# CHANGES IN NATURAL RESOURCE USE AMONG OWAMBO AGRO-PASTORALISTS OF NORTH-CENTRAL NAMIBIA RESULTING FROM THE ENCLOSURE OF LOCAL FRONTIERS

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ABSTRACT Agro-pastoralists living in arid lands of Africa tend to have highly mobile lifestyles and to use natural resources widely and sparsely. Thus, they require frontiers with low population densities and sufficient natural resources. However, this study found that the enclosure of the local frontier has prompted social changes, such as the setting of conservation areas and the construction of new villages. The aim of this study was to clarify how Owambo agro-pastoralists living in north-central Namibia have changed their use of natural resources in response to transformations to the local frontiers they inhabit. The Owambo group consists of a number of subgroups. Some of these groups formed small kingdoms; most group members live at the kingdom's center surrounded by the frontier at the periphery. Since the 1970s, other people have migrated into these frontier areas and altered the local conditions, forcing inhabitants to change their use of natural resources. Local inhabitants have coped with this situation in three main ways: (1) wealthy people have established private cattle posts in the frontier where they graze their livestock and gather natural resources, (2) some (especially non-wealthy people) have started to use indigenous fruit trees in multiple and intensified ways, not only for their fruit but also as building materials and wood for fuel, and (3) older villagers have established social networks with newer villagers on the frontier to exchange goods that are available only from their respective areas. The progress of people who can access the natural resources in the frontier has been limited by the enclosure of the local frontier. However, local customs involving the reciprocal exchange of surplus natural resources among neighbors and neighboring areas remain and have been adapted in response to the new situation.

Key Words: Frontier; Natural resource use; Intensification; Arid land; Ovambo; Namibia.

## INTRODUCTION

The arid land that characterizes the physical environment of north-central Namibia is too severe for many plants to survive, rendering vegetation vulnerable to human activities. In addition, precipitation is variable and undependable from year to year, so people adapt their lifestyles to the dry environment. The people who live in the arid lands in Africa have thus generally developed lifestyles characterized by the sparse use of land and natural resources, seasonal pastoral movement, and shifting cultivation patterns, and consequently have had little impact on the environment. Moreover, high social mobility in conjunction with migration and migrant labor, a feature of most of African society, also plays a role in minimizing the impact of human habitation (e.g., Little, 2003). Such a lifestyle is supported by the existence of vast local frontiers, or areas

with low population density surrounding individual societies (Kakeya, 1999). In general, natural resources remain concentrated at the frontiers, whereas the ecosystems at the centers of these societies are strongly influenced by human activities and thereby form different, semi-artificial ecosystems. Therefore, people who live at the centers usually use natural resources from the frontier.

The concept of the frontier was discussed by Turner (1893), who showed the impact that exploitation of the frontier had on nation building in the United States of America and on the creation of a national identity. Regarding Africa, Kopytoff (1987) showed the relationship between the creation of society and the frontier. He pointed out that frontiers were important locations at which "new" societies in Africa could germinate and develop. Such research indicates the importance of frontiers in terms of lifestyle and social change to the societies that inhabit Africa's arid lands.

However, the vastness of the frontier has been reduced in recent years because of population increases, the settling of conservation areas in which people are not allowed to use natural resources, and land privatization. The reduction in frontier size is a great concern from the perspective of nature conservation. For example, research on land-use change based on satellite images taken over a period of years has shown the reduction of the frontier and the degradation of the natural environment. This has led to the argument that governments should regulate the use of frontiers and human settlement in such areas. However, such an argument is apt to ignore the fact that such frontiers form the basis of local lifestyles, leading to conflict between the practical needs of human settlers and the conservation of natural resources.

The reduction or degradation of frontiers may have a serious impact on inhabitants' ability to live in harmony with the natural environment. Many people of different backgrounds live in the frontiers and use natural resources in different ways (Kopytoff, 1987). Thus, human impacts on the natural environment may be complex in frontier areas.

This paper aims to clarify the impact of the reduction of a local frontier on the lifestyles of its human inhabitants by focusing on the changes in these inhabitants' use of natural resources in the frontier. This research was conducted in north-central Namibia among the Owambo agro-pastoralists. Research on natural resource use by the Owambo has been conducted with ethnographic approaches (Siiskonen, 1990; Tönjes, 1996; Williams, 1994) and ethnobotanical approaches (Rodin, 1985; Marsh & Seely, 1992). Results have shown that natural resource use varies among Owambo subgroups because of variations in the natural environment, differences between groups, and differences in the distances of the groups from town. In addition, Kreike's (2004) elaborate research showed historical changes in land use, the environment, and the society of the Kwanyama people, a subgroup of the Owambo, from the late 19th to the late 20th century. He pointed out the importance of the frontier in creating Kwanyama society. In the late 20th and early 21st century, however, the conditions and environment of the frontier have changed considerably, and some Owambo people have had to change how they use natural resources from the frontier.

In this paper, I clarify how the frontier conditions changed from the late 20th to the early 21st century and how people both caused and responded to these changes, paying particular attention to natural resource use.

I first discuss the creating of the frontier among the Kwambi society, focusing on how they changed the conditions of the frontier during the 1970s. Next, I show changes in natural resource use between the 1970s and today as revealed through interviews with elders. Then, I discuss how people are coping with these changes in frontier conditions.

## RESEARCH METHODS

I conducted fieldwork at U village in the Oshana Region, north-central Namibia, from September 2002 to March 2003, September 2004 to April 2005, and February 2007 to April 2007. During the field research, I resided in U village and observed natural resource use, subsistence, and daily activities. To clarify the changes in natural resource use, I interviewed homestead owners and their wives in 30 households of U village, asking about folk terms for the place where people use the natural resources and asking about resource use during the 1970s and during the time of fieldwork. To learn about resource use in the 1970s, I interviewed two elderly men born in U village (one 62 years old and the other around 70) and two elderly women, also born in U village (one 70 years old and the other around 70) about their life histories.(1) I also interviewed a number of household members and surveyed the economic conditions of the households, such as the number of persons employed, total income, participation in economic activities (e.g., selling crops and livestock), number of livestock, and management of a cattle post. In addition, in 2002 and 2004, I counted the number of livestock per household and measured the areas of cattle posts and farming fields using a hand-held receiver of global positioning system (GPS).

To evaluate vegetation, in 2002 I counted and measured all trees taller than 4m on the land belonging to 32 households to analyze the tree structure of the canopy layer (about 90.3ha of fields and about 91.0ha of bush). The heights of palms were measured from the ground to the terminal shoot, excluding the leaves. I also counted and measured the number of trees that had been cut down, and I questioned householders about their reasons for felling the trees.

From February to March 2007, I asked people to record their experiences of gifting marula brew in a notebook to determine the frequency of the use of this particular gift.

## RESEARCH AREA

U village is located in a suburban area 10km west of the town of Oshakati, which is the central town of the Oshana Region. The population of the Oshana Region is approximately 161,916, and population density is 18.7/km$^2$ (Republic

of Namibia, 2003). The population in the same region in 1991 was 134,884 (Republic of Namibia, 1995); thus, the population had increased by 20% over a 10-year period. Many seasonal rivers flow in this region from north to south (Fig. 1), and during the rainy season from December to March, floods come from the north. The mean annual rainfall is 400–500mm, concentrated in the rainy season (Mendelsohn et al., 2002). According to the 2001 population census, the population of U village is 590 (97 households). The dominant ethnic group in this area is the Owambo. The Owambo are agro-pastoralists who migrated into this area from the northeast (Williams, 1994). The name "Owambo" is a generic term, and the group contains subgroups. Most of the residents of U village belong to the Kwambi, one of those subgroups (Williams, 1994). The Kwambi people live in units of nuclear or extended families residing in the same homestead. Traditionally, they practiced polygamy, but in recent years, monogamy has dominated. Thus, in most recent cases, the members living in one homestead corresponded to the unit of household, which is the unit of food consumption. They build homesteads apart from other homesteads, forming scattered settlements.

