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THE DIETARY REPERTORY OF THE NGANDU PEOPLE OF THE TROPICAL RAIN FOREST: AN ECOLOGICAL AND ANTHROPOLOGICAL STUDY OF THE SUBSISTENCE ACTIVITIES AND FOOD PROCUREMENT TECHNOLOGY OF A SLASH-AND-BURN AGRICULTURIST IN THE ZAIRE RIVER BASIN

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ABSTRACT Food acquisition and consumption behavior of the Ngandu, who are a Bantu people living in the Zaire basin, is described. The utilization of plants and animals as foods is examined from food diaries recorded over a long period of time by two informants.

The Ngandu are multi-subsistence strategists, utilizing widely and predominantly the resources of the forest. The Ngandu are almost self-sufficent with respect to their dietary needs. The food plants consumed by the two informants include 24 species of cultivated plants (representing 20 genera, 16 families) and 22 spp. of wild gathered plants (22 gen., 18 fam.) plus one unidentified sp. and 10 mushrooms. The animal foods consumed include 37 spp. (24 gen., 16 fam.) of mammals, 10 spp. (9 gen., 5 fam.) of birds, 29 spp. (23 gen., 18 fam.) of fish, 12 spp. (10 gen., 8 fam.) of reptiles and 21 spp. (11 gen., 8 fam.) of insects.

The cultivation of cassava as the basic staple food is maintained by less labor-intensive efforts which make it much easier for the Ngandu to engage in various other subsistence strategies such as hunting. They use elaborate hunting techniques which enable them to utilize a wide variety of animal foods. For this reason, they have not needed to develop symbiotic relationships with the hunter-gatherers which are found between the Mbuti and the neighboring agriculturists in Eastern Zaire. Their self-sufficiency, which has been established by a thorough utilization of the forest resources, has been of substantial importance both in the process of territorial expansion and in the stability of the forest habitation. Complicated food taboos which seem contradictory to a maximal utilization of and conservation of resources are observed, and serve as socially-regulating factors. Although such food restrictions may be a factor contributing to the reproduction of the forest resources as is the case with the Mbuti, the existence of the agriculturalists with their diversified subsistence strategies may act as an unfavorable factor which will lead to a shortage of the forest resources.

Key Words: Zaire basin; Food ecology; Ngandu; Tropical rain forest; Subsistence strategy; Food consumption pattern; Forest habitation.

CONTENTS

INTRODUCTION

For six months, from September 1975 to February 1976, and again for about five months, from August to December 1977, I conducted ecological and anthropological fieldwork among the Ngandu, a Bantu people who practice slash-and-burn agriculture, in the Zone d'Ikela of Region of Equateur, in the Republic of Zaire in Equatorial Africa.[1] The Ngandu are members of the Mongo peoples and are widely dispersed over the tropical rain forests of the Zaire River basin. They grow mainly cassava.

Twice during the period of Belgian colonial rule, in about 1930 and again about 1950, a program of chiseling roads through the dense forest and relocating villages along the newly-built roadsides was carried out. Hamlets which until then were located in the forest came to be aligned in lineage units directly along these new roads. However, this relocation did not sever the Ngandu's relationship to the forest; rather, the forest has become an indispensable source of food. The rain forest supports a wide variety of plant and animal life, and the Ngandu have developed a wide variety of food-getting activities designed to take advantage of this situation. Both forest hamlets without cassava fields (*kumbo*)[2] and forest hamlets with cassava fields (*behecha*) are more heavily dependent upon the forest than are the villages along the roads (*boola*) (Takeda, 1984a, 1984b). *Kumbo* are exclusively for hunting or fishing and are composed of members of one family, or of several families at the most. They construct simple homes (*lilombe*) using the leaves of the *bombongo* tree (*Gilbertiodendron dewevrei*, Caesalpinioideae) for the walls and roofs and then live there for two to five months. Although the Ngandu are allowed to move into a different administrative zone, they are not allowed to have fields there; so they eat cassava that the women bring from their own fields in *boola* along the road or whatever they can *beengo* (i.e., buy or barter for)[3] in nearby hamlets with fields. *Behecha* are settlements where people clear a primary forest (tropical rain forest) or a secondary forest to create fields and destroy termite (*Macrotermes* sp.) mounds to build houses with hardened walls and floors for lengthy residence. These settlements are usually composed of several branch lineages belonging to the same root lineage (*boola* or *losombo*) (Takeda, in preparation b).

The purpose of this study is to understand the ecological aspects of Bantu agriculturists in the tropical rain forest and to analyze their subsistence strategies through a concrete description of the diet of inhabitants of the *behecha* which is more closely connected to the tropical rain forest rather than *kumbo* out of the two types of settlements. The understanding of the food acquisition and consumption behavior of the Ngandu, among the daily and various subsistence activities, will teach us how the Ngandu have adapted to the tropical rain forest, and will give us one clue to consider both the process of the territorial expansion of the Bantu into the forest and the stability of their forest habitation.

STUDY AREA AND METHODS

I. Brief Description of the Study Site

In the Republic of Zaire, the smallest unit of administration is the "village." Several "villages" gathered together form a "groupement." Above the "groupement" is the "collectivité", and above that is the "zone", formerly called "territoire" ("Territoire" was renamed "zone" around 1973). The village chief ("chef de village") is elected by the village council; the "chef de groupement" is a hereditary office, provided those involved have not committed any serious offense. The "chef de collectivité" and "chef de zone" (also called "commissaire") are officials dispatched directly from the central government. Bowa (Fig. 1), the study site, is a *behecha* created by people from Yaseka,[4] which in turn belongs to the "groupement" called Ilongo (itself composed of the four villages of Yaseka, Tomba, Bokuli and Yalokembe).

The Ilongo administrative area encompasses a region of some 1,200 km^2 and is bound on the north by the Luo River (formerly called the Maringa River during the

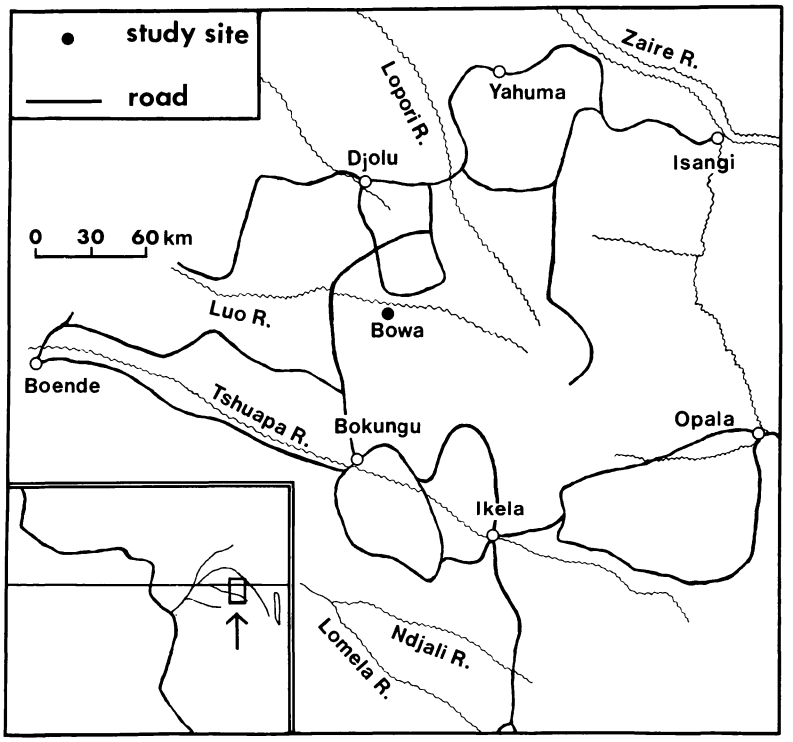

Fig. 1. The study site.

period of Belgian colonial rule), by the Bulembe River on the west, by the Ngandu River (a tributary of the Luo) on the east, and by the Lolaka River on the south. Dugout canoes are used to cross the Luo and there is a bridge across the Lolaka, which forms the border between Ilongo and Pango. However, one must ford on foot the network of rivers that criss-cross the forest itself.

Bowa is several hours' walk from Wamba and about a day-and-a-half walk from Yaseka of the Ilongo "groupement." Ilongo and Wamba (0°10'N, 23°30'E) are locations whose inhabitants intermarry. Wamba is one of *boola* villages and the population is much denser, but Bowa, *behecha* settlement composed of five families, is thinly populated (Fig. 2). Bowa, which is strategically located at the crossroads between the two areas, attracts passers-by. Although the inhabitants of Wamba are members of the Ngandu tribe, they are skilled at piloting a boat. Fishing is a popular activity among the men who set up many fishing camps (*kumbo*) along the Luo and its tributaries.

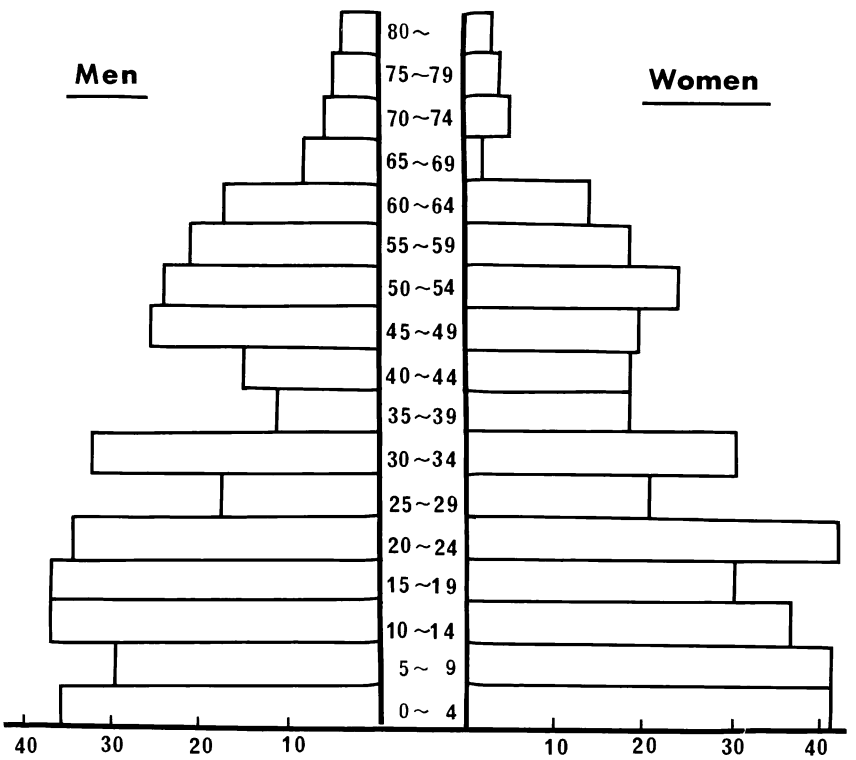

Fig. 2. The age pyramid for Wamba (1985).
Legislatively, Wamba village (*boola*) belongs to the Zone de Djolu. The population structure as shown in this Figure is based on the data of Mr. R. Asato (unpublished data, as of January, 1985). The inhabitants are in total 823 persons, of whom 433 are men, 384 are women and 60 are persons whose sex was not determined. Average age of men is 31.3 when excluding 49 men of unknown age, and that of women is 28.1 when excluding 5 women of unknown age.

The details of the fauna are omitted here (see Takeda, 1984b, in preparation a), but there are many species of forest-dwelling antelopes and primates which are endemic to the tropical rain forest in the Zaire basin. As for the monkeys, a new species of cercopithecine has been found and reported very recently by Kano and his colleagues (Kuroda et al., 1985).

The vegetation in the area of the study site consists of dry primary forest growth, secondary forest growth, swamp forest and riverine forest. Although there are many kinds of trees in the primary forest, the most common are those of the subfamily Caesalpinioideae such as *bofili* tree (*Scorodophloeus zenkeri*), *botuna* tree (*Cynometra hankei*) and *bombongo* tree (*Gilbertiodendron dewevrei*). Vines of Vitaceae and Apocynaceae also flourish. Cassava, the major staple food, is cultivated in fields made by clearing dry primary and secondary forest growth. Secondary forest growth over abandoned fields is characterized by an abundance of fast-growing *bochumbe* tree (*Musanga smithii*, Moraceae). Swamps have developed along the rivers and are composed primarily of *bosenge* tree (*Uapaca heudelotti*, Euphorbiaceae), *waka* tree (*Guibourtia demeusei*, Caesalpinioideae) and palm trees such as *mpeto* (*Sclerosperma mannii*) and *bolilo* (*Raphia sese*).

The Zaire basin is remarkably flat. The field site is about 350 meters above sea level and lies directly on the equator. There are no clearly defined wet and dry seasons, but the year can be divided into a comparatively dry period called *elanga* (January to June) and a wetter period called *eula* (July to December). The sun is rather strong during the months of March and April. The period from July to September, called *luuma* (plural, *bauma*), is a season when edible insect larvae appear in large numbers and the forest is at its richest. Monthly rainfall is the greatest in the following October and November. The rains of this period are said to cleanse the ground spoiled by the feces of the *isusu*, a species of edible insect larvae of Lepidoptera. According to weather records in Djolu, the center of the Zone de Djolu, which is located approximately 90 km north of the study site, the average annual rainfall from the years 1960 to 1967, was 2,052 mm and the average annual temperature was 24.3°C (Longman & Jeník, 1974).

II. Study Methods

The data presented in this paper are based on the information from two male villagers who kept daily records of what they ate at the study site. These records were kept in Lingala or, if there was no Lingala equivalent, in Longandu. In the Republic of Zaire, French is the official language, but the language of every day use among the Ngandu is the tribal language, Longandu. Lingala is an inter-tribal lingua franca.

