '**saub**' (Knappert 1981), i.e. the term used to describe grass seeds of primarily *Stipagrostis* spp.[6]. Songs such as that transcribed above, also affirm shared experience of the hard work required in enacting, or successfully *performing* (*vide* Richards 1995), this resource-use practice, and highlight the enthusiasm generated by successful collecting in seasons of plenty (*vide* Figure 2).

The consumption of grass seeds as cereals is considered to have been a feature of subsistence in semi-arid and arid areas throughout human history and pre-history. Despite the apparently low diversity of species used in this manner today, some pastoralist groups in sub-Saharan Africa continue to gather and consume large quantities of wild grass seeds. Maiga (1992), for example, describes the widespread collection of grass seeds directly from the plant among contemporary Gourma pastoralist groups of Mali, where *Panicum laetum, Echinocloa colona, E. oryzetorum, Cenchrus biflorus* and wild rice (*Oryza* spp.) are the most commonly utilised wild cereals. As stated in Renvoize *et al.* (1992: 7), "The outstanding value of grasses as a source of food lies in their nutritious seeds" which have both high lipid and protein contents (Carroll & Janzen 1979). Of further significance in unpredictable arid environments is the fact that cereals lend themselves to storage for later consumption. It is thus extremely likely that seeds from harvester ant nests, which can be stored for up to three years, were important in sustaining the various groups of people now known as Damara in the precolonial past. As recorded for Australian Aboriginal groups, who collected seeds directly from the plant but, like the Damara, additionally relied on procuring large quantities of seed from harvester ant nests (Latz 1995; O'Connell *et al.* 1983; Tindale 1977), seeds could have been stored in convenient natural caches such as rock crevasses, as well as in dwelling places[7].

Broadly speaking, seeds collected from harvester ant nests and utilised for food are from the grasses *Stipagrostis* spp. (**sâun**) and the endemic monotypic genus *Kaokochloa* (*nigrirostris*) (≠ **haa**), and the Geraniaceae species *Monsonia umbellata* (occasionally *M. senegalensis*) (**bosu**) (*vide* Figure 3). Grass seeds collected directly from the plant include *Setaria verticillata* (≠ **ares**), *Setaria finita* (**!gari-ao-oâ**), *Eragrostis* spp. cf. *E. annulata* and *E. cylindriflora* (**!homara**) and *Danthoniopsis dinteri* (≠ **namib**). This diversity of recognised edible grass species in north-west Namibia contradicts the general consideration that "grasses appear not to provide food items for humans" across eastern and southern Africa (Peters *et al.* 1984: 402), and is in contrast to other arid areas where seeds from woody species tend to be as, if not more, important (*vide* O'Connell *et al.* 1983; Veth & Walsh 1988).

Once gathered from the ant nest, and in a process similar to that documented by Tindale (1977) for Australian Aboriginal groups[8], the preparation of grass seeds involves 'cleaning' by winnowing the seeds in a shallow oval to elongate wooden dish called ≠ **goub** (Figure 4). These hard-wearing winnowing dishes are usually carved from the soft wood of various *Commiphora* spp. (including *C. anacardiifolia*, *C. glaucescens* and *C. multijuga*), a genus of which north-west Namibia has a uniquely high diversity of species (Van der Walt 1974). The seeds are husked, re-winnowed and milled through grinding using small upper and large, flat, lower millstones.

As noted above, seeds from *Stipagrostis* spp. grasses, and occasionally *Monsonia* spp., are also used as the basis for brewing beer (**!khadi**) and for the distillation of a liquor called **bâuga**. These processes add value to the raw resource and, as documented elsewhere, constitute important income-generating activities for the women of many rural households[9]. The procedure for brewing **sâun** beer is much simpler than that described elsewhere (*vide* Fox 1938), requiring only that several kilograms of unground seeds are soaked for two or three days in water sweetened with sugar or honey. The seeds can be reused over periods of one to three years during which time the flavour is improved by topping up with freshly collected seeds. It is common for women to prepare beer in 200 litre oil drums and to sell beer for around N$1[10] a pint. The distillation of **bâuga** from beer is much more time-consuming, requiring a complicated apparatus of pipes and containers for heating the beer and collecting the finished product (Figure 5). The returns are much higher, however, with a 250ml bottle fetching upwards of N$5 and higher prices received by women who have the means to transport the liquor for sale in urban areas. **Sâun** itself is also sold informally.

Figure 4. Using a ≠ **goub** to winnow or 'clean' seeds, in this case primarily **!hoe sâun** or *Stipagrostis hochstetterana* var. *secalina*, from harvester ants nests at !Giribes Plains, north-west of Sesfontein, central Kunene.

Together with honey-harvesting, the collection of seeds from harvester ant nests is guided by essential knowledge regarding the links between two completely different orders of the natural world, in this case ants and plants. Harvesting practice is thus informed by pragmatic understanding of both ecological diversity and the dynamics of seed availability. It is also coupled with constraints regarding utilisation which are linked explicitly to ensuring future productivity (i.e. sustainability), and to informally-recognised access rights concerning who is eligible to harvest seeds from specific nests. These areas of folk ecology and customary practice surrounding seed-collecting are discussed separately below.

Ecological diversity and classification

As Table 1 indicates, in arid north-west Namibia a range of seed-harvesting ant nests yield a diversity of edible seeds, primarily from grasses. This is in contrast to a recent phytochorological[11] analysis of 'useful' grass species which recorded only 8 useful grass species for the Karoo-Namib biogeographic region as a whole, none of which were recognised as human food (5 were important as livestock forage, 1 for building materials, and 5 recognised as important for 'land use' i.e. soil erosion control, salt tolerance, etc.) (Renvoize *et al.* 1992). Similarly, while SEPASAL[12] records the use of seeds for food of 64 species (Renvoize *et al.* 1992) few, if any, of the species consumed in north-west Namibia feature in this international database. This suggests that, in this area at least, local ecological knowledge and resource-use practice in Namibia can make an important contribution to international understanding of economically and culturally valuable biodiversity.