People move their homesteads upon the death of the household head; therefore, the membership of a village tends to be fluid. In recent years, however, people have seldom moved their homesteads. The Kwambi build their homesteads on banks between seasonal rivers and set fields around them. They cultivate crops such as pearl millet, sorghum, and cowpeas. Crops are usually sown in December and harvested in May. During the growing season, cultivators generally weed their fields with hoes, taking care not to cut down young fruit trees. During the dry season, the Owambo graze cattle and goats around the village and in their fields as well as on grazing land about 30km away. In the rainy season, they bring their livestock back to the village.

People mainly use natural resources as building materials, fuel, food, drink, and tools. The Owambo people build complex homesteads (*egumbo*) composed of some huts, the outer palisade, the inner palisade, and the livestock enclosure

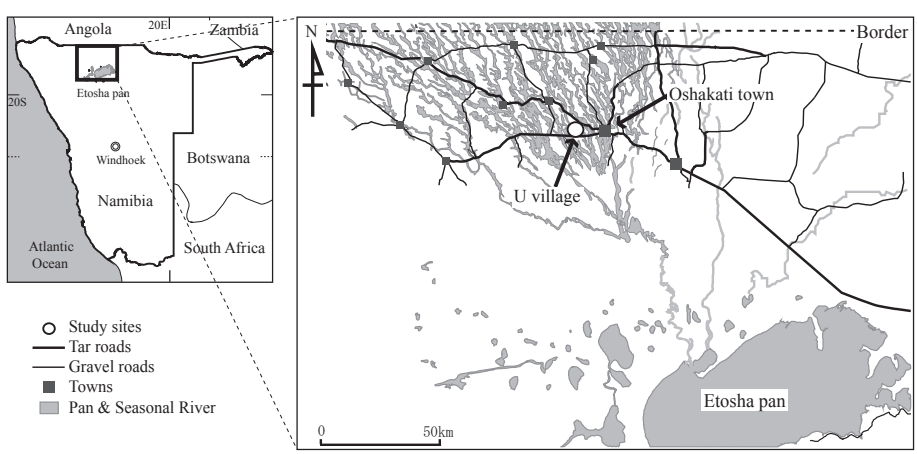


**Fig. 1.** Research area.

(kraal). They use a great many logs to build the homestead and kraal (Loeb, 1951; Fujioka, 2005). The use of natural resources for fuel, food, and drink varies considerably. They usually eat food two or three times a day. Their staple food is pearl millet (*mahangu*), which they cook for their daily meal of *oshithima*, which is made by stirring flour into boiling water. *Oshithima* is usually eaten with a single side dish at each meal. Various natural resources are used as side dishes, such as livestock products, fish, wild animals, insects, and wild leaves. People use tree branches or cattle dung as everyday fuel for cooking. For beverages, they usually make *oshikundu* from pearl millet flour and sorghum seeds. People also make various alcoholic brews such as *omagongo*, made from marula fruit, *omalovu*, made from sorghum, and liquor such as *ombike*, made from palm fruit. The time for making *ombike* and *omagongo* varies depending on when the fruits are ripe. In addition, people use natural resources to make various tools, including baskets, granaries, mallets, mortars, and clay pots.

In Kwambi society, people commonly recognize a certain manner of reciprocal help, which is called *ethipa lyothingo* (literally, neck bone). Two meanings are contained in this phrase: (1) when people slaughter their livestock, they should give away livestock meat, which is hung around the necks of their neighbors; and (2) households should strongly connect with one another, like neck bones. People of different households help one another with daily labor and give surplus food, such as meat, milk, and edible insects, to other households. This practice functions to increase the opportunities for households to obtain food and to maintain social relationships within and outside the village.

Namibia was colonized by Germany in 1884, but from 1920 until 1990, it was under the control of South Africa (South West Africa at that time). Under South African rule, the land was divided into two sections: the land for native people (which was established as the homeland after the 1960s) and the land for new settlers (freehold land).[(2)] Most Owambo villages are distributed within the homeland (Ovamboland). The colonial government permitted the ownership of private land in the freehold land, but not in the homeland. The homeland was managed by "native nation," which was introduced by the colonial government to provide indirect rule. That organization was composed mainly of senior headmen and headmen who managed the land and national resources in each village. After independence, the two-land system remained but with changed names: Communal Land (formerly the homeland) and Commercial Land (formerly the freehold land). The "traditional" land management system remained in national law,[(3)] which coexists with local authorities. This system was uncertain and unpredictable before independence, and consequently, a stronger consciousness in terms of land ownership emerged among the Kwambi. People, who voluntarily constructed fences around "their" land, which they only had on a usufruct basis. Moreover, land usufruct has been inherited in recent years, showing that the notion of private rights to land use has intensified.

Another change in Kwambi society in recent years has been the increased economic disparity among households. During the colonial era, many men were

recruited by colonists to work in cities and on commercial farms as contract labor. Their movements were controlled by the authorities, and they experienced inhumane conditions (Hishongwa, 1992).

## CREATING THE FRONTIER AND CHANGES SINCE THE 1970S

### I. Creating the Frontier

In this paper, I define the frontier of the Kwambi from several perspectives: as the "central" residential area emerging from the historical construction of the kingdom, as involving political regimes (such as colonial rule and state building), and in terms of differences in the ecological environment. Although the spatial range and the meaning of local frontier might be tied historically to the political situation, the purpose of this paper is not to examine in detail historical changes to the frontier.(4) I now outline the process of creating the frontier of Kwambi.

After the Owambo migrated to this area, they lived in loose gatherings by subgroup, and kingdoms were formed(5) among especially large subgroups, such as the Kwanyama, Kwambi, Ngandjera, Ndonga, and Kwaluudhi. However, the Owambo's basic unit of economic production was the homestead, which was composed of family members, and homesteads were sparsely distributed over wide areas; thus, it was considered that "there were no true villages in the Owambo communities" (Siiskonen, 1990: 44–45). Therefore, Owambo kingdoms might not be concentrated like other big African kingdoms. However, it was considered that "the inhabited areas were composed of uniform populations clustered, separated from one another by woodland zones" (Siiskonen, 1990: 41). The political structure of the subgroup was built around the hereditary king (*omukwaniilwa*; Siiskonen, 1990: 45), and the king's residence might be at the center of the inhabited area.(6) Areas of low population density and available natural resources surrounding the inhabited areas made up the frontier of each subgroup, but these frontiers were not freely accessible to anyone. Access to natural resource use in areas peripheral to the kingdom was free within the territory,(7) which was divided between kingdoms. The Kwambi people could use natural resources south of the center of their kingdom. Thus, this area to the south of the center of the Kwambi kingdom is regarded in this paper as the frontier area of the Kwambi.

The relationships among ethnic groups might be the product of natural resource use in the frontier. Around this area were groups such as the Himba, Herero, Kavango, and Hai||om. The Kwambi people had deep relationships with the Hai||om people (*kwankala* in the Owambo language),(8) the hunter-gatherers who lived in the southern part of the Kwambi's inhabited area. The Kwambi kingdom fell under the rule of *kwankala* at the beginning of its history, and the Kwambi king was obliged to marry a *kwankala* woman (Williams, 1994:

125). With each new Kwambi king, the relationship between the *kwankala* and Kwambi changed, as it did with the construction of colonial rule and state building (Williams, 1994: 125–132, 159–163). According to interviews with senior residents of U village, they rarely saw the *kwankala* in the 1970s in the southern part of the inhabited area. It was considered that the *kwankala* people were not strongly restricted to the natural resource use of the Kwambi people.

The Kwambi people's kingdom lasted until 1932 under South African rule; after that, the "new" political organization based on the kingdom's organization was introduced for indirect rule. Moreover, the Owambo people were exploited as labor for white settlers as they had been during the German colonial period, and official recruiting companies were established in 1926. Most of the Owambo's inhabited area was designated as homeland under the segregation policy, and the movement of Africans was controlled by various regulations and proclamations (Hishongwa, 1992). The Police Zone was established in 1919 to restrict and contain the mobility of both people and animals (Mendelsohn et al., 2002). Thus, the Owambo's area became the marginal area of the colonial government, although there was a strong connection with the colonial government remained through the contract labor system.