The method commonly used in nutritional studies has been to either measure or estimate the volumes and types of foods consumed in a specified period of time, or to have the informants dictate from memory what they ate in the preceding 24 hours. With this method, some deviations in the consumption of food type and volume on the part of those observed due to the presence of the observer cannot be avoided, and

snacks eaten at the spot during hunting, gathering and fishing go unnoticed unless the observer is there to record them. The Ngandu do not eat a set number of meals a day, like our breakfast, lunch and dinner, nor do they eat at a specific time of the day. They frequently snack and eat at odd hours. In this case, a long-term nutritional study based on quantitative measurements is difficult. There were limits to the amount of time I could stay in the study site and it was not possible to observe eating habits in detail throughout the year. The method of having the informants keep diaries of what they ate was a means of covering my period of absence from the study site and of discerning the range of foods eaten throughout the year as well as discerning any variation in food consumption by type and season.

The age and sex of informants capable of keeping this food diary was limited to middle-aged men, who did not travel much, spent most of their time in the area, and had time to spare from their livelihoods. There were two such middle-aged men at the study site who could write Lingala. Informant "A" was married but without children and was born in 1938. He was a member of the Yasimbo lineage from the village of Yaseka. Informant "B" was a bachelor born in 1941 who lived with his married younger sister, who cooked his meals for him. He, too, was from Yaseka, though a member of the Yohaliyongo lineage. I had them record what they ate as main dishes, side dishes, snacks and beverages such as liquors and coffee. In this paper, I will define main dish as a staple which is consumed most daily and frequently, and is eaten with or without other prepared food, although the former is more likely.[5] Predominantly, a people's main dish has a high carbohydrate content. Side dish is always eaten as an accompaniment with some staple foods. Snacks has no accompaniment at all and is eaten in small amounts irregularly. I had them also note on separate lines in their food diary each time they ate and/or drank, for they had no wrist watch and it was impossible for them to record the time, it was a necessary means to avoid confusion as to the content of the menu each time.

Using food diary entries made during the years 1975–78, I tried calculating the number of times food was eaten. The number of days entries which were made in the diaries is shown in Table 1. I used the data from both A and B when calculating

Table 1. Number of days recorded in the food diaries by the two informants.

Year of diary	Month												Total
	J	F	M	A	M	J	J	A	S	O	N	D	
Informant "A"													
1975											30	31	61
1976	31	28	31	30	31	30	31	31	30	31	30	31	365
1977	19	28	31	30	31	30	15						184
1978		20	23							6	30	1	80
Total	50	76	85	60	62	60	46	31	30	37	90	63	690
Informant "B"													
1975											9	31	40
1976	31	23	31	30	31	30	31	31	30	31	30	31	360
1977	27		3			23	25	31	30	31	30	5	205
Total	58	23	34	30	31	53	56	62	60	62	69	67	605

the frequency of consumption of all but one food. I took the average number of times such foods were eaten per month by combining the figures recorded by both A and B (where these existed) and divided by two (see Tables 11–18). The average number of times per month when a particular food was eaten by either informant A or B is given by each type of food in Tables 3–5 and 7–10. The average number of times per month that fish was eaten is shown only for informant A in Table 9. This was because he carefully listed the names of each type of fish consumed, whereas B simply used the generic term "fish (*mbisi*)." In the food diaries no distinction was made between bananas (*Musa sapientum*) and cooking bananas (plantains, *Musa paradisiaca*). Similarly, no distinction was made between two species of oranges (*Citrus* spp.) and three species of genet (*Genetta* spp.). The figures showing the number of times these foods were eaten per month have been combined into single categories, respectively.

Examination of the likes and dislikes these two men exhibited in their eating habits, as well as an examination of variations in monthly consumption, are discussed in a separate article. For the present analysis, year-to-year variations are ignored and the number of times particular foods were eaten are computed by the month. For this reason, there is some danger that I have understated seasonal variations in food intake. In addition, the two informants were middle-aged males, so the results may be skewed by age and sex. Also, averaging food consumption for the two informants may generalize whatever idiosyncratic preferences there may have been. However, I believe that an analysis based on multiple food diaries eliminates bias due to individual food preferences and is a powerful tool for grasping the breadth of the diet and understanding the annual cycle and the long-term variations in that diet.

During my stay in the study site I also gathered data through direct observation, which was complemented by the information informants provided in the Lingala language. Although some general names, and names of plants and animals, that appear in the text are common to the Mongo language, I have consistently used the Ngandu singular. Things normally referred to in the plural have been given both their singular and plural forms. Both forms have been given where the singular and plural are irregular forms.

RESULTS

I. Food Repertories and Acquisition Technology

The utilization of plants and animals as food, based on both the food diaries and the extensive inquiries among the Ngandu people, is summarized in Table 2. Plants of 95 spp. are eaten; of these, 26 spp. are cultivated crops and 69 spp. are wild. Of the 287 spp. of animals consumed 282 spp. are wild and 5 spp. are domesticated. Of the total 430 spp. of wild animals recognized and named by the Ngandu people,

Table 2. Foods of the Ngandu people.

	[1] Species recognized	[2] Foods Consumed	[3] Foods Not consumed	[4] Inedible species	[5] Unknown species	[6][1] Average consumption frequency	[7][2] No. of forbidden species	[8] [2]/[1] (%)	[9] [2]+[3]/[1] (%)	[10] [2]/[2]+[3] (%)	[11] [7]/[2]+[3] (%)
Animal foods											
Mammals											
Wild	72	35[3]	27	4	6	259.3	28	48.6	86.1	56.5	45.2
Domesticated	5	0	3	2	0	0	0	0	60.0	0	0
Birds											
Wild	84	10	36	13	25	17.1	13	11.9	54.8	21.7	28.3
Domesticated	2	1	1	0	0	7.9	0	50.0	100.0	50.0	0
Reptiles & Amphibia	38	12	8	16	2	21.2	11	31.6	52.6	60.0	55.0
Fish	108	34	70	0	4	205.3	6	31.5	96.3	32.7	5.8
Insects	128	21[4]	29	77	1	51.2	1	16.4	39.1	42.0	2.0
Wild & non-domesticated	430	112	170	110	38	554.1	59	26.0	65.6	39.7	20.9
Domesticated	7	1	4	2	0	7.9	0	14.3	71.4	20.0	0
Total	437	113	174	112	38	562.0	59	25.9	65.7	39.4	20.6
Plant foods											
Gathered	388	33	36	319	0	260.8	0	8.5	17.8	47.8	0
Cultivated[5]	26[6]	22	4	0	0	888.6	0	84.6	100.0	84.6	0
Total	414	55	40	319	0	1,149.4	0	13.3	22.9	57.9	0

(1) The average consumption frequency is based on informant "A" as to the consumption of fish, while other consumption frequency other than fish is based on both informants ("A" and "B").

(2) Food restrictions are imposed not only on the informants, but on the general inhabitants in the study site. Food restrictions imposed on occupational specialists like hunting magicians or traditional blacksmiths are excluded in this Table (see also Table 24).

(3) Although three species of genets (*Genetta servalina*, *G. tigrina* and *G. victoriae*) are recognized and consumed in the study site, both informants filled in the food diaries with the only name (*simba*) which is the locally comprehensive word for genets. Accordingly, one species is counted here as one genet (see Table 5).

(4) Four kinds of wild honey are produced by Apidae bees. Each kind is usually consumed along with its larvae.

(5) Plants cultivated which are not used as food are excluded here.

(6) Although banana (*Musa sapientum*), plantain (*M. paradisiaca*) and two kinds of oranges are consumed, *Musa* spp. and *Citrus* spp. are each counted here as one food item. Only one part of each cultivated food plants is consumed except cassava (tuber and leaf) and oil palm (mesocarp and kernel).

65.5% is consumed as foods.

Table 2 shows that 22.9% of the 414 plants recorded in the food diaries (17.8% of the wild plants and all of the cultivated plants) and 65.7% of the 437 animals (65.6% of the wild animals and 71.4% of the domesticated animals) are consumed as food. This suggests how much higher a proportion of animals than plants are utilized as food. At the same time, 57.9% of the total 26 foods in the food diaries consisted of plants, and 39.4% of the total 287 foods in the food diaries consisted of animals. This shows that many species of animals are eaten infrequently and less than food plants although these animals are recognized as foods.

1. Plant Foods

(1) Cultivated plants

The cultivated plants, referred to collectively as *bohusi*, include 24 species representing 20 genera and 16 families (Table 3). Two plants contain two edible parts: Cassava (root and leaf, *Manihot esculenta*) and oil-palm nuts (mesocarp and kernel, *Elaeis guineensis*). All other plants contain only one edible part.

The work of clearing primary forest growth for cultivating cassava is done by the men. The first part of the job, called *bengi*, involves cutting away undergrowth with a machete. The next phase, called *bolemo,* consists of cutting trees with a foreign-made axe, called *bongenda* or a traditional axe called *liswa*. Felled trees and vines are left where they fall for a month or two to dry out. On a day that promises fair weather, the area is burned. This job, called *chumbalisala*, is the role of women. Cassava stalks gathered from the roadside village (*boola*) or from a nearby forest-dwelling village with the cassava field (*behecha*) by *beengo* (see also Note 3) are transplanted (*puusa*). This is done after rain dampens the burnt land. Transplanting is accomplished by vegetative propagation. Small holes are made in the scorched earth with digging sticks and cassava stalks (cut in lengths of about 20 cm) inserted into the holes. Between eight months and one year later the roots can be eaten. Care of the fields after transplanting, harvesting, refining and processing cassava are part of the daily routine of women.

The Ngandu cultivate mainly the large-yield bitter cassava that is rich in cyanic acid. They peel the cassava and soak it in water for three to four days to remove the harshness.

Other cultivated plants are rarely transplanted into the gaps between the fields of cassava that surround the *behecha*. Such plants are usually grown in crowded lots near homes.

Oil palms propagate naturally in secondary forest and fallow lands. Climbing the palm trees to get the fruit is the role of men, but either men or women may pluck them from younger palm trees whose fruit is within reach from the ground. Besides cassava, foods dug out of the ground include sweet potatoes, peanuts and three kinds of yams. All other food plants which mature on the ground are harvested by women and children.

Five other foods—rice, avocado, coffee, *losio* seeds (*Cucurbita* sp., Cucur-

Table 3. Cultivated plants consumed by the informants.

Scientific name	Common name	Local name[1]	Part[2] eaten	Food intake[3] frequency (A)	(B)
Manihot esculenta, Euphorbiaceae	Cassava (tuber) [4]	*lomata*	t	668.6	649.1
Manihot esculenta, Euphorbiaceae	Cassava (leaf)	*bokinja*	l	49.0	88.1
Capsicum annuum, Solanaceae	Red pepper	*iyole*	f	+[5]	+[5]
Hibiscus acetosella, Malvaceae	Sp. of hibiscus	*londende-lapuusa*	l	47.2	29.5
Zea mays, Gramineae	Maize	*lisangu*	g	26.7	13.0
Solanum melongena, Solanaceae	Eggplant	*losolo*	f	21.0	17.3
Saccharum officinarum, Gramineae	Sugercane	*bosongo*	c	17.4	1.5
Phytolacca dodecandra, Phytolaccaceae	Pokeberry#	*lisingo*	l	12.3	14.9
Persea americana, Lauraceae	Avocado	*limuka*	f	9.3	5.8
Elaeis guineensis, Palmae	Oil palm (wine)*	*nkele*	sa	8.9	1.7
Dioscorea baya, Dioscoreaceae	Yam	*esambu*	t	8.6	3.6
Carica papaya, Caricaceae	Papaya	*lipaipai*	f	8.5	4.7
Ananas comosus, Bromeliaceae	Pineapple	*linanasi*	f	7.8	4.8
Coffea canephora, Rubiaceae	Coffee#*	*kawa*	se	7.6	6.1
Cucurbita sp., Cucurbitaceae	Sp. of pumpkin#[6]	*losio*	se	6.9	1.5
Lycopersicon esculentum, Solanaceae	Tomato	*ibachu*	f	6.8	5.1
Dioscorea dumetorum, Dioscoreaceae	African bitter yam	*lito*	t	6.7	2.6
Musa spp., Musaceae	Banana[7]	*likondo & ingunda*	f	5.9	4.0
Citrus spp., Rutaceae	Orange	*lilala*	f	5.5	2.9
Elaeis guineensis, Palmae	Oil palm (mesocarp)	*lomba*	f	4.7	4.4
Oryza sativa, Gramineae	Rice#*	*bopunga*	g	4.5	4.2
Dioscorea minutiflora, Dioscoreaceae	Yam	*ehusu*	t	4.3	1.6
Ipomoea batatas, Convolvulaceae	Sweet potato	*litembela*	t	3.4	1.5
Elaeis guineensis, Palmae	Oil palm (kernel)#	*bolika*	f	3.2	0
Musa spp., Musaceae	Banana (liquor)	*likondo & ingunda*	f	2.1[8]	3.3[8]
Zea mays, Gramineae	Maize (liquor)	*lisangu*	g	2.1	3.3
Saccharum officinarum, Gramineae	Sugercane (wine)	*bosongo*	c	1.9	0
Arachis hypogaea, Leguminosae	Groundnut#	*likalanga*	se	1.1	1.6

#: Stored foods.

*Foods usually brought in from other villages (*boola* or *behecha*).

(1) Local name, which is shown in singular form, is used for the edible part itself, not for the plant which produces the edible part.

(2) Part eaten is c: cane, f: fruit, g: grain, l: leaf, sa: sap, se: seed, and t: tuber.

(3) Consumption frequency per 100 days (see also Table 11).

(4) Cassava is called *iyoko* in the words of the Mongo. Six cultivars, *bolangiti, bombanda, bongala, bowala, boyenge,* and *ilolo,* are cultivated in the study site. As to the sweet cassava (*bokuho*), there are two cultivars recognized, which are locally called *buunju* and *litowe.*

(5) Peppers are too frequently consumed, on a constant daily basis, and so were not listed in the food diaries during the recording period, but this does not imply that they were not eaten at all.