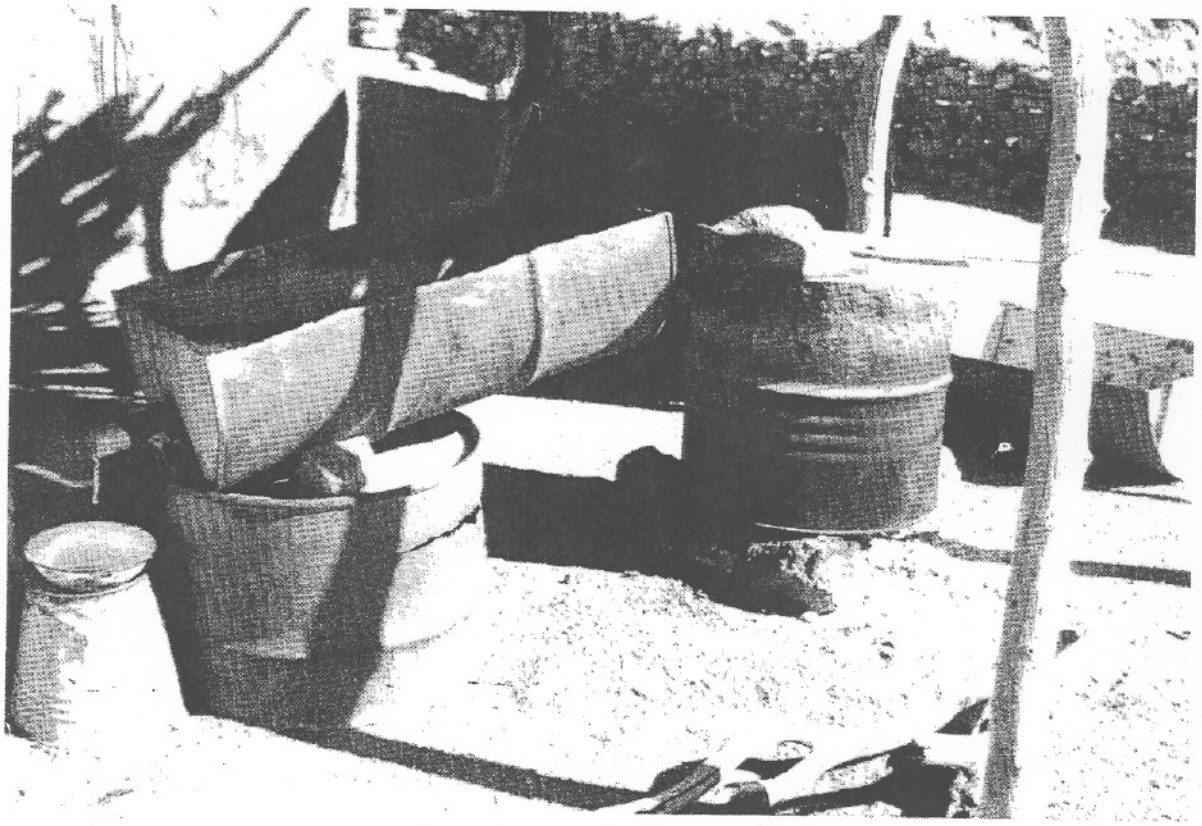

Figure 5. Apparatus for distilling **bâuga** or liquor from grass seeds (**sâun**). Photograhed at ǁGaisoas, Ugab River, south Kunene Region.

Table 1. Seeds collected from harvester ant nests: plant species recorded in this study and literature reference.

Grass species	Damara name and ethnoecological information	Additional literature references
Aristida cf. *effusa*	Both the seeds and the plant are called '*!gaebiburu ǂ gahe*'. This species is one of a generic class of grasses or '*!gân*' called '*tînkî*' which has awns which are not hairy or feathery like those of *Stipagrostis* spp. (classed as '*!haburo !gân*', *vide infra*) The name '*!gaebiburu ǂ gahe*' describes the difficulty of preparing these seeds before cooking; '*buru*' refers to the process of winnowing and '*ǂ gahe*' refers to putting the seeds into the *ǂ goub* or winnowing bowl.	In Pisani (1978), Schultze (1907) is recorded as asserting that seeds from *Aristida* spp. are collected from ants' nests and usually consumed with milk.
Chloris virgata	This species is called '*nanubé*' and its seeds are mixed with *sâun* in harvester ant nests and consumed with *sâun* as a consequence. This species has a terminal raceme and is therefore recognised as a '*ǂ hara ǂ gaî*' type of grass, literally translated as 'foot at the end'.	
Danthoniopsis ramosa (= *Loudetia ramosa*)	The similar species *Danthoniopsis dinteri* is called '*ǂ namib*' from which the edible seeds are collected directly from the plant. When 'cleaned' these are reportedly white like '*ǂ u sâun*'.	*Loudetia ramosa* is referred to as "*ǂ u-saû*", collected from harvester ant nests, by State Museum (n.d.).
Enneapogon desvaxii	The seeds and plant are referred to as '*ǂ khari !nabise*', i.e. 'small' *!nabise*. This distinguishes it from the larger '*!nabise*', i.e. *Monelytrum leuderitzianum*, to which it is considered similar. Also referred to as '*ǂ khari !hùru*' (*vide* notes for *Kaokochloa nigrirostris*). Like *Chloris virgata*, the seeds are mixed with *sâun* in harvester ant nests and consumed with *sâun* as a consequence.	Eiseb *et al.* (1991: 21) record the name "*!gàri-i*" for this species.
Kaokochloa nigrirostris	The seeds are referred to as *ǂ haa* in and around Sesfontein and as '*ǂ narabé*' by informants further south e.g. Dâureb Damara. The plant as a whole is called '*!hùru !gân*', '*!hurubé*' or '*ǂ narabé*'. '*!Hùru*' means 'ripe' as in ripe ears of wheat, e.g. '*!horo ge go !hùru*' means 'the wheat is ripe'. This name refers to the perceived similarly of this and other grasses (e.g. *Schmidtia* spp.) when ripe to ears of wheat. The open, empty seed heads of this and other *!hurube* grasses can make *sâun* and *bosu* 'dirty' and difficult to 'clean' or winnow. The seeds of this species are collected either on their own in areas of calcrete hills where *Kaokochloa* dominates or are found in a mixture with other species.	
Stipagrostis spp.	The seeds are referred to as '*sâun*' while the plant as a whole is called '*!gaburogu !gân*'. *!Gân* is a generic term for grass and '*!gaburogu*' describes the feathery awns characteristic of this genus, which, when the wind blows, carry the *sâun* to the ground for the harvester ants (*ǂ goburun*) to collect so that they 'do not stand in one place'. *!!Naa-i* is the term used to describe the empty seed head, i.e. the lemma with no seed inside.	Referred to, but unidentified, by Pisani (1978: 14); referred to as "*saawi*" by Steyn & Pisani (1984/1985: 45) and as "*sâu-i*" by State Museum (n.d.). Used in Sesfontein (Van den Eynden *et al.* 1992).
Stipagrostis cf. *damarensis*	Identified as a '*sâun !gâb*' i.e. which produces edible seeds. Dâureb Damara respondents towards the south of Kunene consider that this species produces edible seeds known as *ǂ uti*'.	

Table 1. cont. Seeds collected from harvester ant nests: plant species recorded in this study and literature references.

Grass species	Damara name and ethnoecological information	Additional literature references
Stipagrostis cf. *hirtigluma* subsp. *patula* and subsp. *hirtigluma*	Both the seeds and the plant are referred to as *!garibe*, a name describing the hardness of the seed (*!gari* means 'hard').	Referred to as "*saawi*" by Steyn & Pisani (1984/1985: 45).
Stipagrostis hochestettetana var. *secalina*	Both the seeds (which are *sâun*) and the plant are referred to as *ǁhoe*. Distinguishing feathers of the seeds are their small size and sharpness.	Referred to as "*saawi*" by Steyn & Pisani (1984/1985: 45).
Stipagrostis cf. *obtusa*	Called *≠ habo ǀgâb* and described as a *tsaura* or 'soft' grass which sways and lies on the ground when the wind blows.	*Stipagrostis obtusa* referred to as "*saui*" collected from "ant-hills" "*≠ gui-adi*" by Pisani (1978: 14) and called "*≠ habob*" by State Museum (n.d.).
Stipagrostis cf. *uniplumis*	As with *Stipagrostis* cf. *hirtigluma*, both the seeds and the plant are referred to as *!garibe*, a name describing the hardness of the seeds (*!gari* means 'hard').	Referred to as "*saawi*" by Steyn & Pisani (1984/1985: 45).
Other Species	**Damara name and ethnoecological information**	**Additional literature references**
Fabaceae		
Indigofera sp.	The small orange seeds are called *!ganikie* and are collected and consumed in small quantities when found with more abundant seeds in harvester ant nests.	
Geraniaceae		
Monsonia umbellata	Commonly called *bosu* or *≠ khari bosu*, i.e. 'small' *bosu* to distinguish it from the larger seeds of *M. senegalensis*. Also called *raba*.	Pisani (1983) records that the Nama refer to the seeds as "*raba*", the orange seed from which the husk has been removed as "*tsaman*", the harvester ants' nests as "ǁ*kunib*" and the act of gathering seeds as "ǁ*kunire*". Pisani (1978: 14) refers to the consumption by Damara settled on the Ugab River of an unidentified "red seed" called "*bosui*". Steyn & Pisani (1984/1985: 45) also refer to the consumption of these seeds in the same area. Dentlinger (1977) refers to the use of *Monsonia* seeds by the ≠Aonin or Topnaar of the Kuiseb River. Van den Eynden *et al.* (1992: 74) refer to *Monsonia* sp. as "*harapab*" or "*rapab*" the seeds are "*bosui*" and unripe seeds as "*surube*".
Monsonia senegalensis	The seeds of this species are also called *bosu* with the addition of a preceding term describing their large size relative to those of *M. umbellata*, i.e. *surube*, *ǁnurabe* or *gai* bosu.	