Etosha National Park was established in 1907 around Etosha pan, south of the Owambo kingdoms, because a lot of wild animals live there. Etosha National Park is surrounded by fences, and people cannot enter in to obtain natural resources. Thus, the frontier of the Kwambi kingdom was historically constructed of frontiers of various levels, such as the frontier of the colonial regime, the frontier of the kingdom, and the frontier of the various ethnic groups. Ultimately, it was gradually enclosed by Etosha National Park and the colonial governing system.

The frontier of Kwambi society can also be defined by the ecological environment. The local vegetation was once classified as mopane savanna (Giess, 1998), which was dominated by mopane (*Colophospermum mopane*), a member of the Fabaceae family. However, Mendelsohn et al. (2000) discovered several patches of vegetation that were dominated by acacia (*Acacia arenalia*), which belongs to the Mimosaceae family. The distribution of acacia has a pattern similar to the distribution of the Owambo kingdoms (Fig. 2), implying that this vegetation was cultivated by people. Previous studies have demonstrated that this vegetation formed as a result of bush encroachment (Mendelsohn et al., 2000; Strohbach, 2000) and that the overuse of mopane timber by the Owambo led to vegetation degradation (Erkkilä & Siiskonen, 1992; Erkkilä, 2001). Thus, vegetation varies between the center of the kingdom and the frontier because of the historical impact of the uses of vegetation at the center of the kingdom.

The Owambo people encouraged the growth of numerous useful trees bearing edible fruits, such as palm (*Hyphaene petersiana*) and marula (*Sclerocarya birrea*) trees and created unique vegetation dominated by palm, marula, and acacia trees (Cunningham, 1997; Kreike, 2003; Fujioka, 2005). Previous research at U village showed that 91% of tall trees in 2002 were palm and marula trees (Fujioka, 2005).

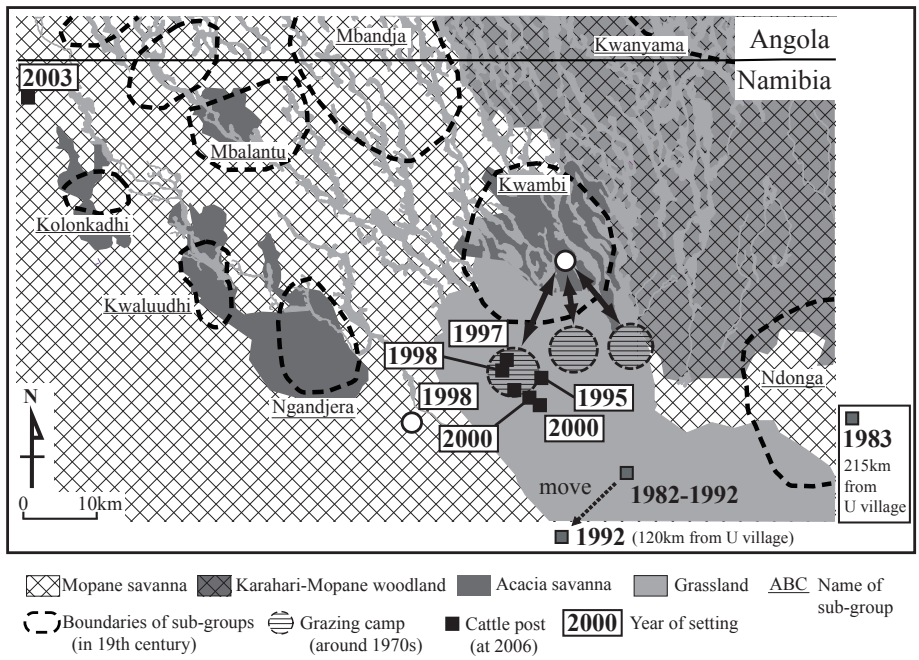


**Fig. 2.** Vegetation in north-central Namibia and locations of grazing lands.
Vegetation distribution in 1997 according to Mendelsohn et al. (2000). Distribution of ethnic groups according to Siiskonen (1990). The locations of various subgroups around the end of the 19th century and beginning of the 20th century are shown. Location of cattle posts surveyed using hand-held receiver of GPS. Location of temporary grazing camps in the 1970s according to interviews and hand-held GPS.

The Kwambi people recognize numerous differences in landscapes, referring to them using different folk terms (Fig. 3). Within and near the village, a seasonal river covered by grass is *oshana*, the slight upland-like sandbank where shrubs (especially acacia trees) grow is known as *eputa*, a field is *epya*, a small pan in an *oshana* where water remains until the late dry season is *ondombe*, and a slight concave place on *eputa* where the tall grass grows is *lonzi*. The *eputa* and *epya* also feature many palm and marula trees, and these species became important characteristics of these landscapes (Fig. 4). These landscapes emerged at the center of the Kwambi kingdom. Grasslands extending southward from U village are known as *ombuga*, and mopane forest is called *okuti*. According to interviews with senior residents of U village, in the 1970s people rarely lived around these landscapes, which were spread over the southern part of the Kwambi kingdom. People tended not to use natural resources from these areas, and thus, the resources were unfamiliar to the people living near the center of the kingdom. The definition of frontier used in this paper is grounded in the *ombuga* and *okuti* landscapes. The natural resources gathered from each landscape are also different.

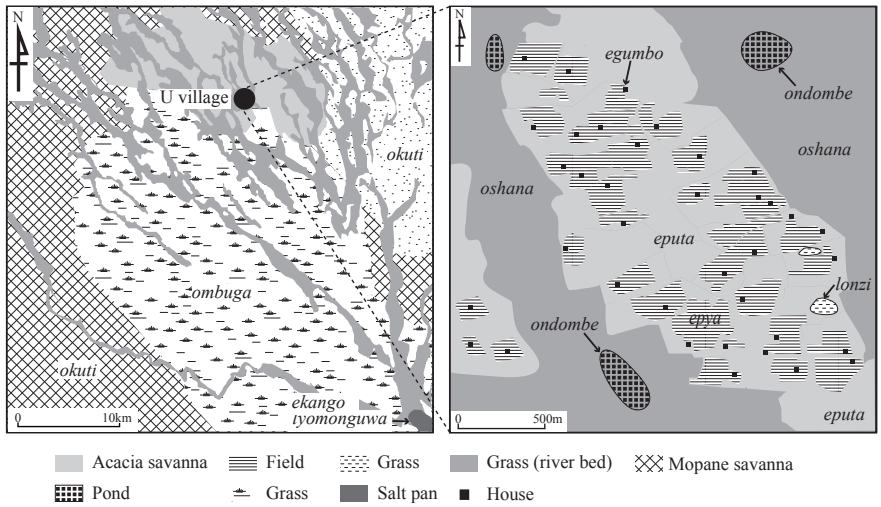


**Fig. 3.** Folk terms of vegetation around village of Kwambi.
Distribution of vegetation according to Mendelsohn et al. (2000). Distribution of fields and homesteads as surveyed in 2004 using a hand-held receiver of GPS.

**Fig. 4.** Palm trees and marula trees growing in the fields (dry season, September 2004).

## II. Enclosure of the Frontier since the 1970s

After the 1970s, some people born in villages at the center of the Kwambi kingdom migrated to *ombuga* and *okuti* to establish new villages. This phenomenon occurred in most of the four regions; for example, the farmland around the Okalongo area on the northern central side increased more than 9% per year from 1943 to 1964 and 2% from 1964 to 1996, and that around the Okahao and Tsandi area on the western side increased 3% per year from 1964 to 1970 and 2% from 1970 to 1996 (Mendelsohn et al., 2000). In addition, Erkkilä (2001) documented the expansion of homestead and agricultural land on the eastern side. The Kwambi people first migrated to O village, one of the new villages where U villagers collected natural resources in *okuti*, in 1971. In the following years, the increasing number of migrants brought the population

to 670 people in 2002 (Uno, 2005). From 1970 to 2002, land use around O village changed, homesteads and crop fields increased markedly, and 13.8% of mopane savanna was transformed into crop fields (Fig. 5). Residents of O village said that the reasons for migration were land shortages, the search for grazing places, and the intensification of the war for independence. These new villages have increased in *ombuga* and *okuti* since the 1980s, and headmen have been assigned to the new villages. Some people migrated into *ombuga* and *okuti* to avoid conflict between the South African army and the SWAPO (South West Africa People's Organisation) army during the war for independence (Erkkilä, 2001: 43–47).[9] Thus, the frontier area had been enclosed by the creation of the national park and colonial governing system since the colonial era, and the enclosure of the local frontier was accelerated by the migration of local peoples.