(6) Only the seeds are consumed, but the fruit pulp is not eaten. The plural form (*sio*) is spoken in a daily life. Dried seeds are eaten raw, but pounded seeds are chiefly cooked with salt, red pepper or mesocarp oil of oil palm just as a seasoning.

(7) In addition, there are three cultivars, which are locally recognized and called *bolongo, linganja* and *luhehele.*

(8) Distilled liquors are made from maize and banana. As there was no distinction as to its original material in the food diaries, the drunk frequency of distilled liquors is divided evenly.

bitaceae) and palm-oil nuts[6]—are brought in from villages, nearby *behecha*, or Wamba, where they are cultivated.

Two species of red peppers—practically indispensable as a side dish or a supplement—are cultivated: Red peppers (*imbenga*, *Capsicum annuum*, Solanaceae) and *lombolombo* (*C. annuum*), which is shaped like a small-sized sweet pepper. The former is widely cultivated and frequently used as a condiment or spice. Since peppers are almost always consumed with each meal, they seemed to think of peppers as food enhancer rather than food. I found to my surprise that although the informants ate peppers very frequently, they omitted to record the fact. Thus, although peppers were not recorded in the diaries, they were very much eaten.

Cassava is used with some accompaniments as the main food eaten with overwhelming frequency. Cultivated plants other than cassava, such as the three kinds of yam, maize, rice, sweet potatoes and bananas, are eaten separately without any side dishes.

(2) Wild gathered plants

Gathered plants used as food cover 22 species (22 genera, 18 families) except for one unidentified type and 10 kinds of mushroom (Table 4).

The extremely sour leaves of the caesalpinioideous *kookumbo* or *kumbokumbo* tree (*Schotia romei*) and the aromatic leaves of the *bofili* tree (*Scorodophleus zenkeri*), both of which belong to the Leguminosae, are actively collected whenever sighted and within reach during hunting, gathering, fishing or moving in the forest. *Bofili* leaves are sometimes gathered for immediate use in cooking, at which time they are combined with side dishes of meat and fish or are used to wrap these foods when eaten steamed as a main course. *Kookumbo* leaves are used mainly with fish, but they are sometimes used with *bofili* leaves. The sour juice squeezed from *kookumbo* leaves is a particular favorite of the Ngandu.

The leaves of the fern *boohe* (*Histiopteris incisa*) and the pith of the palm *bokau* (*Ancistrophyllum secundiflorum*) has a bitter taste.

The burseraceous butter tree *bosou* (*Dacryodes edulis*) and the African elemi *bele* tree (*Canarium schweinfurthii*) both bear fatty fruits in their upper branches. Usually a man climbs these trees and knocks the fruit to the ground with a stick. The fruit is then gathered by a woman (usually the man's wife) who accompanies him. The fruit is put into a basket and brought back to the village. If the tree is near the village, a splint or brace is laid against the trunk as a ladder which the man then climbs to get at the fruit. *Bosou* trees are sometimes planted near homes.

Fruits such as *bolingo* tree (*Anonidium mannii*), *mbimbo* tree (*Treculia africanum*), *botete* tree (*Treculia* sp.) and seeds of *bokana* tree (*Panda oleosa*) and *bokongo* tree (*Antrocaryon micraster*) are gathered after they fall naturally to the ground. The *bolingo* fruit matures after it falls to the ground. Infrequently, it is planted near the home like the *bosou* tree. Like the *bosou*, it is one type of tree that can be proto-cultivated (Coursey & Coursey, 1971).

Trees such as *botende* tree (*Pancovia laurentii*) and *imama* tree (*Byrscocarpus viridis*) tree and woody vines such as *botofe* tree (*Landolphia laurentii*) produce fruit

Table 4. Gathered plants consumed by the informants.

Scientific name	Local name[1]	Part[2] eaten	Frequency[3] (A)	(B)
Scorodophloeus zenkeri, Caesalpinioideae	*bofili*[4]	l	48.3	130.5
Anonidium mannii, Annonaceae	*bolingo*[5]	f	25.7	10.5
Tetracarpidium conophorum, Euphorbiaceae	*bokaso*[6]	se	22.9	10.2
Schotia romei, Caesalpinioideae	*kookumbo*[7]	l	16.2	10.0
Sacrophrynium macrostachyum, Marantaceae	*booye*	sh	15.4	23.6
Fungus	*eselemete*	ml	14.6	9.8
Dacryodes edulis, Burseraceae	*bosou*[8]	f	14.0	27.1
Fungus	*lomongo*	ml	11.5	6.0
Fungus	*bouwo*	mt	10.2	8.7
Histiopteris incisa (Fern)	*boohe**	l	10.1	11.4
Treculia africana, Moraceae	*mbimbo*[9]	se	9.4	10.5
Fungus	*losolosolo*	ml	8.5	3.4
Ancistrophyllum secundiflorum, Palmae	*bokau**	p	8.3	3.7
Antrocaryon micraster, Anacardiaceae	*bokongo#*	se	6.3	4.5
Canarium schweinfurthii, Burseraceae	*bele*[10]	f	6.1	8.0
Landolphia owariensis, Apocynaceae	*botofe*	f	6.1	2.5
Hymenocardia ulmoides, Euphorbiaceae	*beenje*	l	5.8	4.4
Chystranthus carneus, Sapindaceae	*bosemu*	se	5.5	3.3
Pancovia laurentii, Sapindaceae	*botende*	f	5.5	2.6
Panda oleosa, Pandaceae	*bokana#*	se	4.8	9.2
Aframomum laurentii, Zingiberaceae	*londake*	f	4.3	0
Fungus	*beesesu*[11]	ml	4.0	1.6
Dioscorea smilacifolia, Dioscoreaceae	*bohekiheki*[12]	t	3.8	3.9
Fungus	*lotsukutsunu*	mt	3.5	11.2
Fungus	*yoko#*	ml	2.4	3.6
Synsepalum stipulatum, Sapotaceae	*imama*	f	2.2	1.9
Fungus	*lolungola*	ml	1.7	3.2
Napoleona vogelii, Lecythidaceae	*imange*	l	1.6	3.2
Guyonia intermedia, Melastomataceae	*londende-aloshe*	l	1.3	0
Fungus	*botola*	ml	1.3	0
Auricularia sp., Auriculariaceae	*lisele*[13]	mt	1.2	1.9
Treculia sp., Moraceae	*botete*	se	0	1.9
Fungus	*itotolui#*	ml	0	4.3

#: Stored foods.

*: Bitter-tasting leaves.

(1) Local name, which is shown in singular form, is used for the plant itself which produces its edible part. In some cases, the name of plants such as trees or vines is different from that of its edible part: *bokana* (*likana*), *bokaso* (*lokaso*), *bokongo* (*lokongo*), *bosemu* (*losemu*), *bosou* (*losou*), *botende* (*lotende*), *botete* (*etete*), and *botofe* (*lotofe*).

(2) Part eaten is f: fruit, l: leaf, ml: mushroom which grows on the ground (*bouwo-balooko*), mt: mushroom which grows on live or fallen trees (*bouwo-botamba*), p: pith, se: seed, sh: shoot, and t: tuber.

(3) Consumption frequency per 100 days (see also Table 12).

(4) Young leaves, which are more fragrant, are usually used.

(5) The main amount of *bolingo* fruits are usually gathered in the forest, but the tree rarely grows near the house.

(6) It is called *awusa* in the Creole lauguage. The Ngandu do not know another use, though the seeds yield a very rapidly-drying oil.

(7) The leaves are sour-tasting.

(8) It is called *lihole* in the Mongo language. The pulp of the fruit is boiled or roasted to form a kind of butter (bush butter). It also grows near the house in small amounts, but its fruits are chiefly gathered in the forest like *bolingo* fruits.

(cont.)

on their higher branches. Those fruits are obtained by climbing or, less frequently, chopping down the trees. The hard, round husk of the *botofe* fruits are broken open with a rock or a machete. The seeds, as large as half the length of a man's little finger, are swallowed whole together with the white sweet-sour fruit-pulp.

The marantaceous *booye* herb (*Sacrophrynium macrostachyum*), the sprouts of which are edible, does not grow near Bowa but is mainly brought in from Wamba.

The 11 kinds of wild mushrooms are divided into two types: *bouwo-ba-looko*, or those that grow directly out of the ground, and *bouwo-botamba*, or those that grow on dead trees. Mushrooms without caps and certain small mushrooms are not gathered.

The only wild plant gathered by pulling it out of the ground is the wild *yam* (*Dioscorea praehensilis*).

Both men and women will gather plants they sight which can be eaten either alone or as a side dish. Foods that must be gotten by climbing trees, however, are collected by the men.

2. Animal Foods

(1) Mammals

Thirty-seven species of mammals (representing 24 genera, 16 families and 8 orders) are eaten (Table 5). Thirty-one of these species—over half of all mammal species eaten—are forest duikers, primates, carnivores and rodents.

Most of these animals are caught by men either in hunting (*paho*) or in trapping (*lilongi*). Hunting with firearms is not common among the Ngandu because in 1974 the government confiscated all firearms. Though homemade shotguns for hunting monkeys are sold secretly, they are difficult to obtain and ammunition is expensive.[7] Instead, the Ngandu have developed a wide variety of hunting methods (Table 6) which were discussed in detail elsewhere (Takeda, 1978, 1984b). Here, I will note only the most popular hunting methods adopted in the *behecha*: *Paho*, including individual bow-and-arrow hunting (*lotongo*), collective bow-and-arrow hunting (*bakula* or *bakimano*) and net hunting with the aid of dogs (*paho-ambwa*). *Lilongi*, the trapping method, includes spring traps such as *zekki* (a wire binding trap) and *nilo* (a nylon binding trap). Also, a very large trap for catching elephants, called *elongo*, is set in primary forest areas near cultivated fields.

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(9) The common name is African breadfruit.

(10) The common name is African elemi tree or incense tree. That it has been utilized by men for a long time is easily understood from the following fact. The assumption of Clark (1980) that food collecting communities were pre-adapted to food production through a long period of manipulating plants prior to cultivating them deliberately is based on evidence from Bosumpra in eastern Ghana where a microlithic industry with pottery, making use of oil palm and *atili* nut (*Canarium schweinfurthii*) dates from 3420±100 B.C.

(11) It is also called *ingwengwe*, but it is mainly used by the people of the Djolu Zone.

(12) The common name is bush yam. The root of the yam, which is consumed, is called *eheki*.

(13) It is the fungus of a Jew's-ear plant.

Table 5. Mammals consumed by the informants.

Scientific name	Common name	Local name[1]	Frequency[2] (A)	(B)	Major hunting methods[3]
Cephalophus monticola, Cephalophinae	Blue duiker	*boloko*	41.7	54.4	Pb, Pk, Pl, La, Lc
Cephalophus callipygus, Cephalophinae	Peter's duiker	*mbengela*	36.8	84.6	Pb, Pl, La
Loxodonta africana, Elephantidae	African elephant[4]	*njou*	30.4	50.9	Ld, Pt
Atherurus africanus, Hystricidae	Brush-tailed porcupine	*iiko*	20.2	17.9	Pm, Pb, La, Le
Potamochoeurs porcus, Suidae	Bush-pig	*nsombo*	15.3	19.8	Pb, Pl, La, Lc
Hyemoshus aquaticus, Tragulidae	Water chevrotain	*lukulukya*	11.3	12.7	Pk, Pl, La, Lc
Cephalopus nigrifrons, Cephalophinae	Black-fronted duiker	*mpambi*	9.1	2.8	La
Petrodromus tetradactylus, Macroscelididae	Four-toed elephant-shrew	*litoko*	8.3	3.9	La, Lc, Le
Genetta spp., Viverridae	Genet[5]	*simba*	7.8	4.3	La, Lc
Crossarchus obscurus, Viverridae	Dark mongoose	*ekanda*	6.7	4.0	Pb, La
Cricetomys emini, Cricetidae	Giant rat	*botomba*	6.6	4.2	La, Lc
Cephalopus dorsalis, Cephalophinae	Bay duiker	*kuluha*	6.5	13.8	Pb, La
Atilax paludinosus, Sciuridae	Marsh mongoose	*buunju*	6.5	9.5	Pl, La, Le
Cercocebus aterrimus, Cercopithecidae	Black mangabey	*ngila*	6.4	5.2	Pl
Nandinia binotata, Viverridae	Two-spotted palm civet	*mbio*	6.3	1.6	La, Le
Cephalopus syluicultor, Cephalophinae	Yellow-backed duiker	*mbende*	5.6	6.7	Pb, La
Aethosciurus poenis, Sciuridae	Green squirrel	*ekochi*	5.0	2.3	La, Le
Cercopithecus ascanius, Cercopithecidae	Red-tailed monkey	*nsoli*	4.9	13.3	Pb, Pl, Le
Colobus angolensis, Colobidae	Black-and-white colobus	*luka*	4.8	8.6	Lc
Potamogale velox, Potamogalidae	Otter shrew	*iyonge*	4.8	0	Le
Eidolon helvum, Pteropidae	African fruit bat	*lolema*	4.4	0	Ps
Manis tricupsis, Manidae	Tree pangolin	*ngaa*	4.1	8.1	Ps
Viverra sp., Viverridae	African civet	*imongone*	3.9	1.6	Le
Felis aurata, Felidae	Golden cat	*lowa*	3.9	8.3	La, Lc
Viverra civetta, Viverridae	African civet	*yoo*	3.5	1.9	La
Tragelaphus spekei, Bovidae	Sitatunga	*mbuli*	3.3	13.4	Pb, La
Protoxerus stangeri, Sciuridae	Giant forest squirrel	*lifo*	2.6	2.3	La, Le
Cercopithecus mona, Cercopithecidae	Mona monkey	*mbeka*	2.5	8.7	Pl
Funisciurus lemniscatus, Sciuridae	Four-striped squirrel	*embonje*	2.4	0	La, Le
Manis gigantea, Manidae	Giant pangolin	*ikanga*	2.3	0	La
Herpestes sanguineus, Viverridae	Slender mongoose	*bongeemu*	2.2	0	Pb, La

(cont.)