Seeds collected from harvester ant nests by Central and Western Australia Aborigines (from Latz, 1995 and Walsh, pers. comm. 1996)

Poaceae	Fabaceae	Malvaceae
Aristida inaequiglumis	*Acacia ancistrocarpa*	*Abutilon otocarpum*
Brachiaria spp.	*Acacia dictyophleba*	*Sida* spp. x 2
particularly *Brachiaria subquadripara*	*Dactyloctenium radulans*	
Yakirra australiensis		

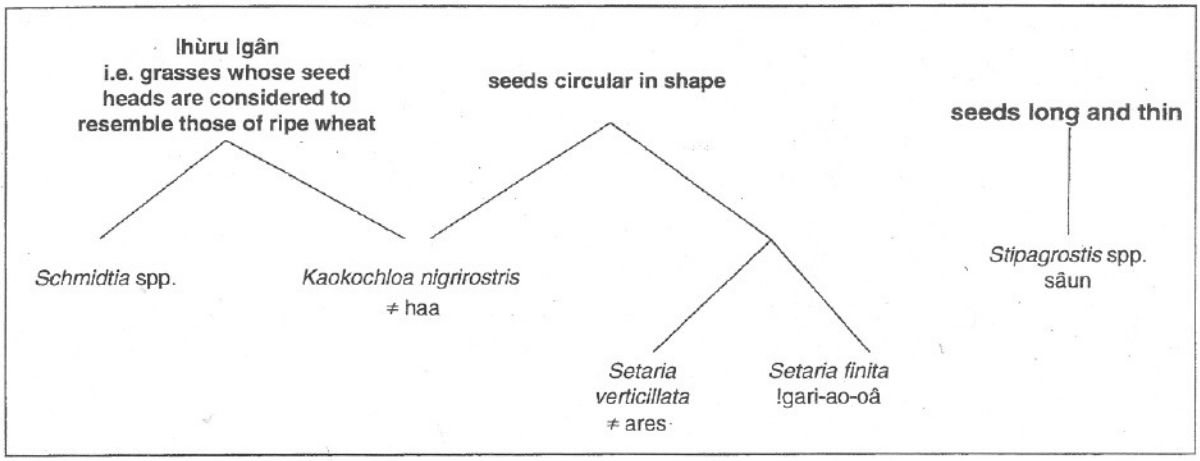

Figure 6. A provisional Damara classification of some species of edible grass seeds.

Differentiation in Damara names of seeds to species level is the norm, despite both the separation of seeds from their parent plant once collected at a nest, and the extreme similarity of seeds from different species once assembled together in a nest. Figure 6 provides a preliminary indication of Damara seed taxonomy (*vide* Fowler 1977), of both seeds collected from harvester ant nests and those collected directly from the plant. From this it can be seen that classification is based pragmatically on physical similarities of the seeds (*vide* Heinz & Maguire 1974; Posey 1984; Povinelli 1990) translated into considerations of relatedness between species (as in 'this species is family with that one'). Figure 7 shows names and classification of different ant species considered to harvest seeds, i.e. *Messor* Forel, 1890, *Pheidologeton* Mayr, 1862 and *Tetramorium* Mayr, 1855 spp. (Hymenoptera: Formicidae: Myrmicinae). Seeds are generally collected from the nests of 'ordinary' ≠ **goburun**, sometimes referred to as **!nau-dana** (or 'fat-head') ≠ **goburun** and identified as *Messor tropicorum* Wheeler, 1922. *Pheidologeton kunensis* Ettershank, 1966 nests also yield smaller quantities of seeds from which the outer seed coat has been removed or 'cleaned' by the ants. The nests of *Tetramorium sericeiventre* Emery, 1877 (**lawa**' or 'red' ≠ **goburun**) are not raided, apparently because this species stores such small amounts of seed[13]. Different castes within the same species of ant are recognised by the distinguishing terms **kai** or ≠ **khariro**, i.e. large or small.

Dynamics of availability

Local understanding of the availability of seeds for collection from harvester ant nests is rooted in observation of the effects of unpredictable and rainfall-driven variations in primary productivity. This is apparent, for example, in the existence of the specific term **luubi** or **!gûibes**[14] to describe nests which are small and where the harvester ants are inactive as a result of periods of drought. It is thought that the ant population declines as a result of the lack of available grass seeds during these conditions and that it needs time to recover following rain; the consideration that a run of good rain seasons enables the harvester ants to store increasing quantities of seeds further suggests observation and understanding of time-lags associated with the recovery of seed stores in ants' nests following drought. Collecting occurs towards the end of the rain season (February onwards) when the ripe seeds begin to be blown to the ground and are carried by the harvester ants to their nests. Depending on rainfall, seeds can be collected from these nests throughout the year such that good rain years lend themselves to more frequent harvesting.

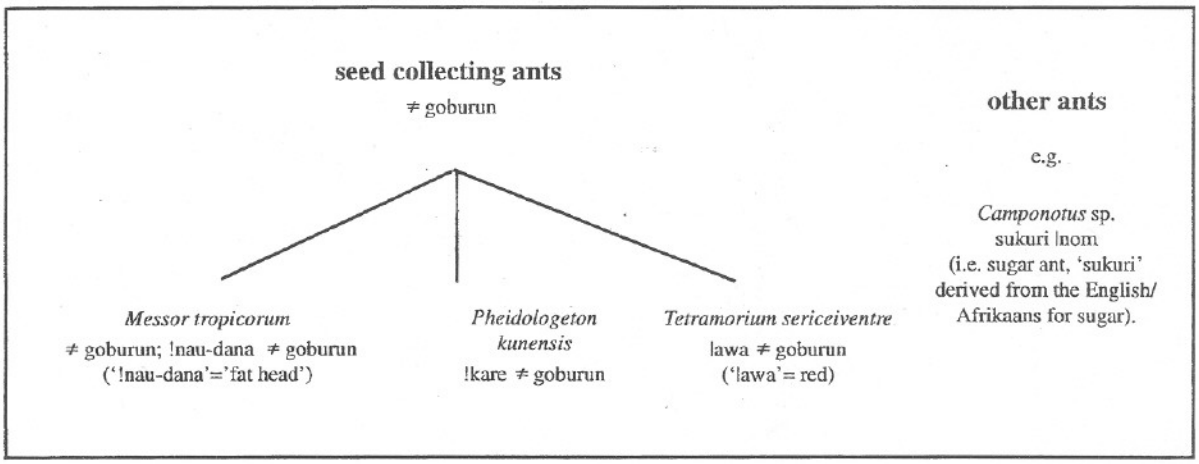

Figure 7. A provisional Damara classification of seed-harvesting ants.