As a result, villagers started to use natural resources around their new villages, and these villagers agreed with Kwambi headmen to the priority rights to natural resource use. After this, the people living at the center of the Kwambi kingdom found it more difficult to use the natural resources of *ombuga* and *okuti*.

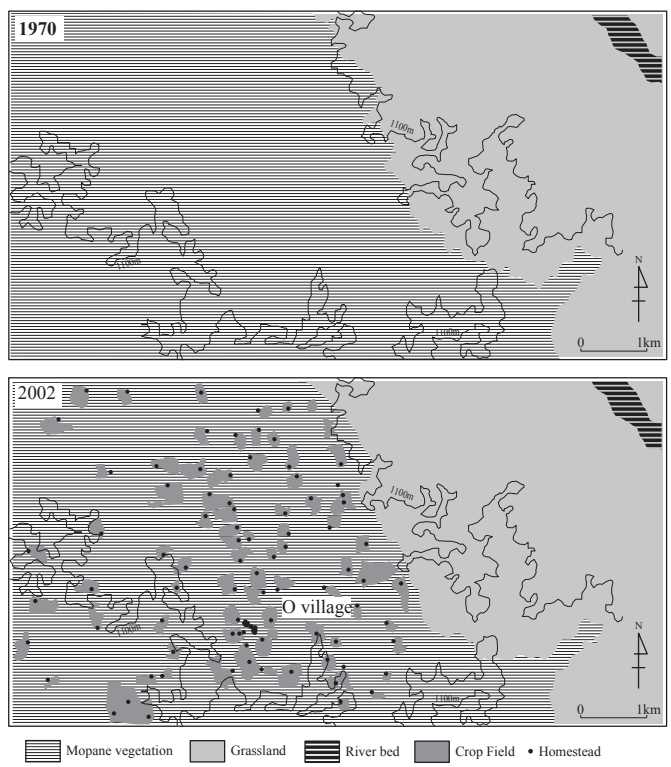


**Fig. 5.** Change in land use at O village during 1970 to 2002.
This figure was drawn based on aerial photo from 1970, field survey data from 2002, and satellite images. Contours were drawn using a DEM (Digital Elevation Model). Only one contour line is shown based on contours every 10m.

## CHANGES IN NATURAL RESOURCE USE IN THE FRONTIER

### I. Natural Resource Use in the Frontier by the Kwambi People in the 1970s

Prior to the 1980s, one of the important uses of the frontier was as a temporary grazing camp in the dry seasons. People in U village grazed their livestock, including cattle, goats, sheep, and donkeys, around the riverbeds of seasonal rivers from the beginning of the rainy season to the middle of the dry season, which is the busiest time for crop farming. After the crops were harvested, the people grazed livestock inside the fields. At the end of the dry season, livestock, especially cattle, were moved to grazing land about 30km south in *ombuga* (Fig. 3) because of the lack of pasture around the village. The Owambo people established such temporary grazing camps around these areas, which were called *ohambo*. The herders who stayed in the *ohambo* used pearl millet flour for their daily meals and also caught wild animals such as springbok and kudu to eat. The location of this grazing land was decided by each group, and the U villagers mostly used three different locations (Fig. 3). This seasonal migratory grazing was one feature of the traditional Owambo pastoral system (Siiskonen, 1990).

The frontier area was also the place for gathering natural resources that could not be obtained near the village. A list of natural resources used by U villagers in the 1970s is given in Table 1. *Okuti* was the place for gathering mopane timber. The acacia patch vegetation prominent today replaced mopane vegetation, but when this transition occurred is not known. According to four elderly villagers (see "Research Methods"), there were very few mopane trees around the village during their childhood. Therefore, U villagers gathered mopane logs in other places to use for building homesteads and kraal. Almost all households (88%) in U village collected mopane from the southern *okuti* until the 1970s (Fujioka, 2005). In the dry seasons, once every several years, they went to *okuti* with donkey carts and brought logs back to the village. In addition, the Kwambi people took natural salt from the pan around Oponono Lake in *ombuga* in the dry seasons, also using donkey carts. According to an elder in U village, they brought some salt rocks each time, and they did not go every year. They also obtained thatch grass for making hut roofs from *lonzi* and *ombuga* in the dry seasons.[10] In these ways, people utilized natural resources in dry seasons.

However, they also used natural resources around U village, such as *epya*, *eputa*, and *oshana* (Table 1). For fuel, they used mostly acacia trunks, which grew in *eputa*. At that time, there were fewer homesteads in U village than there are now, and more acacia grew around the homesteads.[11] People also gathered various fruits from wild trees to eat and to use in fermenting brews. Palm and marula fruits were gathered for brewing liquors of *ombike*, made from palm fruit, and *omagongo*, made from marula fruit. In addition, they used palm leaves to make baskets, and they occasionally cut trees to make tools such as cooking instruments and mortars.

**Table 1a.** Natural resources used by U villagers.

| Utilization Methods | | Item | Name | Scientific Name | Part | Folk Term of Material (Product) | In 1970s | | 2004-5 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Frequency type | Place of getting | Frequency type | Place of getting |
| Food & drink* | Food | Plant | wild leave | *Cleome gynandra* | leave | *omboga* | 3 | epy | 3 | epy |
| | | | wile leave | - | leave | *ekwakwa* | 3 | epy | 3 | epy |
| | | | palm | *Hyphaene petersiana* | fruit | *ondunga* | 3 | epy, ep | 3 | epy, ep |
| | | | marula | *Sclerocarya birrea* | fruit | *ongongo* | 3 | epy, ep | 3 | epy, ep |
| | | | wild fig | *Ficus sycomorus* | fruit | *onkuyu* | 3 | epy, ep | 2 | epy, ep |
| | | | bird plum | *Berchemia discolor* | fruit | *ombe* | 3 | epy, ep | 3 | epy, ep |
| | | | jackal berry | *Diospyros mespiliformis* | fruit | *onyandi* | 2 | ep, epy | 2 | ep, epy |
| | | Animal | kudu | *Tragelaphus strepsiceros* | | *osholongo* | 2 | om, ok, oh | 4 | om, ok, oh |
| | | | springbok | *Antidorcas marsupialis* | | *omenye* | 2 | om, ok, oh | 4 | om, ok, oh |
| | | | hedgebok | *Atelerix frontalis* | | *okanikitha* | 2 | ep, epy, os | 2 | ep, epy, os, ok |
| | | | a kind of rat | - | | *ombuku* | 2 | epy | 2 | epy |
| | | Bird | guineafowl | *Numida meleagris* | | *onkanga* | 2 | ok, oh | 4 | ok, oh |
| | | | others (small birds) | - | | - | 2 | ep, epy, os | 2 | ep, epy, os |
| | | Insect | rhinoceros beetle | *Orictes boas* | grub | *endangali* | 3 | og | 3 | og, oh |
| | | | tussock moth | - | larva | *okanangole* | 3 | ep | 0 | |
| | | | emperor moth | *Heniocha* sp. | larva | *okatalashe* | 0 | | 3 | ok, oh |
| | | | giant jewel beetle | *Sternocera orissa* | adult | *engo* | 2 | ep | 0 | |
| | | | stink bug | *Coridius viduatus* | nymph, adult | *onkili* | 3 | epy | 3 | epy |
| | | | cicada | *Platypleura liadiana* | adult | *enbulunyenye* | 2 | ep | 0 | |
| | | | hawk moth | *Celerio liaeata* | larva | *enanpalo* | 2 | os, om | 2 | os, om |
| | | | emperor moth | *Imbrasia belina* | larva | *egungu* | 0 | | 3 | ok, oh |
| | | | emperor moth | *Gynanisa maja* | larva | *ehonkowe* | 0 | | 3 | ok, oh |
| | | Fish | catfish | *Clarias* sp. | adult | *oshi* | 3 | os, on | 3 | os, on |
| | | | other (small fish) | - | adult | *ontangu* | 2 | om, os | 2 | om, os |
| | | Amphibia | giant bullfrog | *Pyxicephalus adspersus* | adult | *efuma* | 3 | os, on, lo | 3 | os, on, lo |
| | | Reptile | tortois | - | adult | *oshima* | 2 | ok | 4 | ok, oh |
| | Liquor & Brew | Plant | palm | *Hyphaene petersiana* | fruit | *ondunga* (*okanyome/ ombike*) | 3 | epy, ep | 3 | epy, ep |
| | | | palm | *Hyphaene petersiana* | sap | (*omalunga*) | 2 | epy, ep | 0 | |
| | | | marula | *Sclerocarya birrea* | fruit juice | *ongongo* (*omagongo*) | 3 | epy, ep | 3 | epy, ep |
| | Oil | Plant | marula | *Sclerocarya birrea* | seed | (*omagadhi eengongo*) | 2 | epy, ep | 2 | epy, ep |
| | Other | | salt | | | *omongwa* | 1 | ek | 1 | ek |