(**Table 5.** cont.)

Perodicticus potto, Lorisidae	Bosman's potto	*kachu*	1.6	4.3	La, Le
Funisciurus pyrrhopus, Sciuridae	Red-fronted squirrel	epehe	1.2	1.7	La, Le
Galago demidovi, Galagidae	Dwarf galago	*lisile*	1.2	0	Pl, La, Le
Colobus badius, Colobidae	Red colobus	*yemba*	0	4.2	Lc

(1) Local name is shown in singular form.
(2) Consumption frequency of the informants per 100 days (see also Table 13).
(3) Refer to Takeda (1978, 1984b, in preparation b) for the detailed hunting methods. Major hunting methods are Pb: net-hunting, Pk: collective bow-and-arrow hunting, Pl: individual bow-and-arrow hunting, Pm: hunting with dogs, Ps: snatching with hands, Pt: individual spear hunts, La: spring-traps, Lb: snares, Lc: deadfall, Ld: spiked traps, and Le: other traps (see also Table 6).
(4) Although legislatively forbidden to hunt, the people sometimes ask the government office for the permission to hunt in order to protect their own cassava fields or houses.
(5) Although genets, which are locally recognized in the study site, are small-spotted genet (*Genetta servalina*), large-spotted genet (*G. tigrina*), and giant genet (*G. victoriae*), they are called *simba* by a single local name.

Table 6. Traps used by the Ngandu.

Local name	Trap-setting site		Major trapped animals			Materials used for trap
	Ground	Tree	Mammals	Birds	Others	
Spring traps						
nilo	X		s, m	tb		nylon string
zekki	X		m			wire
imote	X		s	tb		*lokosa* (*Manniophyton fulvum*)
lokinga	X		s	tb		*liheke* (*Raphia gentiliana*)
bomboka	X	X	s		rt	wire
bopata		X	s, mk			*liheke*
imboka	X		s			*bokombe* (*Haumania liebrechtsiana*) *longoli* (*Eremospatha haullevilleana*)
bahaso	X	X	s	s		*longoli*
ilongalotomba[1] (= *ilongileleko*)	X		s			*bokombe*, *longoli*
ilongaliyalitoko	X		s			*bokombe*, *longoli*
ilongaliyaekochi[2]	X		s			*bokombe*
ilongaitoli[3]	X			s		*bokombe*
ilongaliyaechichi	X		s			*bokombe*
italabai	X		s	tb		nylon string, *lokosa*
inyate		X		s		*longoli*
bokolo	X		m, l			*itohe* (*Landolphia glabra*), *longoli*
lipuchu[4]	X			bp		*lokosa*
Deadfalls						
botamba[5]	X		s			log
ekwata[5]	X		s			log
ikuliya[5]	X		m, mk			log
lilika[5]	X		m, mk			log
Snares						
bopachi	X	X	mk	m		*lokosa*
*boneyi**		X	mk	hb		*lokosa*

(cont.)

(**Table 6.** cont.)

Spiked traps					
elongo	X		k		spear (steal)
bolongo[6]	X		m, l		spear (wooden)
esongo	X		l		spear (steal)
Bag nets					
*iteko (= konongo)**	X	X	s		*lokosa*
*bopone**	X		s		*lokosa*
*bolongwa**		X	mk		*lokosa*
Other methods					
kombelia[7]	X			tb	wooden cage
bokosa (= lopote)	X			s	resin of *luna* (*Landolphia congolensis*) or *bosenda* (*Saba florida*)

For the details of hunting methods, see also Takeda (1978, 1984b).
bp: birds of prey like African hawk-eagle or African fish eagle, hb: hornbills, k: king sized like elephant or hippopotamus, l: large-sized, m: middle-sized, mk: monkeys, rt: reptiles, s: small-sized, tb: terrestrial like Guinea-fowl or Congo peafowl.
*: The trap must be watched by the trapper on the spot where it is set.
(1) Fruits of *boleko* (*Ongokea gore*, Olacaceae) are used as bait, and the seeds (Irvine, 1961) are also used as bait for small rodents.
(2) Steamed cassava is used as bait.
(3) Flowers of *bosombooko* (*Aframomum* sp., Zingiberaceae) on which giant rats like, are usually used as bait.
(4) Skins of monkeys or other animals are used as bait. *Imote*, a kind of spring trap is also set.
(5) Termite hills or stones are used as a weight for pressing down.
(6) Pitfall is also dug under the ground.
(7) Sometimes *imote* is also set in front of the entrance of the nest.

There were cases of tree pangolin (*Manis tricupsis*) caught bare-handed, without the aid of any hunting implement whatsoever, and of squirrels hunted by throwing a stick at them. There were even instances of small rodents that had just been swallowed by a snake being eaten, and one case where a fresh genet (*Genetta* sp.) was taken away from an African hawk-eagle *punungoli* (*Stephanoaetus coronatus*) and eaten.

Men take spears or bows and arrows with them when they enter the forest. They will sometimes throw a spear at an animal they happen to sight by chance on the path, but success in this manner is rare.

(2) Birds

Ten species of birds, representing nine genera and five families, are eaten (Table 7). With the exception of chickens all these birds are wild. Ducks are rarely kept in the forest-dwelling village with cassava field (*behecha*) or forest-dwelling camp (*kumbo*), although they are usually raised in the larger roadside villages (*boola*).

Terrestrial birds such as the crested Guinea-fowl *lokanga* (*Guttera edouardi*), the Congo peafowl *litundu* (*Afropavo congensis*) and Nkulenge rail *bonjemba* (*Himatornis haematopus*) are caught mainly with the aid of spring traps such as the *nilo* or the *imote*, which is a binding trap made of string from the cambium of the bark of the *lokosa* woody vine[8] (*Manniophytum fulvum*, Euphorbiaceae), or with a small deadfall called *botamba*. Sometimes birds are hunted with the bow and arrow or are

Table 7. Birds consumed by the informants.

Scientific name	Common name	Local name[1]	Frequency[2] (A)	(B)	Major hunting methods[3]
Guttera edouardi, Phasianidae	Crested Guinea-fowl	*lokanga*	8.5	4.9	*imote, nilo, botamba*
Afropavo congensis, Phasianidae	Congo peafowl	*litundu*[4]	7.3	1.7	*imote, nilo, botamba*
Stephanoaetus coronatus, Accipitridae	African hawk-eagle	*punungoli*[5]	6.1	3.3	*lipuchu, likula*
Pteronetta hartlaubii, Anatidae	Hartlaub's duck	*bowa*	5.0	0	*imote, likula*
Pernis apivorus, Accipitridae	Honey buzzard	*ikolikoli*	4.7	0	
Guttera edouardi, Phasianidae	Crested Guinea-fowl (egg)	*lokanga*	3.8	1.6	
Gallus gallus domesticus, Phasianidae	Chicken#	*nkoko*[6]	3.6	6.8	
Himantornis haematopus, Rallidae	Nkulengu rail	*bonjemba*	3.1	3.1	*imote, nilo, botamba*
Tropicranus albocristatus, Bucerotidae	White-crested hornbill	*lochumba*	2.3	2.2	
Bycanistes cylindricus, Bucerotidae	Brown-cheeked hornbill	*yaata*[7]	2.2	4.7	
Gallus gallus domesticus, Phasianidae	Chicken(egg)#	*nkoko*	2.1	6.5	
Cuncuma vocifer, Accipitridae	African fish eagle	*eikei*	0	3.2	*likula*
Phasianidae	Quail	*bongongo*[8]	0	1.7	

#: Except for this poultry (and their eggs), other birds (and their eggs) consumed are wild.

(1) It is shown in singular form.

(2) Consumption frequency of the informants per 100 days (see also Table 14).

(3) Refer to Takeda (1978, 1984b, in preparation b) for the detailed hunting methods, but birds are usually hunted with spring traps (*imote, nilo,* and *lipuchu*), a small version of the deadfall (*botamba*) or by individual bow-and-arrow hunts (*likula*) (see also Table 6).

(4) The female of this bird is called *bosukulu,* while the male is *mbeka.* The feathers of the former are used for the feathers of an arrow.

(5) In hunting this bird with bow-and-arrow, a high-pitched cry (*lomao*) is also usually used by the hunter in order to draw the bird closer (Takeda, 1978, 1984b).

(6) The people recognize eight breeds of chickens according to the color of the feathers: *bojia, bokoko, bokoli, bosulu, boyenge, hichi, ipepe,* and *lohongo.*

(7) The small-sized bird of this species is called *bolongo,* while the large-sized one is *bongonde.*

(8) It is also called *isenjuli.*

grabbed from the nests they hide in. Occasionally, for a snack, children and old people will catch small birds by using glue made from the sap of the apocynaceous *luna* tree (*Landolphia congolensis*) or *bosenda* tree (*Saba florida*). Two uncommon traps also exist, the *lipuchu* for catching African hawk- eagles and the *kombelia* for catching Guinea fowls. Guinea-fowls may be captured by hand, without the aid of any hunting implement whatsoever, or by throwing a machete at it, but rarely.

(3) Reptiles and amphibia

Most of reptiles and amphibians are opportunistically caught while traveling or during hunting, except frogs and tadpoles. These are mainly captured by the fishing method of bailing (*puhanse*). Reptiles of 12 species are totally eaten, including one species of land turtle, one hardshell aquatic turtle, one species of crocodile, eight species of snakes and one lizard (Table 8).

Three species of frogs and tadpoles are eaten. In addition to these three, the Ngandu formerly ate two other species that they no longer eat. Captured frogs are usually consumed by women and children; men rarely eat them. These are often caught along with fish, so they have been included in that category (Table 9).

(4) Fish

The most abundant and diverse supply of freshwater fishes are found in Equatorial Africa and Zaire. The Zaire basin is rich in indigenous fish, of which probably over 80% are endemic to the Zaire region (Lowe-McConnell, 1975). Among the Ngandu, the inhabitants of areas near the Tshuapa River and Luo River are almost exclusively fishermen who are called *bolinga*, and as expert fishermen they usually set up camps to fish. In the interior forest, however, the most common type of fishing is bailing called *puhanse* and is conducted by women and children. This method of fishing is utilized for not only fish but also shellfish, shrimps, crabs, aquatic invertebrates such as dragonfly nymphs and predacious diving beetles and amphibia (tadpoles and frogs). The Ngandu eat 29 species of aquatic animals representing 23 genera and 18 families plus unidentified species (four unidentified fish species and one unknown fish). Most of these animals are mainly captured with the *puhanse* method (Table 9).

Puhanse involves building dams (*konge*) made of fallen trees, river sand, earth, branches, leaves, etc. The water pooled by such a dam is then bailed out with pots or baskets (*lichungu*). Sometimes dams are built above and below where the river splits into several rapids. In such cases, the dams are not built across the whole width of the river but instead, across where the rapids wind through the center of the river. The fish are led into deep holes near the roots of trees on the riverbank where the water level declines, or captured by hand or net (*lisangi*; a woman's hand net) when the water level of the dam is low enough to allow easy catching. The fish are collected one by one as they flop about on the nearly dry riverbed or try to furrow under dead leaves and mud. The bailing method clouds the water, so a *puhanse* is begun downstream and proceeds to different places upstream. This method insures that the fishermen will go home with a catch.

When conducting a *puhanse*, women take with them a hand-net, or *lisangi*

Table 8. Reptiles consumed by the informants.

Scientific name	Common name	Local name[1]	Frequency[2] (A)	(B)
Osteolaemus tetraspis, Crocodylidae	Dwarf crocodile	*lokokwele*[3]	12.5	3.7
Kinixys erosa, Testudinidae	Hinge-backed tortoise	*eulu*	10.2	10.3
[Chelonia]	Tortoise (hardshell; aquatic)	*eyale*[3]	5.5	1.6
Varanus niloticus, Varanidae	Nile monitor	*lombe*	4.7	0
Naja melanoleuca, Elapidae	Black cobra	*biilimi*	2.7	1.6
Elapsoidea sundevallii, Elapidae	De Costers' garter snake	*ibolui*	2.4	0
Bitis nasicornis, Viperidae	Rhinoceros viper	*mpele*[3]	1.1	6.5
B. gabonica, Viperidae	Gaboon viper	*lichulambwa*[3]	0	3.2
Dendroaspis jamesoni, Elapidae	Green Congo mamba	*lokonga*	0	1.7
Python sebae, Boidae	Common African python	*nkuma*	0	3.8
Naja nigricullis, Elapidae	Black-necked cobra	*bongeema*	0	5.4
Natrix anoscopus, Colubridae	Brown water snake	*liyoi*	0	2.9

[ ] : Order name.

(1) Local name is shown in singular form. The irregular plural form is Nile monitor (*lombe*, plural; *jyombe*). *Lokokwele* is *lokesa*, *mpele* is *ichuha*, and *lichulambwa* is *liate* in the words of the Mongo.

(2) Consumption frequency of the informants per 100 days (see also Table 15).

(3) These aquatic animals are also caught at the time of bailing (*puhanse*) done by women and girls.

Table 9. Fish and acquatic animals consumed by the informant.