These considerations mirror formal ecological understanding of foraging and population dynamics among seed-harvesting ants in desert ecosystems, although it is worth mentioning that not a single one of the entomology references reviewed demonstrated an awareness of the practice of raiding the granaries of these ants by people. Ludwig & Whitford (1981) state that the scanty and unpredictable availability of seed (*vide* Brown *et al.* 1979), together with the type of colony, regulates foraging activity in Chihuahuan Desert species. Similarly, Whitford (1978) describes in Ludwig & Whitford (1981: 288) how the large colony-size group-forager *Pogonomyrex rugosus* Emery, 1895 (Hymenoptera: Formicidae: Myrmicinae) "harvested intensively in a year with high annual production following drought" (*vide* also Brown *et al.* 1979: 210-211). Under laboratory conditions, increased exit rates of foragers from nests are stimulated by the return to the nest by an ant with exceptional food (Carroll & Janzen 1973: 240). Conversely, reduced energy expenditure through ectothermy and dormancy, coupled with seed storage, allows periods of foraging inactivity corresponding with low availability of seed (Brown *et al.* 1979). This ability to capitalise on good years and store food throughout periods of low seed productivity enables established colonies to survive for many years (Brown *et al.* 1979; Wilson & Hölldobler 1990). A further suggestion by Wilson (1971) in Brown *et al.* (1979: 208) "that individual colonies may sustain dramatic reductions in populations of workers and brood while retaining the capacity to respond quickly when conditions become more favourable" remains possible but has not been confirmed empirically.

Harvesting practice and constraints

Related to the observations of inter-annual variations in seed availability described above are various harvesting practices of the Damara which are understood and explained as means of ensuring productivity into the future. It is widely stated, for example, that harvesters must leave enough seed within the nest for the ants to survive the process of nest-raiding and to be able to continue to store seeds in future seasons. Similarly, only seeds from the surface layers of the nest are collected so as not to damage the nest through digging too deep, and seeds located deep in the nest during drought should not be collected as these are necessary to enable the ants to survive the drought so that they can collect in abundance following rain. The practice of remaining silent while collecting is intended to minimise disturbance to the ants, although Vedder (1928: 50), in characteristic dismissive fashion, describes how women are expected to gather in silence so

as not to behave as "chatterboxes". Stones are placed over the entrances to the nests for various reasons; to 'prevent the ants from leaving the nest', to mark the nest as the property of a harvester (*vide infra*), and possibly to facilitate collection of seeds by encouraging their concentration in surface chambers formed by these stones and preventing, to some extent, the mixing of these seeds with soil and other debris in the nest.

Nests as property

Harvester ant nests may be considered the property of those individuals, normally women, who first collected from them, and as such can be passed on to their daughters. This is particularly true of nests located in close proximity to settlements where the ratio of nests to people is relatively low. This agreement is informally understood and enacted: the harvester makes it known throughout the settlement that she has begun collecting from a specific nest and appropriate social behaviour requires that other women should not collect from this nest. Similarly observed property rights over individual bee hives harvested by men are described below. This treatment of nests as essentially private property does not necessarily constrain collection from nests located further afield. Ancestral claims to land do, however, play an important role in influencing where people will go to collect seeds, as well as other resources. When collecting seeds or honey in Sesfontein and environs, for example, people tend to travel in the direction of the land area with which they have ancestral links. So, Damara from the area north-west of Sesfontein towards Purros travel in that direction and collect from nests in the |Giribes plains, while so-called Namidaman from the Hoanib River and Namib Desert to the west of Sesfontein tend to return to known concentrations of ant nests in the direction of these areas. In this sense, food-gathering constitutes an affirmation of relationship with the land; as Bell (1993: 52) describes for the Warlpiri Aborigines of central Australia, resource gathering constitutes "time away from the settlement, time with close kin, time in one's country", all of which are as important as the economic dimensions associated with exploitation of local resources.

HONEY

Honey is a sought-after and highly valued commodity throughout sub-Saharan Africa and elsewhere, particularly as an additive to beer. Its collection is universally an activity carried out by men[15] and honey collectors tend to be widely respected for their "bravery and experience, and in their knowledge of the ways of bees" (Brokensha *et al.* 1972: 116). Both the collection of wild honey and the harvesting of honey from managed hives is usually surrounded by a rich honey culture including myth, ritual and song (*vide* Brokensha *et al.* 1972; Brokensha & Riley 1986; Ntenga & Mugongo 1991; Strickland 1982).

Despite the aridity of north-west Namibia, honey-harvesting similarly is a time-honoured tradition among the Damara requiring skill, patience and relevant environmental know-how, and surrounded by celebratory myth and praise songs. Knappert (1981: 73) states that "Their ability to find honey and collect it for trading purposes has further earned them the name 'Danidaman'", i.e. **danib** = honey. Its importance can also be illustrated by the emphasis on honey in the following account by Köhler (1959: 35) of conflict between the Herero and Damara in which he states that "Under the leadership of one Josef Toke they [the Herero] made a raid on the Bockberg area, burnt down the Bergdama huts and plundered the people. They seized their livestock and their honey".

The honey bee ('**!habus/b**') represents valued qualities of industriousness, discipline and respect for the wisdom of elders, as the following account of the origins of honey-making indicates:

'!Gâimû-es ge ||namahebas ge !habu sa ge ||nâu.'

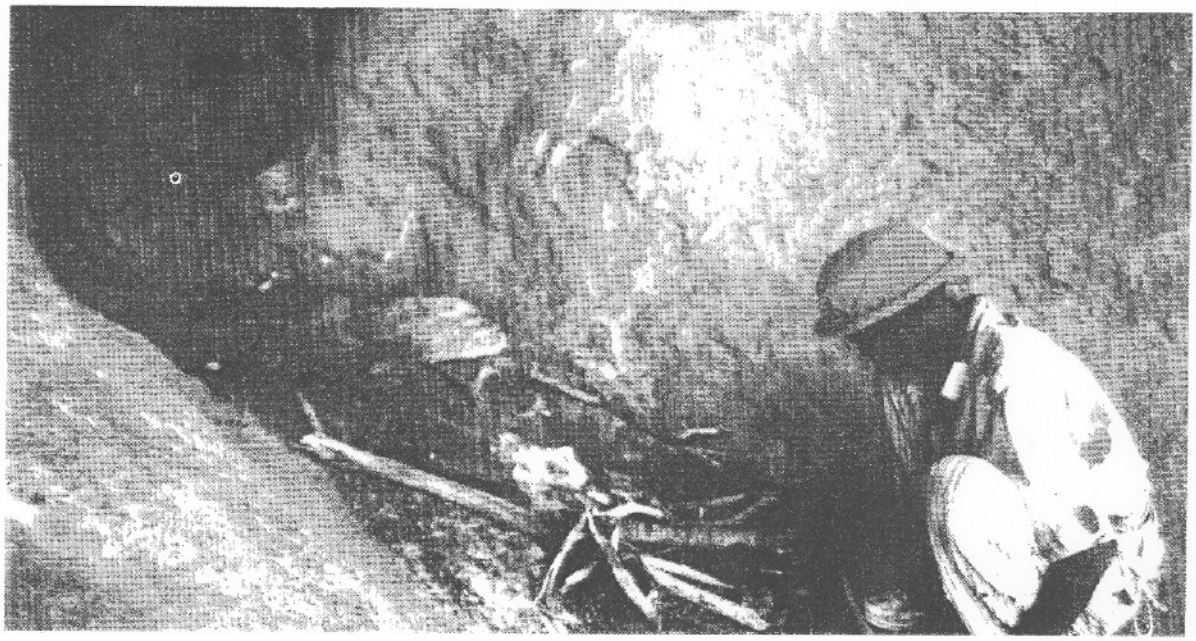

Figure 8. ≠ **Uina**, a 'Purros Damara' man who in 1995-1996 was living in Sesfontein, harvesting from 'his' bee-hive east of the !Giribes Plains, north-west of Sesfontein, central Kunene.