**Table 1b.** (continued) Natural resources used by U villagers.

| Utilization Methods | | Item | Name | Scientific Name | Part | Folk Term of Material (Product) | In 1970s | | In 2004-2005 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Frequency type | Place of getting | Frequency type | Place of getting |
| Building materials | Hut, Palisades, Kraal | Plant | mopane | *Colophospermum mopane* | trunk | *omusati* | 1 | ok | 0 | ok, oh |
| | Hut, Palisades, Kraal | Plant | palm | *Hyphaene petersiana* | petiole | *oshipokolo* | 0 | | 3 | ep, epy |
| | Hut, Kraal | Plant | palm | *Hyphaene petersiana* | trunk | *omulunga* | 0 | | 1 | ep, epy |
| | Hut, Palisades | Plant | crop | - | stem | *oshihenguti* | 2 | epy | 3 | epy, oh |
| | Roof of hut | Plant | grass | - | leave, stem | *omwiidhi* | 1 | lo, om | 1 | lo, om, oh |
| | Floor of hut | Soil | termite mound | | | *oshaanda* | 1 | ep, epy | 1 | ep, epy |
| Tool | Basket | Plant | palm | *Hyphaene petersiana* | leave | *oshihale* (*oshimbale*) | 3 | epy, ep | 3 | epy, ep |
| | Granary | Plant | mopane | *Colophospermum mopane* | stem | *omusati* (*eshisha*) | 1 | ok | 0 | |
| | Dyestuff | Plant | bird plum | *Berchemia discolor* | root | *omuye* | 3 | epy, ep | 3 | epy, ep |
| | Fishing basket | Plant | grass | - | stem | *oshizimba* (*oshongo*) | 1 | os, ep | 1 | os, ep |
| | Pot | Soil | clay | | | *eloya* (*ombiga*) | 2 | os, on | 2 | os, on |
| Fuel | | Plant | mopane | *Colophospermum mopane* | trunk | *omusati* | 1 | ok | 4 | ok, oh |
| | | | mopane | *Colophospermum mopane* | root | *oshithindi* | 1 | ok | 4 | ok, oh |
| | | | acacia | *Acacia arenaria* | trunk | *omano* | 5 | ep | 4 | ep |
| | | | palm | *Hyphaene petersiana* | petiole | *oshipokolo* | 0 | | 5 | ep, epy |
| | | | palm | *Hyphaene petersiana* | seed | *shakulenge* | 0 | | 3 | ep, epy |
| | | | palm | *Hyphaene petersiana* | leaf sheath | *epakululu* | 0 | | 3 | ep, epy |
| | | | palm | *Hyphaene petersiana* | peduncle | *eshila* | 0 | | 3 | ep, epy |
| | | | marula | *Sclerocarya birrea* | trunk | *omugongo* | 0 | | 3 | ep, epy |
| | | Livestock product | cattle dung | | | *omapumba* | 0 | | 5 | os, ep, epy, og |
| Others | Fishbait | Invertebrate | water snail | - | adult | *ehumdju/onkonkolosa* | 3 | os, on | 3 | os, on |
| | Manure | Livestock product | cattle and goat dung | | | *uushosho* | 3 | og | 3 | og, oh |

ok: *okuti* (forest), ep: *epya* (field), ep: *eputa* (bush), os: *oshana* (seasonal river), om: *ombuga* (grass land), on: *ondombe* (pond), lo: *lonzi* (grass field), og: *oshigunda* (kraal)
oh: *ohambo* (cattle post), ek: *ekango lyomonguwa* (salt pan)

0. Rarely used 1. Use by every several years, 2. Seldom used during the part of a year, 3. Frequent used during the part of a year, 4. Seldom use in a year, 5. Frequent used in whole year.

-: unidentified.

Natural resource use during the 1970s as determined through interviews with elderly people at U village. Natural resource use from 2004 to 2005 as determined through interviews and food survey (Oct. 2004 to Mar. 2005) of several households in U village. *Crops and livestock are excluded.

In sum, until the 1970s, the frontier area of the Kwambi was used temporarily as a grazing camp in dry seasons and as a place to gather mopane timber and other resources, also in dry seasons. Each household member could freely access areas within the "territory" of the Kwambi kingdom for natural resource use.

## II. Natural Resource Use in 2004–2005: Coping with the Enclosure of the Frontier

### 1. Expanding cattle posts and changes in livestock grazing and natural resource use

A comparison of spatial patterns in natural resource use over time reveals the importance of the area surrounding the homesteads, such as *eputa*, *epya*, and *oshana* (Table 1). However, changes have occurred in places like *okuti* and *ombuga*, where resource use had previously been occasional. Some people started to set private grazing land (cattle posts) in *okuti* and *ombuga* during the 1980s, and they gathered natural resources there. This is also an obvious feature of natural resource use in recent years. I examined this feature with a special focus on (1) the settling of cattle posts, (2) the multiple and increased uses of indigenous fruit trees, and (3) the roles of social networks with people who migrated out of the villages.

Almost all farmers lost most of their livestock because of continuous severe drought in the 1980s.[12] Some affluent farmers were able to purchase livestock after the drought, and more affluent people were able to avoid the drought by acquiring new grazing land as fixed cattle posts far from the village. This grazing land was surrounded by fences, and the herder(s), who was employed by the owner, remained all year around. Although this type of grazing land is called *ohambo*, which is same word as for traditional temporary grazing land, the use of this grazing land was very different from the traditional pattern. Thus, the different name is used in this paper: cattle post is substituted for fixed grazing land.

Cattle post owners employed several paid employees (herders) to look after the livestock. The owners checked the condition of their livestock several times a month when they visited the cattle posts by car. Livestock were kept at the cattle posts for most of the year (typically September–May) and were moved back to the village for several months (June–August) to graze inside the crop fields. The movement pattern and the length of the grazing period outside the village began to change. These features resemble the "modern" pastoral system that is practiced at commercial farms. However, no household in U village set their temporary grazing camp in the traditional style. One reason for this was the decrease in the availability of open space due to the settling of new villages, and another was the decrease in the number of livestock because of serious drought. In addition to this, the number of households decreased because young people tended to stay in town, and it became difficult to establish temporary grazing camps because of the shortage of herders.[13]

The first cattle post owner emerged in U village in 1982 (Fig. 3). After that, the number of cattle post owners increased, particularly during the 1990s. By 2006, there were nine cattle posts owned by eight of the 30 households. These cattle posts were established around the areas where temporary grazing camps had been set before the 1980s (Fig. 3).