Scientific name	Local name[1]	Frequency[2] (A)	Major fishing methods[3] In the study site	Outside the study site
Tilapia tholloni, Cichilidae	*likoke*	35.9	*puhanse*	*bonjanga, longongo*
Clarias buthupogon, Clariidae	*mbeli*[4]	31.0	*puhanse*	*bonjanga, dopani moke iyumbwa,*
Clariallabes melas, Clariidae	*lohongo*	14.3	*puhanse*	
Macrobrachium sp., Palaemonidae	*bohali*	14.1	*puhanse*	
Barbus miolepis, Cyprinidae	*bokuho*	13.7	*puhanse*	*boteteliya, liyololo*
Ptrocephalus sp., Mormyridae	*lohumbe*	13.7	*puhanse*	*dopani moke*
Brachypetersius huloti, Characidae	*lilanga-lohonde*	12.1	*puhanse*	*boteteliya, botono*
Chrysichthys sp., Bagridae	*likoku*	11.1	*puhanse*	*bonjanga, dopani. longongo*
Clariallabes sp., Clariidae	*lipulu*	10.8	*puhanse*	
Eutropius grenfelli, Schilbeidae	*lolangwa*	9.4	*puhanse*	*bonjanga, dopani moke*
Ctenopoma nanum, Anabantidae	*eyunju*	8.9	*puhanse*	
Amphilius maesi, Amphillidae	*esimi*	7.7	*puhanse*	
Barbus christyi, Cyprinidae	*lohonde-bolima*	5.9		*boteteliya, liyololo*
Ctenopoma nigropannosum, Anabantidae	*booli*	5.7		*dopani moke*

(cont.)

(**Table 9.** cont.)

Stomatorhinus sp., Mormyridae	*lohulu*	5.5	*puhanse*	
Gnathonemus schiltuisi, Mormyridae	*botoha*	5.1	*puhanse*	
Auchenoglanis sp., Bagridae	*likanga*	5.1	*puhanse*	
Epiplatys sexfasciatus, Cyprinodontidae	*bunika*	4.4	*puhanse*	
Xenomystus nigri, Notopteridae	*lokombe*	3.7		*bonjanga*
Hydrocyon sp., Characidae	*benga*	3.5	*puhanse*	
Mastacembelus brevicauda, Mastacembelidae	*bokaka*	3.1	*puhanse*	
Polypterus palmas, Polypteridae	*boonga*	3.0		*bosoi, dopani*
Clariallabes brevibarbis, Clariidae	*lokamba*	2.8	*puhanse*	
Clariidae	*bopoto*	2.4		
Barbus hulstaerti, Cyprinidae	*lalale*	2.4	*puhanse*	
Malapterurus electricus, Malapteruridae	*nchula*(5)	1.5		*bonjanga, bosoi, dopani*
Protopterus dolloi, Protopteridae	*nsembe*	1.3		
Ophiocephalus obscurus, Ophiocephalidae	*nsinga*	1.3		*bosoi*
Gymnarchus niloticus, Gymnarchidae	*ndondo*(6)	1.1		
?	*litoke*	4.2	*puhanse*	
?	*boseke*	5.0		
?	*butulu*	4.4	*puhanse*	
?	*eninga*	4.4		*boteteliya, liyololo*
?	*bolanga*	1.7		*liyololo*
?	?	2.4		

(1) Although the plural form of *lolangwa* is irregularily *dangwa*, the local name is shown in singular form; all belong to the category of fish except *bohali* and *litoke*. The former is a kind of acquatic shrimp, and the latter is the tadpole of frogs like *bokokele, bokolokolo, elenge, embondo, emei, ihanda, linongo*, and *lumu* (all unidentified; see also Table 15). *Bonga* is called *nkonga* in the words of the Mongo. *Bokuho* is also called *lohonde-lokuho* or *liyololo*, *lohulu* is *lohulongo*, and *lilanga-lohonde* is called *lohonde* for short.

(2) Consumption frequency of the informant "A" per 100 days (see the text and also Table 16).

(3) There are largely two fishing methods done by the Ngandu. One is done in the small river near *behecha* or *kumbo*, and another in the larger river where some small rivers join together. In the study site, a fishing method by bailing (*puhanse*) is daily and prevalently carried out by women and girls, while the methods utilizing fishing hooks or nets in the larger rivers are usually done by men. In the latter, there is fishing with hooks (*bekolota, dopani*, and *liyololo*), gill nets or hand-nets (*bonjanga, boteteliya, botono*, and *lisangi*), fishing with spears (*bolonda* and *bosoi*), traps (*etambo, iyumbwa*, and *longongo*) and other types.

(4) Hulstaert (1957) describes this fish as *Clarias angolensis*. His study site is located near Boende Town (Fig. 1) where lots of inhabitants of the Mongo live. The adult of the fish is called *ngolo* in the language of the Mongo as well as in the language of the Ngandu.

(5) It discharges a weak electric current, which is not so strong as that of the electirc catfish (*Malapterurus electricus*) which is mainly caught in the Luo River.

(6) It is not always consumed by women.

(properly called *lisangi-loyoto*, which means a woman's net). This net is made by weaving string made with fiber taken from the cambium of the woody euphorbiaceous vine *lokosa* (*Manniophytum fulvum*). The net, however, is made entirely by men. The *lisangi* is a collective term for a type of net that includes one called *botono* used in fishing. It is a fine-meshed net with mesh size less than one centimeter that is stretched across a circular wooden frame (*mbula*) and tied by a single vine. Usually, only the net itself (i.e., not the frame) of the *liheta* bag-net used by men is brought from home; the frame is made at the fishing site from whatever is available. The size of the mesh nearest the frame is only a little over two centimeters even when streched. The mesh size near the hole at the tip of the net (*botono*) is fine enough to prevent fish from escaping the net once they have entered. The largest nets are over four meters in length and are attached to a frame that is 1.5–2.0 meters in diameter. There are two handles (*bokumba*) tied onto the net near the middle. Overall, the net is oval-shaped.

Sometimes a type of fish poison (*boita* or *boicha-isongo*) is used to stupefy the fish. The poison is taken from the leaves of either the cultivated *lohange* herb (plural, *pange*; *Tephrosia vogelii*, Papilionoideae) of the family Leguminosae or from the leaves and bark of *itoko* tree (unidentified). Such poison is often mixed with red-pepper leaves, ground and released in the water above the dam. The bark of the *bolemba* vine (*Amphimas pterocarpoides*, Papilionoideae) of the family Leguminosae is similarly ground and released in the water. In either case, poison is used to reduce the physical labor involved in bailing out the water, and is seldom utilized in *puhanse* conducted by young women.

Puhanse are frequently conducted in February and March, when there is little rain. In this season, the swamps bordering the rivers are reduced to many pools of water (*elende*). These are formed by the receding rivers which had invaded the forest during the rainy season. This period when the river level is low is called *elanganse* or *bokalu*. At this time, as well as in June when the seeds of *boloko* tree (*Blighia welwitschii*, Sapindaceae) and/or *lokengo* tree (*Mammea africana*, Guttiferae) mature both men and women conduct large-scale fishing expeditions and release fish poison into the tributaries of the Luo River. These expeditions are different from the small-scale operations. In small-scale operations, bits of leaves to be used as fish poison are rubbed between the hands and immersed in small pools of water in the middle of the riverbed. The fisherman then simply waits for fish to turn belly up. The large-scale operations involve all the people who live along an entire river tributary and who clear the river of fish. First, the fruit and bark of the melicaceous *lileko* tree (*Turracanthus africanus*), or the fruit of the *iyongo* tree (unidentified) or *lokengo* tree (see above) are ground and released upstream. Meanwhile a fence is built across the mouth of the river to narrow it and a large net (*liheta*) is placed across the opening to catch fish coming downstream. After these fish-poisons are released, the Ngandu are temporarily unable to use the river for drinking water.

Near the mouth of the Bowa River, there is another method of fishing in use called *boteteliya*. It is conducted by two men at a place where the river splits into

rapids (such a place is called *bokeli*); they use the tributary, not the main river. A nest (*esele*) of ants (*Crematogaster* sp., Formicidae) called *londoolo* that build nests in trees, is severed from the tree with a machete. The nest is hung from a tree branch hanging over the river and set on fire by one man who is stationed upstream. The man then breaks the hive with a machete, thus spilling the imagos inside into the water, where they act as bait for the fish. The other man downstream stretches a bag-net (*liheta)* across the full width of the river while the first man, careful of his timing, wades into the water and drives the lured fish downstream.

There is another method used on the lower reaches of the Bowa River and wherever the water is rather shallow. This involves two to three men (who all go into the water) equipped with a *liheta* bag-net. One man positioned upstream, called the *chummi*, uses a stick (*likula*) made from a kind of vine called *puti* (*Dalbergia saxatilis*, Papilionoideae) of the family Leguminosae to beat the banks, surface and bottom of the river to frighten fish and drive them downstream. A second man further downstream, called the beater (*ichinda*), also beats on the water and drives the fish further downstream into a net. The *botoalisangi*, who is stationed furthest downstream, holds the handles (*bokumba*) of the net. When the fish come into the net, he lifts the *liheta* net out of the water.

The inhabitants of the village of Wamba, who fish in the Luo River, frequently use a variety of fishing implements that include fishhooks (*dopani*), nylon gill nets (*bonjanga*) and fish traps. They also use a trolling method in which the fruit of the *bosenge* tree (*Uapaca heudelloti*, Euphorbiaceae) is used as bait (*lohamba*). The Ngandu collect the yellow-skinned fruit of the *bosenge* tree growing in the swamps. If the fruit is not ripe yet, they boil it first. The *bekolota,* another trolling method, is used chiefly to catch *boto* fish (*Distichodus* sp., Citharinidae). The matter of fishing in detail will be discussed elsewhere, but I note here that there are some fishermen called *bolinga*, who are so skilled that they do practically nothing else. *Bolinga* men regularly set up fishing camps along the river where they stay overnight to fish.

(5) Insects

Insects are called *ichingo* (plural, *tochingo*). Larvae in particular are used as food and are called *luuma* (plural, *bauma*). Including *luuma*, the number of species of insects that serve as food for the Ngandu totals 51, including one species that was eaten only in the past (Table 2).

The Ngandu eat 21 species of insects representing 11 genera, eight families and four orders (Table 10). Both the larvae and the pupae of *boona* (*Pseudantherea discrepans*, Saturniidae) are eaten. The number of species of which only the larvae are eaten totals 15. Only the imago of two species are eaten. In addition, four species of wild bees are eaten.

Except for the water insects such as dragonfly larvae and predacious diving beetle that are caught during fishing by bailing (*puhanse*), all edible insects are caught on land. Although men sometimes gather small quantities of fairly large larvae of species that do not reproduce in large numbers at one time, it is the women and children who gather the bulk of the insects.

Table 10. Insects consumed by the informants.

Scientific name	Local name[1]	Stage[2] eaten	Frequency[3] (A)	(B)	Major host plants[4]
Noctuidae	*isusu*#[5]	l	28.1	27.1	*langa, liyamba*
Pseudantherea discrepans, Saturniidae	*boona*#	l	9.6	7.7	*bosenge, likoke*
Macrotermes sp., Termitidae	*likalolo*[6]	i	8.2	26.1	
Notodontidae	*lokoo*#	l	7.0	3.2	*bosefe, bokolombe, bokongo*
Anaphe sp., Notodontidae	*ihumbo*	l	6.4	2.9	*bohumbo*
Saturnia sp., Notodontidae	*lihakala*#[7]	l	4.5	3.6	*bokumbo, bolanga, bosenge*
Apis mellifera adansonii, Apidae	*lounjue*[8]	h	3.9	8.4	
Saturniidae	*botoa*#	l	3.5	0	*bopola, bosomba*
Pseudatherea discrepans, Saturniidae	*boona*	p	3.3	0	
Vespidae	*iku*	l	3.3	1.6	
Vespidae	*losongo*	l	2.9	3.2	
Trigona sp., Apidae	*elungu*	h	2.9	3.4	
Nudaurelia dione, Saturniidae	*lilangachike*[9]	l	2.5	2.7	*bochumbe, bosenge, langa*
Anaphe infracta, Notodontidae	*ilanga*	l	2.2	0	*bolanga, bohumbo*
Trigona gribodoi, Apidae	*mbolo*	h	2.2	0	
Dactyfurina standingeri, Apidae	*luchu*	h	1.6	0	
Lepidoptera	*bolenga-luuma*	l	1.3	0	*bolengalenga*
Rhynchophorus phoenicis, Rhynchophoridae	*lohose*	l	1.3	0	*bolilo, liheke, nkele*
Lobobunaea goodi, Saturniidae	*lingonju*#	l	1.1	4.8	*bokungu, bosenge*
Scarabaeidae	*nsungu*	i	1.1	0	
Saturniidae	*ikeninga*#	l	0	1.8	*bokeninga*
Nymphalidae	*bosake*	l	0	1.4	*bosakesake*

#: Stored foods.

(1) Although the local name is shown in singular form, the plural form of *luchu* and *lohose* is irregularily *bauchu* and *pose*, respectively.

(2) Stages eaten are h: honey, i: imago, l: larva, and p: pupa.

(3) Consumption frequency of the informants per 100 days (see also Table 17).

(4) Scientific names of major host plants are the following trees; *bochumbe* (*Musanga cecropioides*, Moraceae), *bohumbo* (*Grewia coriaceae*, Tiliaceae), *bokolombe* (*Staudia stipitata*, Myristicaceae), *bokongo* (*Baikiaea insignis*, Caesalpinioideae), *bokumbo* (*Leonardoxa romii*, Caesalpinioideae), *bokungu* (*Piptadeniastrum africanum*, Mimosoideae), *bolanga* (*Bridelia brideliifolia*, Euphorbiaceae), *bolengalenga* vine (*Cissus* sp., Vitaceae), *bolilo* (*Raphia sese*, Palmae), *bolo* (*Irvingia smithii*, Irvingiaceae), *bopola* (*Alchornea floribunda*, Euphorbiaceae), *bosakesake* (*Caloncoba welwitschii*, Flacourtiaceae), *bosefe* (*Symphonia globulifera*, Guttiferae), *bosenge* (*Uapaca guineensis*, Euphorbiaceae), *bosomba* (*Funtumia africana*, Apocynaceae), *langa* (*Brachystegia laurentii*, Caesalpinioideae), *liheke* (*Raphia gentiliana*, Palmae), *likoke* (*Macaranga monandra*, Euphorbiaceae), *liyamba* (*Albizia* sp., Mimosoideae), and *nkele* (*Elaeis guineensis*, Palmae).

(cont.)