!Gâimû-es was scolded; !habu listened.

i.e. **!Gâimû-es'** (*Xylocopa caffra* (Linnaeus, 1767), the Carpenter bee) mother and father taught her how to make honey one day and the orphaned honey bee ('**!habus**') (*Apis mellifera adansonii*) sat and listened. **!Gâimû-es'** parents said that you must collect **≠habo lgâs** (i.e. *Stipagrostis* spp. grasses, *vide* Table 1) and weave the stems together, and then take nectar from **lgom lgom** plants (such as *Ruellia* spp. i.e. with flowers from which you can suck nectar) and place the nectar in the holes between the woven strands of grass. **!Gâimû-es** didn't follow this advice because she had her parents to look after her; **!habus**, on the other hand, listened very carefully and from that day has been able to support herself by producing honey in the same hive, year after year. **!Gâimû-es** meanwhile is destined to live alone, moving aimlessly from place to place (**!gâi-!gâi-!gâi** = from place-to-place-to-place), and all her attempts to make honey end in failure.
(Story recorded in Sesfontein)

Interestingly, formal descriptions of the reproductive cycle of Carpenter bees (Hymenoptera: Anthophoridae: Xylocopinae) mirror the sense of this story almost exactly, as in the following statement regarding nest establishment by Carpenter bees that "This can be regarded as a primitive stage in the development of true social life and energy-conserving division of labour, as exhibited by honeybees" (Braack 1996: 141).

In addition to the widely harvested honey from the honey bee *Apis mellifera adansonii* Latreille (Hymenoptera: Apidae), the very palatable small quantities of honey of stingless bees or '**nani**' (Apidae: Meloponini) (i.e. so-called 'mopane

bees'), is consumed opportunistically when found. As described above for the collecting of seeds from harvester ant nests, a wealth of technical knowledge is employed in order to harvest honey in ways which prevent destruction of the hive, and harvesting is further constrained by property rules amounting to individual ownership of particular hives. Unfortunately, these constraints are becoming overshadowed by processes largely rooted outside control by local resource-users and threats to sustainability are apparent. These issues are discussed separately below.

Harvesting honey: technical aspects

Locating a new hive relies on keen observation of swarms of bees in flight, aided by following the trail of minute secretions dropped by honey bees when in flight and sometimes by attaching a fine thread to the leg of a bee in order to more easily follow its flight direction (as further reported in Guy 1972). As is common among honey harvesters throughout the world, the technique of harvesting requires the use of smoke to subdue the bees following which the harvester can reach into the hive and break off pieces of comb dripping with honey[16] (*vide* Figure 8). As depicted in Figure 9, access to hives may be facilitated by building loose ladders. Remnants of similar ladders have been observed at the Brandberg by Kinahan (1991) and the long regional history of this practice is indicated by the wealth of rock art depicting ladders built by Khoisan honey harvesters throughout southern Africa (Guy 1972; Pager 1973).

Pisani (1978: 15) has described the practice of locating hives and harvesting honey by Damara living along the Ugab River as follows:

"*To locate a hive can take two or three days. In order to establish the exact spot, men not only pay attention to the flight of bees, but also observe their secretion which can be seen clearly on dark stones. Before the honey is removed, the hive is fumigated. Normally only half the combs are taken. This prevents the bees from deserting the hive alltogether* [sic], *and thus secures its future utilization. Honeycombs are eaten, while honey also constitutes an ingredient of an intoxicating honey beer (dani-!kari)*".

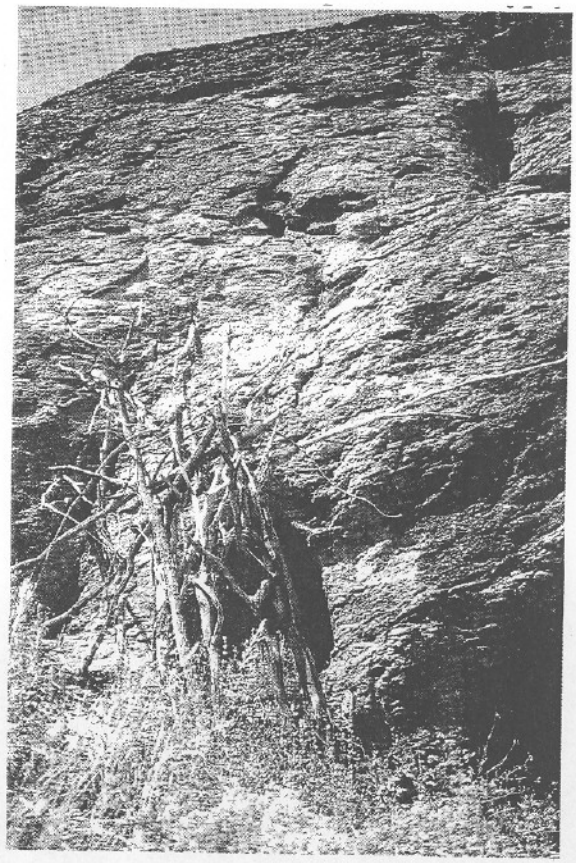

Figure 9. A makeshift ladder, constructed historically by Damara for ease of access to a cliff-face bee-hive, at a place known as ≠Namib ≠Hab, north-west of Sesfontein, central Kunene.

Honey hives as property

A hive is considered to be the property of the first Damara man who found it, who asserts ownership by placing a stone in the opening of the hive. This practice was noted by Wandres (1909) and Vedder (1928) and is similar to that described for southern African San populations in Guy (1972). Among the Damara it continues

to be carried out today by now elderly honey-harvesters, particularly from the northern settlements of Khorixas District, southern Kunene. During field-work for this project stones marking rights to hives in use were observed in rock crevasses and large trees such as *Sterculia africana* and *Moringa ovalifolia* (Figure 10); similarly, nests in *Moringa ovalifolia* trees which had been marked and closed off with stones were found in the course of archaeological work at the Brandberg by Kinahan (1991). The practice of marking ownership of nests is in contrast to other areas where, as a result of higher rainfall, bee-hives tend to be more abundant. Among the Hehe of central Tanzania, for example, more than one honey-hunter could harvest from the same hive (Jennings 1994).

In the north of the Khorixas District where people have a more continuous history associated with the landscape, and as described for the collection of seeds from harvester ant nests, honey-harvesters maintain hives in the areas with which they have ancestral links. Figure 11 shows the distribution of hives 'belonging' to three harvesters from Sesfontein. From this it is clear that harvesters are prepared to travel considerable distances (30-40 km) to gather honey from hives established historically, and under customary law, as their property.

Constraints on harvesting

The departure of a swarm from a hive due to over-harvesting was noted as a recognised offence among the Damara by Wandres (1909) and a number of practices are observed today among traditional harvesters to ensure the sustainable production of honey. Only a portion of the honey is removed, for example, and the harvesting of

Figure 10. Stones placed in the trunk of a *Sterculia africana* tree to mark a hive formerly harvested by members of a Purros Damara family now living in Sesfontein. Located in hills to the south-east of the !Giribes Plains, north-west of Sesfontein, central Kunene Region.

honey from 'young' or recently established hives is avoided. The practice of placing a stone over the entrance to the hive is also considered to encourage the swarm to remain in the hive. These practices bear many similarities to those employed in modern apiculture (*vide* Anderson *et al.* 1983).

Ensuring the long-term sustainable production of honey seems to be a principle which informs harvesting practices wherever there is a long tradition of honey-harvesting (*vide* Guy 1972; Ntenga & Mugongo 1991; Strickland 1982). Among the Hehe of central Tanzania, for example, the bees are similarly subdued with smoke and the honey removed by boring a small hole into the hive, taking care not to disturb parts of the comb containing grubs, and the hole is resealed after collection thereby minimising damage to the hive (Jennings 1994).