Cattle post owners invest large sums of money to establish and maintain their cattle posts (Fujioka, 2007). To establish a cattle post, an applicant must obtain permission from the headman, who is the chief of the village, and they then discuss the land area. The applicant must pay an establishment fee of about N$600 (approximately US$80 in 2004) to the headman who governs the area within which the cattle post is planned (Table 2). The estimated cost of running a cattle post for one year is about N$11,100 (Fujioka, 2007). This N$11,100 is almost equivalent to the cost of seven cows and therefore represents an enormous expenditure for the Owambo people. Most cattle post owners of U village were previously or are currently employed in positions such as civil servant, teacher, soldier, or administrator in a political party. These positions command higher salaries than temporary work, such as shop assistant, bartender, or herder at a cattle post. Households with cattle posts own many more head of cattle compared to households that do not own cattle posts (Fig. 6).

Cattle posts are also used as places for gathering natural resources. From September 2004 to April 2005, mopane worms, mopane roots, wild birds, and thatched grasses were brought to the village from cattle posts (Table 3). The owners of cattle posts consumed these products as well as gifted them to their neighbors and friends, following the local practice of "neck bone." Although natural resources are not frequently gathered there, cattle posts nevertheless provide important access to natural resources that are gathered in *okuti* and *ombuga*. In addition, some natural resources began to be used more frequently

**Table 2.** Details of cattle posts in U village.

| Owner | Main Occupation (Past) | Distance from Village | Year of Setting | Herder | | Livestock | Year of Field Setting | Area of Field (ha) |
|---|---|---|---|---|---|---|---|---|
| | | | | Number | Wage (month) | | | |
| A.D. | Officer, Management of Bar | 45km | 1982-92 | 0 | - | - | - | - |
| | | 128km | 1992 | 2 | N$400 | Cattle, Goat, Sheep | - | - |
| | | 21km | 1995 | 1 | N$400 | Cattle | 1995 | 12 |
| L.P. | Management of Bar (Officer) | 23km | 1998 | 1 | N$300 | Cattle | 1998 | 5 |
| P.A. | Mine worker | 25km | 2000 | 1 | N$300 | Cattle | 2000 | 4 |
| S.A. | (Mine worker) | 26km | 2000 | 1 | N$300 | Cattle, Sheep | 2000 | 4 |
| F.A. | Army | 95km | 2003 | 0 | - | - | - | - |
| P.I. | Builder | 20km | 1998 | 1 | N$400 | Cattle | 1999 | 2 |
| M.A. | Administrator | 215km | 1983 | 2 | N$500 | Cattle | 1991 | ? |
| D.A. | (Mine worker) | 20km | 1997 | 1 | N$350 | Cattle | 1997 | 7 |

Field area measured by GPS. Because F.A.'s cattle post was not yet complete, he had not hired a herder.

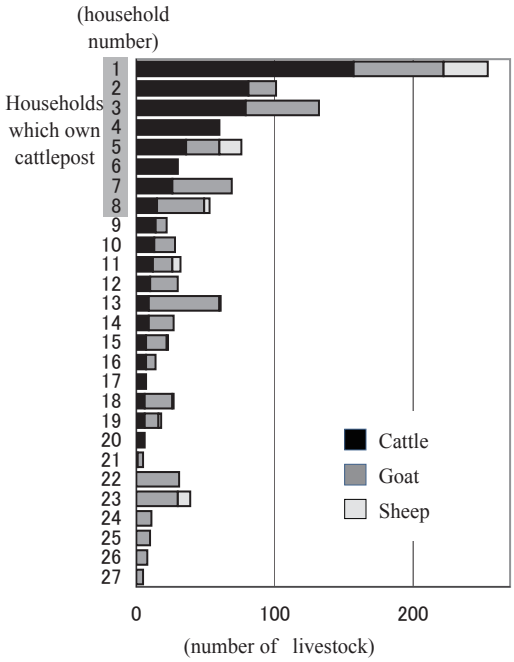


**Fig. 6.** Number of livestock among 30 households in 2004. Three households that did not own any livestock are excluded.

because hired herders were able to gather natural resources throughout the year. For instance, in the past, mopane worms were not frequently eaten at U village, but following the development of cattle posts, they could more readily be gathered, gifted, or purchased.

These natural resources are sold at the local market in town, and their price has increased in recent years. For instance, for one meal for a three-member household, the price of mopane worms was N$8 for 91g (dry), and the price of beef was N$10 for 360g (raw); the two were only slightly different in price. Consequently, some hired herders collected natural resources at cattle posts and sold them at the local market to earn money. For example, when I visited a cattle post owned by Mr. A.D. in March 2006, 67kg of dried mopane worms (equivalent to about 65,000 worms) had been accumulated in the hut of one of the herders. The owner brought dried worms to the village and sold them in the village and town. A total of 27.5kg was sold during my stay, and the profit was more than N$700 (cf. a monthly salary of N$400). The cattle post owner made 30% profit, and herders shared 70% of the profit. In addition, some merchants stayed in *ombuga* and *okuti* to collect natural resources. A traditional leader of the Owambo has even publicly warned of an impending shortage of wildlife due to over-collecting (The Namibian, 7 March 2005).

Cattle post owners sometimes gift natural resources brought from cattle posts to other households in their home village. For example, cattle post owners gifted mopane worms and grubs 10 times (to four households) from December 2004 to April 2005. Hence, although the opportunities to access these natural resources have been limited by households' economic conditions, the opportunity to obtain certain natural resources remains for people who are not wealthy through gifting under the local practice of "neck bone." However, the collection of natural resources for cash may lead to over-exploitation and hence to a decrease in wildlife.

**Table 3.** Type of gift materials and natural resources brought from cattle posts.

| Types | Items | Gift* | Natural resources broght from cattleposts** | |
|---|---|---|---|---|
| | | | Number of times | Gift |
| Crops | Pearl millet | | 2 | |
| | Cowpea | ○ | 2 | |
| | Watermelon | ○ | 2 | |
| | Bambara groundnut | ○ | 0 | |
| Fruits | *Berchemia discolor* | ○ | 0 | |
| | *Ficus sycomorus* | ○ | 0 | |
| | *Diospyros mespiliformis* | ○ | 0 | |
| | Guava | ○ | 0 | |
| | Papaya | ○ | 0 | |
| Plant | Mopane root | ○ | 1 | ○ |
| | Mopane stem | | 1 | |
| | Thach grass | ○ | 1 | ○ |
| Insects | Mopane worm | ○ | 1 | ○ |
| | Stink bug | ○ | 0 | |
| | Grub | ○ | 3 | |
| Meat of livestock | Cattle | ○ | 0 | |
| | Sheep | ○ | 0 | |
| | Dove | ○ | 0 | |
| | Hen | ○ | 0 | |
| Livestock product | Milk | ○ | 13 | ○ |
| | Cattle dung | ○ | 3 | ○ |
| Meat of wild animal | Antelope | ○ | 1 | ○ |
| | Bird | ○ | 6 | ○ |
| | Others | | 3 | |
| Fish | *Clarias* sp. | ○ | 0 | |
| Brew | Marula brew | ○ | 0 | |

Purchased gifts were excluded. *Gift materials found during field work in 30 households from Sep. 2004 to Apr. 2005 are shown here. **Natural resources brought from cattleposts in 8 households during Sep. 2004 to Apr. 2005 are shown here.

2. Multiple and intensified uses for indigenous fruit trees

As the number of new villages increased in *okuti*, one of the largest impacts for U villagers was the restriction on timber collection. Because mopane timber was no longer easy to obtain, most villagers began using other kinds of timber and building materials (Fujioka, 2005). These included purchased materials such as cement and tin plating, which wealthy households used for building block houses and palisades. However, few people could afford such materials. Most other villagers began using palm petioles to construct outer palisades, hut frames, and kraals. Pearl millet stems were also used as building materials. Long, thick palm petioles called *iipokolo* were collected from tall palm trees (>2–3m in height) called *omulunga*. At the end of the dry season, male villagers would climb the *omulunga* and cut down several *iipokolo* and fruits. In one year, an *omulunga* produces 12–20 new leaves on average (Fanshawe, 1967). However,

because *iipokolo* rot more rapidly than mopane logs, they must be replaced every several years. Because *iipokolo* are also weaker than mopane logs, many more *iipokolo* are needed to create a sturdy structure.