When gathering honey, the Ngandu will sometimes chop down a tree. They can discern such trees with a hive either by the presence of bees going into and coming out of a hole in the tree or by placing an ear near the hole and listening for signs of activity. If the tree is not cut down, the Ngandu will gouge a hole about the size of a man's fist in the trunk of the tree. A torch is lit, the bees are smoldered out, and someone reaches into the hole and pulls out the hive. Men carry axes from the homes for the work even if it is a woman who actually finds the tree with a beehive. The Ngandu, unlike the Tongwe of the wooded savannas of western Tanzania (Takeda, 1984a, 1976), do not raise bees (*Apis adansonnii*) to get honey, nor do they utilize beeswax. Because the imagos of the *losongo* and *iku* wasps (both Vespidae, but unidentified) of Hymenoptera will sting, the Ngandu take the hives only under cover of smoke. Both these insects build their hives in trees.

The gathering of edible insects involves no tree-climbing. Instead, the Ngandu gather insects that crawl on the ground, leaves and branches within arm's reach. Most of the food insects live on different species of host trees (see also the footnote (4) of Table 10 as to the major host plants). The locations of these trees serve as markers for gathering particular larvae that feed on their leaves. The Ngandu do not cut down the host plants.

The lepidopteran *isusu* (plural, *tosusu*) larva of the family Noctuidae is one of the first caterpillars to appear during the months of August to November, when insects breed in large numbers. The sound they make when eating the leaves of caesalpinioideous *langa* tree (*Brachystegia laurentii*) is loud enough to be heard. The Ngandu estimate when the insects fall to the ground in the greatest numbers after devouring the leaves. Then, they go out and gather them. The insects are gathered one by one and put in a pot. The work involves much bending over and is very hard on older women. A younger woman or a child can gather as much as 2,000–3,000 *isusu* larvae in four hours.

Termites, specifically the winged reproductives that come swarming out of anthills just before the beginning of the rainy season are widely consumed as food among the African tribes (Bodenheimer, 1951). The Ngandu, however, gather massive-headed, curve-jawed soldiers of Macrotermes species rather than the winged reproductives (*lolonge*; plural, *ndonge*). The gathering of these termites that build large mounds in the forest is done by women and children. Several implements are

(5) In addition to *isusu*, larvae of *isusu-lenjele* and *isusu-ikotakota* are also food insects. The host plant of the former larvae is the *benjele* tree (*Macrolobium coeruleoides*, Caesalpinioideae), and of the latter one is the *likotakota* tree (*Pycnanthus angolensis*, Myristicaceae).

(6) The termite soldiers (*likalolo*) are gathered, then cooked after pounding in a mortar, but are sometimes eaten alive on the spot while gathering; winged reproductives (*lolonge*, plural; *ndonge*) and termite queen (*ngangakuna*) are usually cooked and rarely consumed raw.

(7) The *lihakala-angombe* larva whose host plants are the *bolo* tree (*Irvingia smithii*, Irvingiaceae) is also an edible caterpillar.

(8) As the larvae of four Apidae spp. are usually consumed in small amounts together with the honey, these larvae are included in this Table.

(9) Only the larvae of this insect belong to the food restriction group (see also Table 24).

required. One is a duster-shaped tool that has a slender shaft. The tip is cut in the shape of a vertical cross to which strips of bark from the subterranean roots of meliaceous *lipute* tree (*Turraea vogelii*) are tied in place. This implement is sometimes called by the name of the *lipute* tree from which it is made. Another implement is made by inserting part of the pod of the mimosoideous *bolese* tree (*Tetrapleura tetraptera*, Leguminosae) in a slit at one end of a stick. A lump of charcoal made from one or both of the *bolembo* tree (*Glyphaea brevis*) and the *bofumbo* tree (*G. coriacea*), both of which belong to Tiliaceae, is then applied between the two open prongs of the stick. A third tool is a standing torch that is prepared beforehand in the village. The gatherers walk through the forest and select an termitarium. They then use a machete to cut a long and thin vertical gash in the side of the mound from about the middle to the middle half of the top third of the mound, where it inclines obliquely. The duster-shaped implement is thrust into the hole, *lipute* end first. Then the odor of the *bolese* pod and the smoke form burning charcoal are blown into the hole. Sometimes the gatherers spit on the *bolese* pod. The termite soldiers come pouring out of the hole, bite into the strips of *lipute* and attach themselves to it. The *lipute* is then withdrawn from the hole and struck on the side of a basket to dislodge the termites into the basket. The inside of the basket is lined with large leaves of the marantaceous *lokongo* herb (*Sarcophrynium schweinfurthianum*) beforehand. The leaf surface is smooth and slippery, making it impossible for the termites to climb out. This activity is repeated several dozen times. When the number of termites so taken decreases substantially, the gatherers move on to another mound. Unlike capturing the winged reproductives that swarm out of the mounds just before the beginning of the rainy season, the Ngandu method has the significant advantage that it can be conducted at any time throughout the year, without regard to the seasons.

The Ngangu do not indiscriminately cut down the palm trees that are host plants to the hives of the coleopteran (beetles) *lohose* larvae (plural, *pose*; *Rhynchophorus phoenicis,* Rhyncophoridae) or *likio* larvae (*Augosoma centaurus*, Scarabaeidae). Instead, they cut down a tree only after they detect faint sounds that the living larvae make inside the trunk. Also, they somtimes take beetle larvae from oil palm trees previously felled to make palm wine, as beetles sometimes lay their eggs in the trunks of such fallen trees.

Food imagos are usually gathered after a chance discovery. Food larvae can be gathered in large numbers. Such advantage does not exist when gathering imago which, with the exception of the termites, usually can only be taken one by one.

Sometimes food insects are allowed to grow a little larger before gathering. Such is not the case for pupae, that the Ngandu have a marked preference for. Pupae that are just developing and are soft is a favorite among things the Ngandu like to eat, but not the already hardened pupae.

(6) Livestock and poultry

The Ngandu raise five kinds of livestock: Pigs, goats, sheep, dogs, and cats. With the exception of dogs, these animals are normally raised in the larger villages. Dogs

and cats are not recognized as food. During the recording period, however, none of the other animals were eaten either.

Ordinary chickens as well as a bald-headed variety (*nkolokolo*), and ducks are raised in the larger villages (*boola*). The ordinary chicken and its eggs are eaten (Table 7).

3. Processed Foods

Stores and markets that sell processed foods do not exist in every village. It is possible to purchase such daily miscellaneous manufactured items as canned food at towns that have a government office or a church mission. However, the purchasing power of the people is by no means large, and they find little cause for leaving the village along the roadsides. During my period of field study, two kinds of canned goods (canned sardines and Chinese luncheon meats), as well as condensed milk and four types of soup mixes, were purchased, bartered or received as gifts, but these were consumed infrequently (Table 18).

4. Liquors and Other Beverages

The distilled liquors and other beverages drunk during the recording period are given in Table 18. The records made no distinction between liquors made from maize and bananas and liquors made from sugarcane, and have been combined into one group.

Distilled liquors (*baana-koin*) made from maize and bananas are bottled in old beer bottles and sold. In the settlements, the sale of these liquors constitutes a source of cash income for women. The liquor occasionally made in the *behecha* is not sold but consumed for pleasure. Liquor is made by wrapping maize seeds in palm leaves and soaking them in the river for about a month. The maize seeds are then removed and left to dry on special drying racks (*boliko*) in the home for about a month until they germinate. The seeds are then mixed with dried and pounded cassava and placed in an earthen container with water. The mixture is stirred by hand as it is heated, then ladled by hand into another container of water and sealed. The mixture is fermented for a week or two. The contents are then distilled with homemade stills for which the steam is constantly adjusted and bottled (Fig. 3). From start to finish, the whole process is carried out by women.

The palm wine (*nkele*) of the oil palm (*Elaeis guineensis*, Palmae) or wild raffia palm (*Raphia sese*, Palmae) that grows in the swamps along the Luo River is made by collecting the sap from fallen palm trunks and letting it ferment naturally. Both kinds of palm wines are collected by men. The Ngandu do not practice stem-tapping, a process in which the sap is collected by drilling a hole in an upright living tree.

Sugarcane wine (*baana-songo*) is made by cutting stalks of sugar cane to 20 or 30 centimeters in length, placing them in a boat-shaped mortar (*mbole*), and pounding them with a wooden pestle (*botuti*). The pulp is then pressed (the press is called *lounjya*). In order to make the liquor stronger, the *bochumbe* tree[9] (*Musanga*

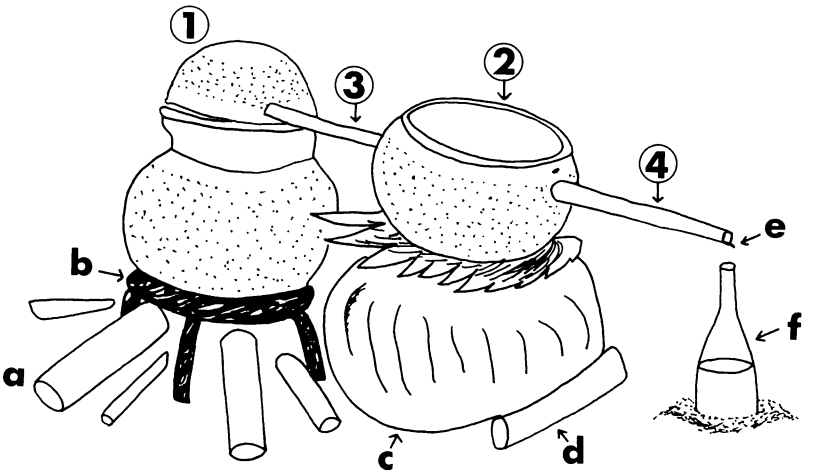

Fig. 3. Liquor-distilling process.
Distilling liquors (*baana-koin*) which are made from maize (*lisangu*) or from bananas (*likemba*) is the role of women. Liquors made from maizes are called *lotoko*, while liquors from bananas *likemba*. Re-distilled liquors which are sometimes made in the village (*boola*) are called *sengiisa*. It is very strong because of its alcoholic content. Two bottles of *sengiisa* are usually obtained by re-distilling five bottles of *lotoko* or *likemba*. Liquor-distilling is done inside the house. Lots of firewood is used for distilling. A lot of smoke and heat is generated under these conditions and makes the task severe. A vessel full of cooling water is sometimes mixed by hand to adjust the temperature and the amount of firewood. Water is sometimes poured on the pipe between the vessels to cool the pipe, too. When the amount of liquefied alcohol amounts to one-third or half a bottle, the bottle is removed, and then another container is placed where the bottle was in order that the impure alcohol does not intermix with the previously-dripped liquor. The quality of liquor is determined by the amount of impure liquor it contains. This impure alcohol is not thrown away, however, but is usually drunk by someone.
a: Firewood; b: Steel trivet; c: A lump of termite hill; d: Stabilizing wood; e: In order to drip the alcoholic liquid smoothly, a piece of banana pith is inserted in the end of a pipe (*kano*); f: A bottle whose bottom is placed into the ground so that it will not fall over.
① A upended basin-shaped vessel serves as a lid for an earthen vessel full of fermented liquid which is heated with firewood.
② A vapor-cooling vessel full of water is sometimes stirred by hand. In order to stabilize the vessel on the lump of a termite hill, pieces of torn board or herb stalk are put between the vessel and the lump of termite hill.
③ An aluminum pipe (*kano*) is pierced through this vessel. Steamed and pounded cassavas are also stuffed into the slightly open entrance and exit of the pipe where the pipe is not cooled directly, in order that the cooling water does not leak.
④ An aluminum pipe (*kano*).

smithii, Moraceae) is soaked in water, which it absorbs; the reddish-brown bark is then stripped off and similarly pounded, and the juice is mixed with the sugar-cane juice. The mixture is then filtered through a basket (*lichungu*) and poured into a round gourd. The gourd is hung above the hearth at home, where it is heated for about a day to ferment. Sugar-cane wine, like palm wine, is a weak liquor made by men. Sugar-cane wine in particular is often used to treat unexpected guests and as an offering to the ancestral spirits (*bolimo*) (Takeda, 1984a) because it can be made fairly quickly.

There was a temporary halt in 1974 to the buying of coffee due to the nationalization of the plantations that used to buy up the coffee cultivated in all the villages. Buying resumed in about 1976 under private operation. The Ngandu drink un-

sweetened coffee. The coffee is made by roasting and then grinding only the beans of the coffee that is cultivated in the larger villages as a cash crop.

II. Food Preparation and Storage

Usually, women bring cooked food to either the *losombo* (a kind of gossip hall which also serves as the meeting place) or to a room where the men are. The men who are gathered at these places help serve the food to any guests present. Most of the time, food is eaten with fingers after the hands are washed with water brought for that purpose. Cassava, the main dish, is cut to one handful and placed on a dish. This lump of cassava is then further cut into smaller pieces with a piece of string, or the like. Side dishes are placed on a single dish or in a pot. The Ngandu use spoons or cut pineapple leaves to scoop up foods that are hard to eat with the fingers. Food is usually eaten several times a day.

Water brought for mouth-rinsing or hand-washing is shared, starting with the first person to finish eating. Sometimes men will clear away the dishes, but cleaning up is women's work. Women gather the utensils and carry them to the river, where they wash them with sand. They do not use soap.

A man with more than one wife (*yaata*) eats foods prepared by each wife.

A general feature of Ngandu cooking is not so much barbecuing foods wrapped in marantaceous leaves, as is a kind of three-way steaming. Foods are placed above hot ashes in the center of a hearth made with three burning logs set concentrically.

1. Cassava-Cooking

The cassava the Ngandu consume most frequently as a main dish is the bitter cassava. It is prepared by soaking it in water for three or four days, heating it and then pounding it (Fig. 4). There is also a kind of sweet cassava (called *bokuho*) that is roasted and eaten without soaking. It is not cultivated much and is only eaten to fill the stomach temporarily. Small amounts of this sweet cassava are split and roasted directly over a fire, or wrapped in leaves and then roasted, without first heating and pounding it.