Current threats to sustainability

Wherever areas are subject to changes in land-use, often associated with conflicting land claims, traditional forms of honey-harvesting appear to be compromised and vulnerable. Brokensha *et al.* (1972: 122), for example, identify two threats to honey-harvesting among the Mbeere of Embu District, Kenya: first, the process of land adjudication which, through granting individual title to land, restricts the movement of honey-collectors to their hives; and second, the fact that, without an emotional commitment to the harvesting process, younger men are unlikely to "be prepared to spend as much time and effort in getting honey". Similarly, around Ruaha National Park in Tanzania, where Hehe honey-hunters have been forbidden to harvest honey from within the park, an increase in practices which damage the hive has been observed (Jennings 1994). In addition, the movement of people into lands with which they have a less intimate ancestral claim is also responsible for an increase in unsustainable raiding of marked hives in this area (*vide* Jennings 1994).

Likewise, in north-west Namibia two processes underlie breakdowns in the sustainability of the traditional process of honey-harvesting. First, is the increasing movement into the area by non-Damara livestock herders who, without either a long history associated with the land or an

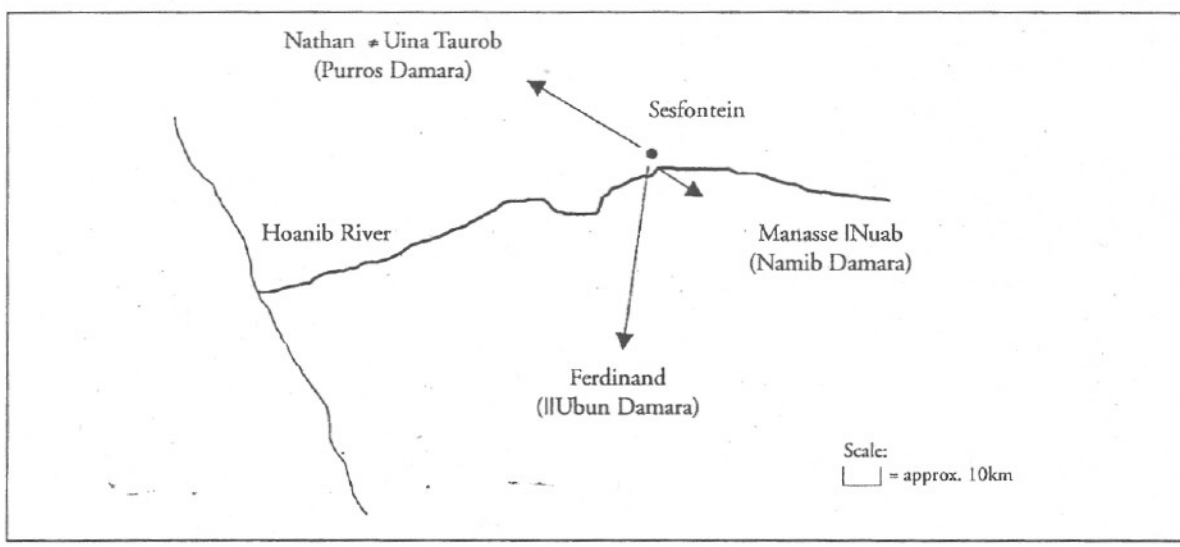

Figure 11. Sketch map showing the location of honey hives 'owned' by 3 harvesters from Sesfontein and the relationship between these hives and the ancestral lands of these harvesters. The names in brackets indicate the 'nation' or locality-based group to which these harvesters trace their lineage (*vide* Haacke & Boois (1991), ǁGaroëb (1991) and Fuller (1993) for further discussion of these groups)

awareness of locally-acceptable harvesting practices, are known to destructively raid hives for honey as they encounter them. Movement of people into the area currently is made possible by Namibia's post-independence constitution which, in reaction to the constraints imposed by the apartheid-style South African administration, allows Namibian citizens much greater freedom to move anywhere on communal land[17]. Second, is evidence of some breakdown in environmental knowledge between successive generations of Damara, with the skills surrounding honey-harvesting losing value among young Damara men, even though they relish consumption of honey when it is made available through harvesting by their older relatives.

DISCUSSION: LOCAL REALITIES AND NATIONAL CONSERVATION AIMS

CBNRM in Namibia constitutes a progressive approach to conservation, by aiming to devolve proprietorship over natural resources to communal area inhabitants who were legislatively divorced from land and resources through the repressive policies of imposed administrations. At a deeper and often less explicit level, a participatory, 'community-based' approach to conservation and development can also be a means of recognising the significance of culture as a 'determinant of social interaction', where these interactions pertain to the use and management of culturally and economically valued biological resources. Botelle & Rohde (1995: 25-26) assert regarding rural planning in Eastern Otjozondjupa;

"... in the context of land use planning it is necessary to recognise existing (cultural) rules governing rights to land and natural resources, and to understand the connections between these rights and kinship networks, modes of exchange and strategies for subsistence survival. Such rules and common practices, while subject to constant revision and adaptation, have an enduring essence which structures individual attitudes towards and perceptions of the material and social environment. These common cultural practices or 'traditions' underpin strategies of survival which continue to evolve in a response to a changing physical, economic and social environment.' thus 'it is vital that the cultural practices that shape ... societies are taken into account within the conceptual framework of land use planning".

I have tried to convey a sense in which economic, cultural and individual interrelationships with the landscape are affirmed and reproduced through the enacting of resource-use practices. Some Damara also claim and assert these interconnections through an idea and practice of '**aoxu**'. In this, small items such as tobacco or the medicinally-valued leaves of *Colophospermum mopane* (**tsaurahais**) are 'thrown away' to the ancestors located in what amounts to a socially constituted, as opposed to a 'wild', landscape. This is accompanied by words which explicitly call upon former inhabitants to protect the collector/ collectors and help ensure success in finding the resources they seek, i.e.

"Ne ta ge sa ôada, sa khoeda
xuige !gaise !ho !oada
"da sâuba kaise xure."

"We are your children, your people
look after us well
(so that) we collect lots of **sâun**."

(**sâuba**, or grass seeds, can be replaced as appropriate by the names of other valued resources such as **daniba** (honey) and **bosuba** (seeds of *Monsonia* spp.).

CBNRM initiatives, however, tend to proceed on the basis that there is a need to create local resource management institutions where such institutions do not, or no longer, exist. As highlighted in this paper, a hidden danger is that locally-specific resource management practice and knowledge will remain "notable mostly by its absence, silenced before it is investigated" (Leach & Mearns 1996) because of the widespread

assumption that 'traditional' common property regimes have disintegrated during this century. Alternatively, it is suggested here that this assumption is an artefact of both a lack of detailed information regarding contemporary resource-use and management practice, and a tendency to perceive indigenous Namibians as passive victims of historical processes.

The case material discussed in this paper instead indicates that the contemporary use of specific resources is guided and constrained by a 'logic of practice' (*vide* Bourdieu 1990) related to a culturally-mediated understanding of their ecology. Moreover, additional material suggests that interest in local environmental knowledge is likely to increase rather than decline in the interests of an emerging middle-class aspiring to reclaim cultural identity in post-independence Namibia (*vide* Sullivan 1998, in press a). Of particular relevance to contemporary environmental and resource management policy and rural planning are areas of convergence between local knowledge and scientifically-derived ecological principles, as highlighted by the case material. For example:

BIOLOGICAL DIVERSITY

The case studies demonstrate a deep recognition of regional biological diversity classified largely in parallel with formal taxonomy. Even when a generic term is used in Damara 'ethnotaxonomy' for several species which are considered related (often corroborated by scientific taxonomy), individual species are recognised by physical characteristics and/or habitat preferences (*vide* Baker & Mutijulu Community 1992). Conversely, two species may also be recognised which formal taxonomy defines as a single taxon. Usually, this arises when either an aspect of the wider ecology of the species, or a variable quality which is meaningful only in the context of its local use-value, is overlooked by taxonomists working in locations far from the environment of the species in question[18].