Outer palisades can be classified into four types based on the construction material used: mopane type, palm type, block type, and combined type (consisting of mopane logs and *iipokolo*). In U village, most outer palisades were of the palm type (44%; Fig. 7) followed by the mopane type (25%; Fig. 8; Fujioka, 2005). On average, the palm type requires 309 palm petioles and 20 mopane logs (per 10-m length of palisade), whereas the mopane type requires 5 palm petioles and 109 mopane logs (Fujioka, 2005). Thus, the palm-type outer palisade requires 89 fewer mopane logs but 304 more *iipokolo* per 10-m length. Given that the average length of an outer palisade is 98.5m, palm construction meant that 2,994 *iipokolo* replaced 876 mopane logs. Although the Owambo people have historically used *iipokolo* for various purposes, using this many *iipokolo* as building material is a recent trend.

Although people had begun to use palm petioles for construction, thick timbers were still needed as important pillars, and wood was needed for daily fuel. Figure 9 shows the ratio of cooking fire times for four households from October 2004 to March 2005. The main fuel materials were acacia trunk, cattle dung, mopane trunk and root, palm petiole, palm leaves, palm peduncle, palm leaf sheath, marula trunk, and gas (Fig. 9). Two wealthy households used gas and mopane purchased in town, and other two households used mainly palm petioles, leaves, and peduncles. In addition, some people cut branches and thick roots from marula fruit trees.

Next, I focus on the use of marula tree. As I mentioned in the previous section, disparities among villagers have widened with regard to the number of livestock and access to natural resources. For non-wealthy persons, traditional gifting via the "neck bone" relationship was an important means of obtaining livestock products and natural resources. To maintain reciprocal relationships with wealthy people, non-wealthy villagers actively gifted marula brew (*omagongo*) to other households during the marula season (*ethimbo lyomagongo*; February and March; Fujioka, 2008). Brewed from the juice of marula fruits, marula brew was made by women in almost all households during the fruit-

**Fig. 7.** Outer palisade made mainly using palm petioles (October 2002).

**Fig. 8.** Outer palisade made mainly using mopane logs (October 2002).

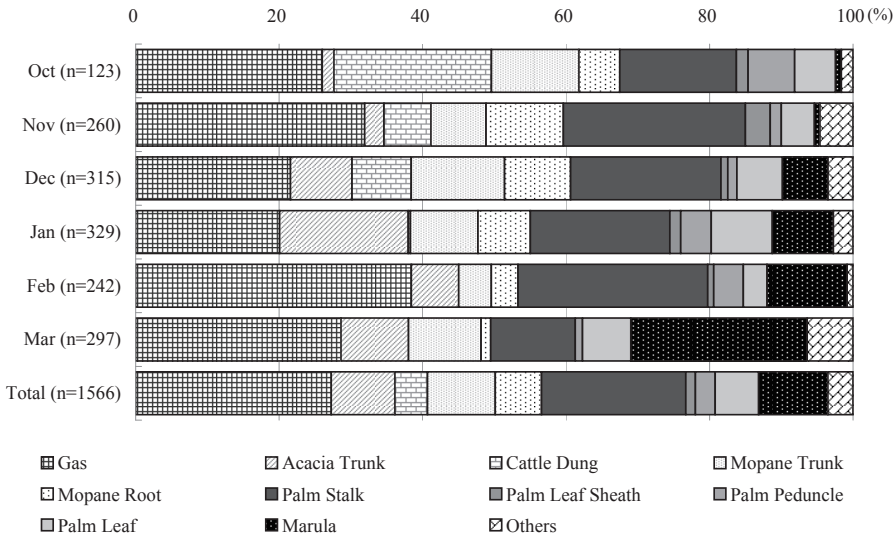


**Fig. 9.** Ratio of times for the cooking fire.
Number of times fuel was used for the cooking fires was surveyed from writings by four women in different household who recorded the kinds of daily fuel in notebook from October 2004 to March 2005. When she used a kind of fuel, two main kinds of fuel were counted, with the rate for each recorded as 0.5.

ripening season of February and March. There is a long tradition among the Owambo of drinking *omagongo* and gifting it to other households. Marula brew was traditionally gifted as a tribute to the kings. According to the elders of U village, they had to gift marula brew as a tribute to the headman every year around the 1970s. They also gifted marula brew among households; however, it could not be gifted freely or frequently because the man who owned the fruit was a senior headman.

From 10 February to 31 March 2007, 22 households gifted this brew to other households, representing a total of 525 gifts (Fujioka, 2008). Of these, 387 (74%) were gifts to households in U village. One reason for the gift giving was to acknowledge help with the production of the brew. The marula juice was squeezed through the collective work of several women from different households. Because the juice belonged to the owner of the fruit trees, women who helped but did not own any trees could not initially obtain any juice; however, after brewing was complete, these women could obtain marula brew as a gift. In addition, other people who did not help squeeze the marula juice also received the brew as a gift (Fujioka, 2008).[14] These recipients belonged to wealthy households of which at least one member worked in town or that frequently gifted milk and meat to other households. One woman who gave marula brew to such wealthy households said that the gift was an acknowledgment of the daily gifts of milk she had received. Thus, although the gifting of marula brew among households is an old practice, it has acquired a new meaning in terms of

maintaining "neck bone relationships," especially for non-wealthy households. In summary, in response to restrictions on natural resource use, people have begun to use indigenous fruit trees, mainly palm and marula trees, in multiple and increased ways.

3. Making use of social networks in the new villages

A third feature of recent natural resource use involves gifts from new villagers. Most of the people who migrated to *ombuga* and *okuti* had social networks of relatives and friends, and the "neck bone" relations persisted even after they migrated. People living in the new villages gifted natural resources that could not be obtained around the village, such as mopane roots, trunks, worms, and thatch grass. In contrast, people living in U village gave palm and marula fruits and palm leaves, which could not be found in *ombuga* and *okuti*.

Two examples of gifted natural resources are edible insects and marula brew. Some edible insects (e.g., *egungu*, *ehonkowe*, and *okatalashe*) were seldom eaten in the 1970s because there were no trees in the vicinity of U village on which these insects fed. From December 2004 to April 2005, U villagers in 30 households ate edible insects 274 times, of which 82 times (30%) involved the aforementioned three species. Of those 30%, the insects were received from other households 36 times and purchased from a local market 44 times. The gift occasions included 8 cases in which the insects were a gift from another household in U village, including one from a cattle post owner, and 28 cases in which the insects were gifts from people living in the new villages. Although these numbers are not large, they represent important occasions for obtaining resources that could not be gathered around the village, especially for households that did not own cattle posts.

U villagers also gifted resources such as marula brew. As noted above, U villagers gifted marula brew mainly to other households in U village, although 26% of gifts were given to households in other villages in *okuti* and *ombuga*.

Thus, U villagers and the residents of the new villages have maintained social relationships by occasionally giving gifts of natural resources. The Kwambi people rarely give a return gift at the same time as they receive one; they usually give another item as a gift some time later. The exchanging of gifts has also been promoted by the improved transportation infrastructure. In recent years, bus service has increased between the new villages and towns, allowing people to visit relatives and friends in other villages more frequently. Some wealthy people also own cars.

## DISCUSSION

### I. Disparities in Access to Natural Resources among Village Households

The frontier area of the Kwambi "territory," which spreads southward from

the center of their traditional homeland, has become gradually more enclosed since the colonial era. People's migration from the center since the 1970s has accelerated this enclosure. Moreover, the establishment of cattle posts has also advanced the enclosure of the frontier. The emergence of new settlements in the frontier region has altered the ways in which people obtain and use natural resources. Comparing the 1970s and 2004–2005, one sees that the frequency of resource use and the location of available resources have changed. For example, *okanangole* (worms) and *embulunyenye* (cicadas) are rarely used today, but *egungu* and *ehonkowe* (mopane worms) are used much more than in the past. These changes were prompted by the introduction of new methods of obtaining natural resources. People can now acquire natural resources by catching or gathering them themselves, by receiving them as gifts, or by purchasing them. Of course, the method of obtaining these resources varies according to their characteristic differences, but changes in these methods have also been brought about by the development of towns, lifestyle changes, and changes to the natural environment.