Cassava leaf cooking, called *liwa*, typically accompanies cassava just removed from water, split and then steamed in an earthen vessel. While the leaves of the cassava are boiled in the vessel, leaves of the marantaceous *lokongo* herb (*Sacrophrynium macrostachyum*) are laid over the top of the vessel. The cassava is then peeled, laid on top of the *lokongo* leaves, covered with its leaves, and steamed. The amount of food prepared this way is enough for one meal. By contrast, the most common everyday method involves crushing soaked cassava through a coarse sieve (called *buyongola*) to produce large grains, which are then wrapped in leaves and steamed in an earthen vessel. Water is placed in the vessel and stems of the marantaceous *bokombe* herb (*Haumania liebrechtsiana*) are bent to form a pad around the sides of the pot. Then, *lokongo* leaves are placed over the top of the vessel and the damp granules of sifted cassava are placed on these leaves. A steam-hole is made

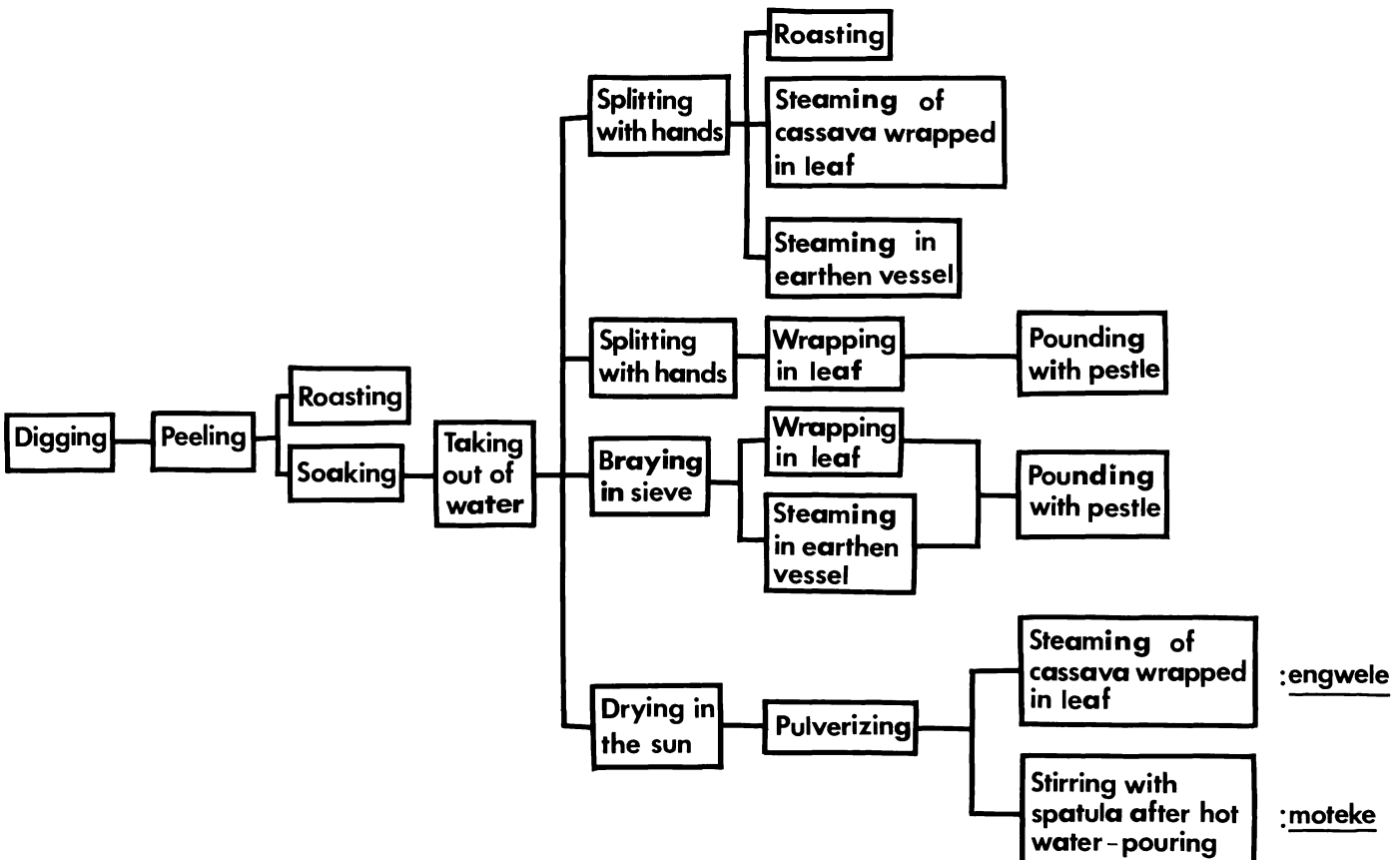

Fig. 4. Cassava-cooking process.

and the cassava is steamed. Thereafter it is placed on a flat bamboo basket called *ehese*, pounded, and kneaded with a stick. This method of cooking, called *maatapoke*, allows one to prepare a volume of approximately 12 kg at one time. This quantity is either divided into four portions and wrapped in leaves for immediate consumption or to be given to close relations, or saved for the next day. Portions saved for the next day are consumed only after rewrapping them in fresh leaves and reheating it near the fire, and returned once more to the mortar (*elingi*) and pounded. Cassava heated in leaves is sometimes also placed in a mortar or basket, pounded and kneaded.

The drying of soaked cassava and making it into flour is called "fufu." Although it is a common method of preparation among the tribes of the lower Zaire River, it is rare among the Ngandu. The Ngandu do have methods for steaming leaf-wrapped cassava in earthen vessels (*engwele*) and for cooking dry flour by pouring the flour into boiling water and kneading it with a spatula (*moteke*). But they cannot obtain the fine-meshed metal sieves needed to make flour and so they pound dry lumps in a mortar. However, these traditional methods of the Ngandu may be related to the humid environment of the tropical rain forest, to the amount of time and labor involved, or to the matter of taste of the Ngandu. There is a type of cooking called "fufu" in the yam belt of west Africa (the yam-producing agricultural culture complex of the Guinea coast) in which not only once-cooked cassava but also yams and plantains are similarly pounded in mortars (Nakao, 1974; Takeda, 1990). Such a method is not seen among the Ngandu, however.

2. Cooking of Cassava Leaves

Cooked cassava leaves are the most frequently consumed vegetable side dish of the Ngandu. The leaves of overripe or still unripe cassava are never used. The most common method of preparation, called *liwa* or *boloho*, involves pounding with a wooden pestle each plucked leaf into a paste and then boiling it in an earthen vessel. Crushed red peppers are always added, as is salt and a little palm oil. Sometimes a type of small river prawn called *isini* (unidentified) is added, as are edible larvae such as *boona* (*Pseudantherea discrepans*), *ilanga* (*Anaphe infracta*), *isusu* (Noctuidae), and *likio* (*Augosoma centaurus*) (Table 10). Often elephant meat is added in small chunks.

A type of food called *eoke* consists of pounded cassava leaves with palm oil. The mixture is then wrapped in marantaceous leaves, placed above the hot ashes in the center of a fire and heated. *Ikalanga* is made by rubbing cassava leaves on the insides of an earthen vessel and drying them as thoroughly as possible. Then they are pounded to a paste in a mortar; palm oil is added and the mixture boiled. Two dishes, *tokonga* and *bochuchu*, are made whenever there is no palm oil. The first consists of wrapping pestle-pounded cassava in two or three fresh cassava leaves and placing the bundles near the fire to heat. The second consists of simply boiling pounded cassava.

3. Cooking of Other Plant Foods

The family names of the plants involved are referred to in Tables 3 and 4.

(a) Foods that are dried and pounded before eating include *bokana* nuts (*Panda oleosa*), from which the germ ball is removed before drying. Pumpkin seeds (*Cucurbita* sp.), though sometimes eaten dried, are usually pounded and flavored with salt, red pepper and palm oil and then heated.

(b) Steamed foods include *bosou* fruit (*Dacryodes edulis*), maize and plantains, which are heated by placing them near hot coals or fire.

(c) Foods that are smoked in earthen vessels include root stalks and wooden mortar-pounded maize.

(d) Foods that are wrapped in leaves and baked include eggplant, the pith of the *bokau* herb (*Ancistrophyllum secundiflorum*), *kookumbo* leaves (*Schotia romei*) and *bofili* (*Scorodophloeus zenkeri*) leaves, as well as seeds such as *bokaso* (*Tetracarpidium conophorum*) and *bosemu* (*Chystranthus carneus*). These are wrapped in marantaceous leaves and placed near the fire.

(e) *Bele* fruits (*Canarium schweinfurthii*) can also be eaten by baking them in the same way as *bosou* fruit (*Dacryodes edulis*), but this is troublesome because of their smaller size. Instead, these are placed in hot water not heated to a boil. Seeds such as *mbimbo* (*Treculia africana*) and *botete* (*Treculia* sp.) are shelled, boiled and pounded.

(f) Foods that are seasoned with palm oil or salt and red pepper include most plants which are boiled with meat or fish. Crushed tomatoes are used as a base for sauces but not eaten raw.

(g) Boiled foods also include rice boiled with water.

(h) Parched foods include seeds such as beans and coffee.

4. Cooking of Animal Foods

Animals caught in collective hunts (*paho*) are slaughtered in the forest. The meat is distributed there so each person can carry his own bundle of meat back home (Takeda, 1984b, in preparation a). A small- or medium-sized animal caught in an individual hunt that is small enough to carry may be brought back to the village by the person who killed it, where others will help butcher it and in turn, receive some meat. The person who killed the animal does not directly participate in its butchering if it is brought back intact but asks another man to do this. This tendency is more pronounced in the case of animals caught in hunting (*paho*) than in trapping (*lilongi*).

A short sword (*lokula*) is used to butcher animals in the forest. In the village, an axe may be used as well. The work of cutting the four legs and the torso into various pieces after the belly has been slit open is called *seesa*. Finally, the intestines are drawn through grasped hands to expel the material therein. All this work is performed by men. The work of cutting large lumps of meat into smaller pieces with a machete (*shika*), breaking the bones open with a machete (*keka*), and washing the meat and disposing the waste is performed by women, who also do the cooking.

Even rotting animals that have been dead for several days in the traps are not discarded. Mammals found still alive in the traps are immediately beaten to death. Birds, if still alive, are sometimes brought back alive to the village.

The mongoose is butchered only after its fur has been burned off by direct scorching. Small rodents are gutted and the contents of the intestines discarded. The bones are broken and lumps of flesh with the fur still on them are wrapped in leaves and baked. Elephants are first skinned and the skin is left at the place of slaughter after the meat has been removed. Monkey fur and antelope skins are used to make hats and waistbands. The skins are also eaten.

Women directly handle, butcher and cook chickens (which are boiled alive), crested Guinea-fowls and tortoises.

Hard-scaled snakes are skinned with a short sword or machete as much as possible. Hard-shelled turtles have their shells removed by softening them in the fire.

Slices of mammal, bird and reptile meat are usually boiled in pots or earthen vessels. Small rodents, crested Guinea-fowl, cracked and broken blue duiker and mongoose skulls and turtles after their shells have been removed are wrapped in leaves and cooked near the fire.

Fish are put in baskets or pots. Very lively fish liable to escape are beaten over the head with a machete or are squeezed to death. The Ngandu gnaw off the spines on the lower jaws of some fish before wrapping them in leaves. They also crush the shells of crabs and pluck the wings of predacious diving beetles. Only the tilapian *likoke* (*Tilapia tholloni*, Cichilidae) is cleaned of its scales at the river using a machete or a knife. Small ones may be brought back to the village whole. Large-sized fish, such as *mbeli* (*Clarias buthuogon*, Clariidae) and *likoke* caught by bailing (*puhanse*), are gutted. The *boonga* (*Polypterus palmas*, Polyteridae), caught in the Luo River, has hard scales. For this reason it is first singed and the scales are removed with a short sword. The fish is then cut into slices and boiled. Except the consumption of small river prawn by girls engaged in a *puhanse*, fish are not eaten alive or raw. The fish, amphibia, shellfish and water insects caught in the bailing method, though not fully cooked, are usually wrapped in leaves and steamed near the fire. The Ngandu do not pick out the bones or peel the skin. The fish—including head and bones—is put into the mouth; bones and other debris are spit out afterward.

Insects are caught alive and put in baskets or pots, or wrapped in leaves and brought home if the quantity is small. Some species die on the way, but the Ngandu do not discard them. Strong spines of *boona* larvae (*Pseudantherea discrepans*, Saturniidae) are burnt off as much as possible before the rest are plucked out with the teeth. The insect is then washed, seasoned with a little salt or palm oil, wrapped in leaves and served. Sometimes several insects are skewered from tail to head with a skewer made from split stems of the leaves of the marantaceous *bokombe* herb (*Haumania liebrechtsiana*) and then steamed. *Isusu* larvae of Lepidoptera, which are caught in large numbers, are sometimes pounded in a wooden mortar, wrapped in leaves and baked, but mostly they are eaten after they have been boiled and dried, or

dried on special drying racks (*boliko*) at home and then placed in gourds or other containers to be stored until eaten.