SPECIES INTERACTIONS AND INTERDEPENDENCE

To a very great extent, ecology is concerned with the complexity of interrelationships between species, and the dynamics of these at population, community and ecosystem levels. Similarly, the case studies of seed-collecting and honey-harvesting discussed above demonstrate local empirically-tested observations regarding the relationships between two completely different kingdoms of the natural world, i.e. insects and plants. This includes: an understanding of the different plant species producing seeds appropriate for a variety of seed-harvesting ants; the importance of the availability of these seeds in maintaining populations of these ants; and a consideration of the plant species, such as *Curroria decidua*, *Aptosimum* spp. and various species of Acanthaceae, which are favoured by bees in their harvesting of plant-nectar for the production of honey.

ECOLOGICAL DYNAMICS

The overriding environmental constraint facing inhabitants of the arid north-west Namibian landscape is its low and variable primary productivity. Baker & Mutijulu Community (1992: 174, 186) maintain that a "true appreciation of the dynamics of the ecosystem" rests with a long ancestral connection with the land. This observation is borne out by the above case studies on plant-harvester ant ecology and honey producton in which seed or honey availability is conceived as intimately related to, and driven by, termporal and spatial patterns of rainfall. In contrast, it has been contended in Rohde (1994, 1997a, 1997b), Sullivan (1996a, 1996b, 1998, in press b) and Sullivan & Konstant (1997) that the relationships between unpredictably varying productivity and local resource management in north-west Namibia are poorly understood in current rhetoric regarding 'desertification' in Namibia's communal areas (*vide* Aharoni & Ward 1997; Dewdney 1996;

Quan *et al.* 1994; Wolters 1994). Continuing to exclude local conceptions of ecological dynamics from national environmental programmes is likely to sustain these misunderstandings, as well as maintaining a hegemonic imposition of international environmental concerns driven by 'the west' (*vide* Sullivan 1999).

'SUSTAINABILITY' AS A HARVESTING PRINCIPLE

Finally, the case material suggests that harvesting resources in ways which will ensure their continued productivity is firmly entrenched within, and sanctioned by, culturally-informed harvesting practice. So, for example, when collecting seeds form harvester ant nests it is implicit that enough should be left for the ants, while non-destructive harvesting practice associated with the procurement of honey is explicitly linked with facilitating the maintenance of bee hives into the future.

The above is not to advocate a romantic view of 'indigenous technical knowledge' as a panacea for all the ills of the development process (*vide* Adams 1996:155), or to uncritically assume that farmers "abound in agro-ecological wisdom" (Richards 1995: 61). Given the general perception that a loss of ecological knowledge is associated with the onset of environmental problems (*vide* Barrow 1988; Brokensha & Riley 1986; Campbell 1986; Getahun 1974), these currently unexplored dimensions of local resource-use practice would, however, appear to have a large potential rôle to play in land-use planning in north-west Namibia. The following quotes from arid environments elsewhere reiterate the potential value that intervention *can* have in both strengthening existing customary forms of resource management, and rejuvenating the value of local ecological knowledge in pursuit of conservation. Barrow (1988: 9-10), for example, describing the role of social forestry among Pokot and Turkana pastoralists of north Kenya, states that;

"... an aspect of any arid lands forest project should include finding out what the traditional knowledge base is concerning trees, what the people perceive as the problems and what the solutions might be. This can then form a rational base for social forestry interventions in the arid lands and help to ensure the long term success of any such venture. However this does demand a sensitive understanding of the area and its people, a long term involvement and the development of an extension approach based on awareness of values and solution finding."

Similarly, Little & Brokensha (1987: 207), with reference to Maasai, Il Chamus and Mbeere range and forest resources of Kenya state that,

"... many remnants of the indigenous management systems still exist ... and producers of these regions maintain a sophisticated knowledge of the environment. As was the case with many colonial programmes, however, many donor-funded natural resource programmes fail to build upon, or even to acknowledge, local practices and knowledge. Yet these projects usually require producers to invest their own labour ... in conservation activities that may be less viable than existing practices and that may be implemented with no real local participation in decision-making".

Emphasising the rôle of formally trained ecologists in supporting the technical value of local ecological knowledge among Aboriginal populations of north-central Australia, Baker & Mutijulu Community (1992: 187) assert that;

"A primary area of concern is the pace at which indigenous knowledge is being lost. Many Aboriginal people are trying to pass on their knowledge, but are at times confounded by young people who have embraced the European view that such knowledge is no longer relevant or valued ... There are also many instances where young Aboriginal people no longer have the opportunity to interact with their land and their elders. Ecologists have an opportunity to assist Aboriginal

people to maintain their knowledge by promoting its validity."

The opinions expressed in these statements apply vividly to the natural resources situation in north-west Namibia. At the very least, an awareness of diverse resource-use practices and of accompanying ecological knowledge could provide an *entrée* into dialogue regarding the environment which is both culturally-meaningful and ecologically appropriate.

Over and above the ways in which local environmental knowledge can contribute to context-specific, conservation-oriented policies and initiatives, however, are issues of representation and power: of whose knowledge is occluded in instances of 'development' based on natural resources, and of how this sustains the marginalisation of particular groups of people in terms of access to decision-making power enabling self-determination within current policy settings. Recent well-meaning assertions that a breakdown of local resource management practices is due to politically unjust historical processes rather than to any innate failing on the part of indigenous Namibians, only further a negation of the contemporary existence and relevance of culturally-informed resource-use knowledge and practice. As such, they pave the way for intervention which overlooks the existence of relevant local ecological knowledge. They also justify a continuing (pre-independence) conservation focus on commercially and internationally valued constituents of biodiversity, i.e. large mammals, rather than on the wider 'community' of socially-constituted resources with immediate value to local livelihoods.

This is not to suggest that animal wildlife is not important in conservation terms. Or that Namibia's communal area inhabitants should not benefit from, and have decision-making control over, the revenue and products accruing from its consumptive and non-consumptive uses. Instead, it is to say that, because animal wildlife is an historically highly politicised resource which is conventionally associated with and controlled by men, then framing conservation initiatives around access to and management of large mammals fundamentally constrains who participates in dialogue around these initiatives (*vide* also Sullivan, in press a). Drawing out those within a 'community' who are confident in discussion regarding high-profile animal wildlife, formerly firmly under the control of a paramilitary-style state sector, may thus exclude potential contributions to 'community-based conservation' by individuals who have maintained the deepest connections to land and other local resources. Moreover, by overlooking the broader diversity of resources currently used by communal area inhabitants, and depending on the exclusionary power of 'communities' constituting newly gazetted conservancies, recent conservation initiatives focusing on animal wildlife may actively constrain people's use of the wider environment. As described in this paper, for example, Damara herders can travel substantial distances to gather resources from ancestrally known locations where they consider themselves to have access and usufructuary rights. Given the rhetoric of participation, empowerment and proprietorship infusing current conservation and rural development plans and projects, it is important that these rights are represented and protected. The silencing of local ecological knowledge regarding the diverse natural resource base utilised in north-west Namibia, combined with a nationally and internationally-driven focus on specific components of biodiversity, however, suggests that these rights may be compromised.

I have tried to illustrate elements of Damara 'citizen science' pertaining to specific suites of resources, and to draw out conceptual parallels between this and western science and resource management criteria. Not surprisingly, the conclusion is that those with a long history of living within, and reaching a pragmatic and

socially constituted understanding of, the landscape of north-west Namibia have much to contribute regarding contemporary environmental initiatives in this area. Specific examples relate to concepts such as species diversity, ecological and population dynamics, sustainability and property rights. Instead, however, the potential significance of culturally-implicit knowledge and practice regarding land and natural resources is deeply undermined by current liberal framing of traditional systems of common property as having been eroded through the alienating policies of this century's colonial and apartheid administrations. A re-focusing of 'community-based conservation' efforts so that they explicitly incorporate the full range of resources used and valued by a broad spectrum of people might further a matching in practice of the inclusive rhetoric of 'community-based natural resources management'.