The Kwambi people have coped with this situation by obtaining natural resources in four main ways: (1) establishing cattle posts, (2) using indigenous fruit trees in multiple ways, (3) gifting and exchanging resources with residents of new villages through social networks, and (4) purchasing resources from the local market. However, one feature of current natural resource use is a wider disparity in access to resources brought about mainly as a result of economic disparities between households. Because the residents of new villages have priority rights to natural resources in the frontier area, U villagers have had to establish cattle posts or travel to more remote places to gather natural resources. To prevent speculative land enclosure for purchase, a person establishing a cattle post surrounded by a fence is required to demonstrate use of the land by setting up fields or having a herder stay there. Therefore, a large sum of money is needed to establish a cattle post, and only the wealthy can afford to do so. Non-wealthy people who cannot establish cattle posts must make difficult journeys to remote areas by donkey cart to gather natural resources. Furthermore, because many young people have school commitments or work in town, households might have few members available to forage for resources in remote areas. For female-headed households in particular, it is difficult to both graze livestock in *ombuga* and travel to gather natural resources.

Under these circumstances, gifts of natural resources under the "neck bone" relationship become more important. Although the "neck bone" relationship traditionally functioned at the scale of the neighborhood, such as within a village, residents of U village now exchange gifts of natural resources with residents of other villages. These gifts represent important opportunities for non-wealthy households to obtain natural resources. Thus, despite changes in opportunities for direct access to natural resources in the frontier, indirect access has been maintained. Although gift giving does not occur frequently enough to eliminate economic disparities among households, the practice contributes to the transmission of culture and knowledge about natural resource use. Wealthy cattle post

owners may give gifts of livestock products and natural resources to others within a village. Often unable to reciprocate, non-wealthy households may make the most of the custom of marula brew gifting during the marula season.

In the context of political ecology, Watts and Bohle (1993) pointed out that increasing vulnerability can lead to destructive impacts on the natural environment. In the case examined here, however, non-wealthy people tend to depend on multiple and intensified uses of indigenous fruit trees when accessing natural resources in *ombuga* and *okuti* becomes difficult. However, wealthy cattle post owners are able to continue to use natural resources in the frontier area. Their use of these areas has been important for maintaining traditional knowledge not only in those households but also in other households that receive the resources as gifts. However, this situation can lead to destructive results, such as over-consumption by sellers of natural resources, as discussed below.

## II. Pervasiveness of the Cash Economy and Changes in Natural Resource Use

The pervasiveness of the cash economy has also greatly impacted natural resource use by the Owambo people. This economic change did not occur abruptly with independence but came about as a result of a process that began in the colonial era. Although wage labor had been scarce under the pre-independence apartheid regime, some Owambo laborers managed to save enough money to buy vehicles or livestock. Since gaining their independence, more people have entered into jobs that pay cash, and as salaries have increased, lifestyles have become increasingly dependent on cash purchases.

The cash economy has impacted natural resource use in two general ways. First, some natural resource use has decreased because alternative products can be purchased. Purchasing items has played an important role in maintaining lifestyles following the enclosure of the frontier. The cash economy has thus reduced dependence on the frontier, making it easier for U villagers to cope with reduced access to the frontier and its resources. Second, the new economy has created value for natural resources, which can be sold for cash. People who can obtain natural resources by purchasing them do not need to gather those resources themselves. However, because resource collectors can earn more money by selling more products, in some cases over-gathering has occurred. As the availability of natural resources declines, these resources become more valuable because of their scarcity, encouraging further over-collection.

The development of towns has led to lifestyles that depend mostly on money. The development of the town of Oshakati, the administrative center of the region, has played an important role in changing the lifestyle of villagers. Oshakati was developed in the 1970s as a South African army base (Hangula, 1993). Today, the town has a large local market and numerous street stalls, in which many vendors sell goods. The town has fostered a lifestyle in which residents use money to purchase most of the items needed for their daily lives.

## III. Sustainability of Natural Resource Use

To prevent environmental degradation and maintain resources in a dry environment, natural resources should be used sparingly and over a wide area. However, the development of new villages and new access rights in the frontier region have changed the resource use situation and may threaten the sustainability of resource use in the frontier areas.

Natural resource use in the frontier is concentrated around the new villages and cattle posts. Possible impacts of this include fewer mopane trees, which are cut for use in *okuti*. However, tall mopanes were already decreasing in number by the late 1970s (Shilunga, 1997). A cut mopane regenerates by shoots, creating a short, multi-stemmed mopane. This type of mopane does not often transform into the tall-stemmed type. For the sustainable use of mopane, it is important to use these short stems, rather than the tall stems, to meet daily fuel and timber requirements. However, *okuti* residents, who can still use the frontier area, have to travel to gradually more remote areas to gather mopane. At the same time, the establishment of more cattle posts in remote parts of the frontier will place more pressure on the availability of natural resources in those areas.

One strategy for coping with the enclosure of the frontier has been to engage in multiple and intensified uses of indigenous fruit trees. This change has been enabled by increased numbers of these trees through intentional and unintentional seed dispersal by local people. Palm trees are important because of the multiple resources they offer. The creation of semi-artificial vegetation composed of large numbers of palm trees has been another way of coping with reduced access to natural resources in the frontier. Palm trees produce new petioles and leaves every year, which makes them more sustainable than mopane wood for use as building material and fuel.

The number of indigenous fruit trees has increased even in new villages, because people obtain fruit from others and disperse the seeds intentionally and unintentionally. Thus, as semi-artificial vegetation becomes established in the new villages, villagers could also begin using indigenous trees in multiple ways.

In contrast, problems have occurred with wildlife resources, including conflicts between livestock herders and carnivorous animals at cattle posts near Etosha National Park. It is also feared that wild animal populations are decreasing because of over-harvesting for sale. Further research is needed to clarify the actual ecological consequences associated with these changes.

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NOTES

( 1 ) Some of the elders had identification cards upon which were written their dates of birth.
( 2 ) For details, see Hinz (1998).
( 3 ) This system didn't remain totally unchanged, and "tradition" was created in some parts.
( 4 ) Kreike (2004) examined this point, focusing especially on the Kwanyama group; Widlok (2000) discussed Owambo and "bushman" relationships from a frontier perspective.
( 5 ) Williams (1994: 90) stated that Owambo "cannot be linked with the 16 century units which culminated in 'state' formations."
( 6 ) The king's homestead sometimes changed after his death. For example, the place of the Kwambi king was moved a dozen kilometers (Willams, 1994: 125–132, 159–163), which might have expanded the inhabited area.
( 7 ) The borders between territories were not marked by fences or other means. Because the kings had no expansionist tendencies, territory was not considered a motive for war (Williams, 1994: 114–115).
( 8 ) Dieckmann (2007) examined the process of peoples' constructing and reconstructing their ethnic categories.
( 9 ) Although the areas around U village saw no battle, elders in U village referred to this.
(10) My observations and conversations with U villagers revealed that they changed the grass in their roofs every several years, not every year.
(11) A comparison of two aerial photographs from 1970 and 1996 revealed that the number of homesteads increased by five at the research site. From 1996 to 2007, five more homesteads were added.
(12) In Namibia, the 1980s was a turbulent social period marked by the war for independence, which pitted the South West Africa People's Organisation (supported by most of the Owambo people) against South Africa. I suspect that the effect of the drought was not as usual given the disorder in the state and market.
(13) Most herders who were employed by cattle post owners were not from U village. Because U village is located near the regional capital, people tend to stay in town.
(14) There was not a large difference in average frequency of gifting between households who helped to squeeze the marula juice and those who did not help.

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