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END NOTES

[1]An Afrikaans expression, literally translated as 'field-food'.

[2]Given current discussion over the rights of traditional leaders *vis à vis* the constitutional government, an additional factor might be the "political reality that recognition of effective land management practices will give traditional authorities an avenue to claim control over communal land" (E. Marais pers. comm.).

[3] The implications of knowledge and practice surrounding a third group of natural resources, plant perfumes gathered and used by women, is discussed elsewhere (Sullivan in press a), stressing gendered aspects of resource-use and the way that these can be translated into community-based conservation projects.

[4] All notes in Damara are written as transcribed by my field assistant, Suro Ganuses. As such, the orthography may not be as detailed or accurate as elsewhere (*vide* Eiseb *et al.* 1991; Olpp n.d.). Similarly, complications are introduced by dialectical differences related to geographical location and lineage of individuals; consequently, Damara-speaking people from other areas may use and hold substantially different names and knowledge relating to natural resources. Given these constraints, every effort has been made to notate Damara names and stories as faithfully as possible. Nb. For typographic reasons long vowels are represented with a double vowel rather than a macron above a single vowel so that ǂhā becomes ǂhaa (*vide* Eiseb *et al.* 1991). Tone is not marked.

[5] It is recognised that the definition of a 'household' is notoriously problematic, particularly for relatively mobile herding peoples. The definition used for this survey was of all individuals consuming food prepared at the same cooking fire. This normally comprised individuals related as kin in some way but could also include unrelated individuals such as adopted children and casually employed herders. Focal households in many cases constitute part of larger family clusters or ǁgâudi, described by Fuller (1993:142) as "the unit which collectively controls ownership of productive resources". Beyond this, 'cooking units' and ǁgâudi are not isolated units but are part of a wider sphere of kin called ǂn"khoen (*vide* Fuller, 1993) which supports a continual movement of resources and people between broadly related households.

[6] *Vide* Appendix 1 for nomenclatural authorities and families for all Namibian plant species mentioned in this paper.

[7] *Vide* descriptions in O'Connell *et al.* (1983) for the Alyawara of north-central Australia and Veth & Walsh (1988) for the Martujarra of the Sandy Deserts, Western Australia.

[8] Predominantly the Wiradjuri, Kamilaroi, Kunggari, Iliaura, Walpiri and Wadjari of western and northern Australia, and the Martu of the Great Sandy Desert, Western Australia.

[9] *Vide*, for example, Fox (1938) who describes the importance for women's income and autonomy of Zulu and Basuto beer production, and Bishop *et al.* (1994) who illustrate this among Bayei and Hambukushu agriculturalists in Ngamiland, Botswana.

[10] At the time of the study £1 = approx. N$7; since then, deflation of the South African rand has caused devaluation of the Namibian dollar to up to £1:N$12.

[11] i.e. focusing on floristic regions where species are naturally distributed.

[12] *Survey of economic plants of arid and semi-arid lands.* Royal Botanical Gardens, Kew, London.

[13] B. Fisher (pes. comm.) elaborates that both *Messor* and *Pheidologeton* have a primary or substantial reliance on seeds, and that one group of *Tetramorium* (the *solidum*- group) has 13 species occuring in Southern Africa (including Namibia) which are know to be granivorous. *Teramorium sericeiventre* is not included in this group and is thought to be only predaceous; but we still have much to learn about the life histories of the desert and grassland ants of Namibia. In addition, *Ocymyrmex* Emery, 1886 species are granivorous, but will also attack and destroy other insects. Graminaceous ants are species that regularly use seeds as part of their diet. These species are to be distinguished from ants that gather seeds to feed on elaisomes (fatty treats attached to seeds used to motivate ants into dispersing the seed).

[14] The latter is from the dialect of the Sesfontein Purros Damara, i.e. Damara who, prior to settling in Sesfontein, inhabited and used land and resources to the north-west of Sesfontein, as far as and beyond the current settlement of Purros.

[15] *Vide* Brokensha *et al.* (1972) for the Mbeere of Embu District, Kenya; Grivetti (1979) for the Tswana-speaking Tlokwa, eastern Kalahari; Ntenga & Mugongo (1991) for the Gorowa, Iraqw and Barabaig of Babati District, north-central Tanzania; Jennings (1994) for predominantly Hehe and Wagogo, central Tanzania; Cunningham (1996) for beekeeping and honey hunting by Bakiga agriculturalists and Batwa hunter-gatherers around Bwindi Impenetrable Forest, Uganda.

[16] Video footage of honey-harvesting by a contemporary Damara harvester from Sesfontein can be found in Mokobo Video and Research and NBC (1996).

[17] This continues a trend set prior to independence when Himba were encouraged to move into the area (Fuller pers. comm.).

[18] An example of this is the Damara classification of the shrubby tree *Cordia sinensis*. During this study all informants adamantly maintained that this encompassed two completely different, although closely related, plants referred to as !khoos and !ais respectively and recognised from their habitat preferences, different physical characteristics and qualities of their edible fruits. The former, for example, are found on relatively rocky substrates, have small, rounded leaves, are generally less spreading in growth habit, and have smaller fruits which are the preferred of the two. The latter occupy alluvial soils in better watered areas, have elongated leaves, a more spreading habit and the fruits are bigger but filled with a sticky pulp which makes them rather less pleasant to eat. The pulp, in fact, is used additionally as a substitute for paper-glue by school-children! It is likely that all of these differences can be attributed to different habitats; however, the possibility that these two forms may represent either different species or two sub-species of *C. sinensis* is an interesting taxonomic question warranting exploration.

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Appendix 1. Nomenclatural authorities and families for Namibian plant species referred to in this paper (following unpublished list by the National Botanical Research Institute, 1996; *vide* also Kolberg *et al.* 1992). Listed in alphabetical order for ease of reference.

ACANTHACEAE
Ruellia L.

BORAGINACEAE
Cordia sinensis (= *C. gharaf* sensu FSWA)

BURSERACEAE
Commiphora anacardiifolia Dinter & Engl.
C. glaucescens Engl.
C. multijuga (Hiern) K.Schum

FABACEAE
Colophospermum mopane (Kirk ex Benth.) Kirk ex J. Léonard
Indigofera L.

GERANIACEAE
Monsonia umbellata Harv.
M. senegalensis Guill. & Perr.

MORINGACEAE
Moringa ovalifolia Dinter & A.Berger

PERIPLOCACEAE
Curroria decidua Planch. ex Hook.f. & Benth.

POACEAE
Aristida cf. *effusa* Henrard
Chloris virgata Sw.
Danthoniopsis dinteri (Pilg.) C.E.Hubb.
D. ramosa (Stapf) Clayton
Enneapogon desvauxii Beauv.
Eragrostis cf. *annulata* Rendle ex Scott-Elliot
E. cf. *cylindriflora* Hochst.
Kaokochloa nigrirostris de Winter
Monelytrum leuderitzianum Hack.
Schmidtia Steud. ex J.A.Schmidt
Setaria finita Launert
S. verticillata (L.) Beauv.
Stipagrostis Nees
S. cf. *damarensis* (Mez) De Winter
S. cf. *hirtigluma* (Trin. & Rupr.) De Winter *hirtigluma*
S. cf. *hirtigluma* (Trin. & Rupr.) De Winter *patula* (Hack.) De Winter
S. hochstetterana (L.C.Beck ex Hack.) De Winter *secalina* (Henr.) De Winter
S. cf. *obtusa* (Delile) Nees
S. cf. *uniplumis* (Licht.) De Winter

SCROPHULARIACEAE
Aptosimum Burch. ex Benth.

STERCULIACEAE
Sterculia africana (Lour.) Fiori