Termite soldiers collected and put in baskets are washed repeatedly in water and brought home, where they are pounded in a morter so that their tough heads are crushed. Depending on preference, they may be mixed with *bofili* leaves (*Scorodophloeus zenkeri*) or red pepper. They are then sprinkled with salt and water, wrapped in leaves, and baked. Sometimes a vegetable ash called *engange* (see 5-(3) Salt) is used in place of refined salt, but most edible insect cooking involves no seasoning. Imagos such as *ngongo* (*Augosoma centaurus*), *ikoko-akele* (*Rhynchophorus phoenicis*) and *nsungu* (Scarabaeidae), which all belong to Coleoptera, are eaten after their wings and legs are removed. *Ngongo* larva (*likio*) and *ikoko-akele* larva (*lohose*) are gutted first, and *boona* pupae have their shells and part of their innards discarded. By and large, however, with edible insects the entire insect is eaten. In addition to cooking cassava leaves, *boona*, *isusu*, *ilanga* and *likio* larvae are dried and eaten directly or cooked in leaves. Sometimes termites are deftly caught by hand, their heads crushed with the teeth, and are eaten, but this accounts for only a small portion of total consumption. Tasting raw insects by finger-licking is only done after the insects have been pounded in a wooden mortar and are about to be wrapped in leaves for cooking. Honey is placed in bottles, etc. The Ngandu eat the honeycomb together with the honey, which amounts to eating the live larvae with it. The larvae of the hymenopteran wasps, such as *losongo* and *iku*, are eaten along with the honeycomb as a side dish for cassava.

Animal foods are rarely eaten alive or raw but are usually cooked and lightly seasoned with salt, red pepper and palm oil. In addition, meats are generally cooked with vegetables such as *beenje* leaves (*Hymenocardia ulmoides*), *bofili* leaves (*Scorodophloeus zenkeri*) and *booye* shoots (*Sacrophrynium macrostachyum*) as well as with tomato, while fish is generally cooked with leaves such as *bofili*, *kookumbo* (*Schotia romei*) and *beenje*.

5. Seasonings and Spices

(1) Palm oil

Oil palm fruit is not placed directly into an earthen vessel of water. Instead, stalks of the marantaceous *bokombe* herb (*Haumania liebrechtsiana*) are folded and placed in the water as a pad, on top of which the ripe fruit is placed. The mouth of the earthen vessel is covered with leaves and the fruit is thoroughly steamed to soften the mesocarp. The vessel with the fruit is opened onto a flat bamboo basket, from which the fruit alone is taken and pounded in a wooden mortar. It is divided into the fibrous mesocarp with its oil and the kernel covered with a hard husk. The inner rind alone is removed to another vessel and boiled in water. The mixture separates into a surface layer of transparent, bright orange-colored oil, called *bauta*, and a bottom layer of watery, mud-yellow oil, called *bosaka*. The surface layer of *bauta* is scooped up with a ladle and poured into bottles. Any fiber (*likamu*) left in the vessel are squeezed by hand to get the oil. These *likamu* fibers of the mesocarp are not dis-

carded after the oil has been removed but are placed on the roof of the house, for later use in lighting fires since they contain a little oil and burn easily. Most of the material remaining in the vessel is *bosaka* fluid, which is used for cooking cassava leaves. The kernel is covered with a hard husk and the Ngandu do not extract the oil in the kernel. The kernels are left to accumulate at the side of the house and are broken open with a machete and eaten whenever anyone feels like eating them; the grounds are spit out. Once-steamed mesocarps are occasionally eaten with the fingers just before getting the *bauta*. In the forest-dwelling camp (*behecha*), *bauta* is a precious commodity used sparingly in cooking.

2) Red pepper

A red pepper, called *imbenga*, which grows to 2 cm in length, is widely used. Red pepper is used so frequently that there is hardly a dish without it, although some households will reduce its spiciness for the sake of the children, who will not eat food that is too hot (in this case usually cassava leaves). It is ground over foods wrapped in other leaves picked before or during cooking. When cooking cassava leaves, ground red pepper is wrapped in a leaf and boiled together with the leaves. After it is thoroughly cooked the leaf wrapping is opened and the red pepper is mixed in.

There is another red pepper shaped like a sweet pepper called *lombolombo* that is about as hot as *imbenga*. I saw no food prepared in the *behecha* that contained this red pepper.

In addition to these two cultivated varieties, I was told that wild ginger (*iyole-lalisombo*; *Aframomum* sp.) and wild pepper (*lilombolombo*; *Piper guineense*) are also used as seasonings. However, I did not directly observe their use in cooking and they were not recorded in the food diaries kept by the two informants.

(3) Salt

The Ngandu have two kinds of salt: *Bokwa-losongo* (white men's salt) and *bokwa-bakoko* (ancestors' salt). The former is rock or refined salt purchased with cash, the latter is traditional salt made from wood ashes. The *behecha* camps in the forest frequently run out of salt and even small amounts of purchased salt are valuable commodities in the forest. For this reason the food of the Ngandu is generally only lightly salted. Salt, whether mixed with red pepper and pounded with a wooden pestle (*bokwa-batole*) or used alone (*bokwa-boyelenga*), is wrapped in small leaves and left on drying racks in the homes. To make the traditional type of salt, one or the other of the following are used: leaves and stems of the alismataceous water herb *liloko* (*Ranalisma humile*), the male spadix of the oil palm *lumbo*, banana (*Musa* spp.) skins. These items are placed on a shard of pottery and heated from below until they turn to ash. The ash, which is called *engange*, is then placed in a spindle-shaped funnel called *ileekwa*. Water is poured into the funnel and the liquid that drips out the bottom is collected. The fluid is placed in an earthen vessel and reheated to boil off the water. The remaining material, which is called *euki*, is used as salt. It is used chiefly in the preparation of termites, cassava leaves, *etete* nuts (*Treculia* sp.) and *lisele* mushrooms.

6. Drying and Storage

The tropical rain forest of the Zaire basin is very humid and abounds with food, so the Ngandu do not have a very highly developed technology for drying and storing animal foods. This is despite the fact that some drying and storage is necessary for large amounts of suddenly acquired animal meat sold for cash or exchanged (Takeda, 1982, in preparation a). Although there are special drying racks in the homes called *boliko* and some dried insect larvae stored in gourds, there are few implements designed to aid drying and storage.

Cassava, the staple food, is a tuberous root, so there is little damage from insects and birds. However, African elephants and bush-pigs raid the fields. I observed the slaughter of an elephant caught in an elephant trap (*elongo*) on February 1, 1976. Its stomach was full of what looked like bitter cassava tubers containing a lot of slightly fermented cyanide.

About a two day's supply of cassava is usually picked at one time for cooking.

Oil palm kernels are discarded after the oil has been taken from the inner rind. Maize, rice, coffee beans, beans and pumpkin seeds (*Cucurbita* sp.) are preserved naturally, though few plants are cultivated for the purpose of drying and storing. Most cultivated plants are picked as needed when they are ripe.

Among the wild plants, the mushrooms *yoko*, *itotolui* and *botola* are dried when picked in large numbers. Two types of nuts, *bokongo* (*Antrocaryon micraster*, Anacardiaceae) and *bokana* (*Panda oleosa*, Pandaceae), are preserved naturally and often left about after they have been gathered.

Animal foods are cooked in the quantities needed. Leftovers are put in a covered pot and consumed within two days at most. Reptiles, birds and small mammals are not dried and stored, so they are consumed within one or two days. The meat of some forest duiker, such as the blue duiker and Peter's duiker, as well as of the elephant, is dried. This dried meat is called *nyaama-ooma*. The meat of large-sized rodents, such as the size of brush-tailed porcupines, may also be dried, when, for example, they have been caught in large numbers or when there is already enough supplemental food for the day. Dried meats, though almost entirely for home consumption, are also bartered and sold for cash. The dried meat is sold directly to people coming from the larger settlements or from Wamba. When they have a fairly large supply of dried meat in stock, they go to the Catholic mission school in the Djolu region to sell it.

Meat is dried by boiling slices of it in water, removing them, placing them on the drying racks in the homes and heating them from below. If the meat is heated without first boiling it, it often happens that while the surface of the meat may be burnt, the inside is not fully cooked and the meat rots (Takeda, 1984a). For this reason, the meat is thoroughly boiled before it is placed on the racks and heated. When large quantities of meat become available at one time—as for example, when an elephant is butchered—the meat is cut into large chunks at the place of slaughter and taken to some nearby area in the forest where a set of drying racks is already erected. The meat is then cut into smaller pieces and boiled in pots and earthen ves-

sels that the villagers have brought from their homes. The meat is removed from the pots, placed on the racks, and smoked by fire from underneath for about a day and a night. Many old marantaceous leaves are brought from the homes and placed over the meat as a precaution against rain during the smoking process as well as for enhancing the effect of the smoke. After the process is finished, the villagers take the meat inside their homes and place it on drying racks to preserve and further dry it. The work of building drying racks in the forest is done by the men. Although men sometimes help with turning over the meat so that it does not burn while being smoked, most of this work involved in drying the meat—bringing water from the river, transporting the meat, etc.—is done by the women. Elephant meat dried in this fashion is consumed bit by bit at home as a side dish or as a complement over a period of one or two months.

To dry the meat of small mammals, the head and tail are removed from the torso and the animal is gutted. The front and rear legs are tied with string to a stick of about 10 cm in length and the animal is thrust into boiling water. After the animal has been thoroughly cooked, the stick is removed and the meat is placed on drying racks and smoked.

The preparation of dried meat from the bush-pig that I observed involved first burning off the hair from pieces of meat to which the skin was still attached. The bottom of a pot was lined with a pad of folded *bokombe* stalks (*Haumania liebrechtsiana* Marantaceae) and filled with water. Chunks of meat were placed in the pot and the mouth of the pot was covered with leaves which were tied in place. The pot was heated and kept boiling. The skin was washed, mixed with red pepper, and wrapped in leaves. The bundle was then put over a fire to smoke. The bones were removed from the meat, tied with slit *bokombe* stems, and smoked over a fire.

Another method of drying the meat of fatty mammals like the bush-pig involves wrapping slices of meat in leaves and dumping the bundled meat into hot water to boil. The bundles are removed, the water inside discarded and the meat is smoked over a fire. The water in which the meat has been boiled has no use and is simply thrown away.

Large-scale fishing expeditions (Takeda, 1987) using fish poison yield large numbers of fish, so all the fish are smoked regardless of size. The flesh of large fish like *sune* (*Heterobranchus longifilis*, Bagridae) and *mboto* (*Distichodus antonii*, Distiochodontidae) is, like elephant meat, cut into slices and boiled before it is smoked. Smoking fish usually involves gutting the fish and wrapping each fish in leaves. The fish are then boiled in water. When the fish are removed from the water, the excess water inside the bundles is discarded. Fish are then placed on drying racks and further dried over a fire. Small fish are smoked. Instead, they are placed directly on the racks to dry. With *sune* and *mboto*, the head and tail are folded over the body and tied in place with string. Then the fish is smoked. The electric catfish *nchula* (*Malapterurus electricus*, Malapteruridae) from the Luo River is first skinned to remove the electric organ and then beheaded.

Although the lepidopteran larva *isusu* (Noctuidae) is the most common species of

insect food, other insects such as the *boona* (*Pseudantherea discrepans*), *lihakala* (*Saturnia* sp., Notodontidae), *lilangachike* (*Nudaurelia dione*, Saturniidae), *botoa* (Saturniidae), *ikeninga* (Saturniidae), and *loko* (Notodontidae) are dried and stored as well. The fat-rich beetle larvae *lohose* (*Rhynchophorus phoenicis*) and *likio* (*Augosoma centaurus*) of Coleoptera are not dried. *Isusu* larvae, which are caught in large volumes, are put in an earthen vessel full of water and the pot is then covered with leaves which are tied in place. The pot is heated until the water evaporates and the larvae are steamed, after which they are transferred to a flat, shallow basket. The basket is placed on a drying rack and heated from below until the larvae are crisp and dry. Most of the larvae are stored and preserved in a gourd for later consumption.

Boona larvae are skewered tail to head, 10–20 of them on one skewer. The skewer is then bent into a circle and the ends are tied together. These insects have hard thorns, so they are thoroughly cooked (without burning) over a fire before they are steamed. An earthen vessel is filled with water and the bottom of the vessel is cushioned with folded *bokombe* stalks (*Haumania liebrechtsiana*). Several round skewers of *boona* larvae are placed on the pad and the pot is sealed and heated to steam the *boona*. Larvae that are turning into pupae are not skewered but gathered together and wrapped in a single leaf. Holes are made in the leaf with a finger and the bundle is then put into the vessel to steam.

Most insect food is for home consumption, although dried *isusu* larvae are sometimes shared or sold.

III. Yearly Food Consumption Trends According to the Food Diaries

1. Monthly Changes in Consumption Frequency and Numbers of Species

(1) Plant foods

Tables 11 and 12 show the monthly intake frequency of plant food. Some 22 cultivated items of foods were consumed, excluding red pepper and including two species of bananas (*Musa* spp.) and two species of oranges (*Citrus* spp.) that were considered as one item each. Both cassava and oil palm, of which two parts were eaten respectively, were each counted as two items of food.

Among the cultivated plants, the average monthly intake frequency of the cassava tuber (*lomata*), the major staple food, was 658.9 per 100 days. Namely, it was eaten six times a day. The figures of 535.8 for December and 732.1 for March denoted a difference in intake frequency of two meals a day between the two month. The average monthly intake frequency of cassava leaves (*bokinja*), a complementary food, was 68.6; they were eaten once a day as a side dish to the main food, cassava. Beans had the lowest intake frequency at 1.4.

Of the 22 food items of cultivated plants, the intake frequency of 15 species (68%) varied from one to ten. Some 12 items of foods—over half of all food items of cultivated plants—were consumed over a continuous period of ten months or more. The food items that were eaten over a continuous period of 12 months or more, consisted

Table 11. Monthly changes in consumption frequency of cultivated plants per 100 days.

Common name (Local name)[1]	Part[2] eaten	Month												Average frequency	Total of months
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
Cassava (*lomata*)	t	560.0	664.5	732.1	710.0	704.1	692.8	630.8	637.9	662.5	699.7	676.7	535.8	658.9	12
Cassava leaf (*bokinja*)	l	64.8	72.2	96.5	98.3	52.4	73.8	73.2	49.2	45.9	75.9	79.4	41.3	68.6	12
Sp. of hibiscus (*londende-lapuusa*)	l	21.8	20.6	31.5	75.8	49.2	52.7	39.1	38.8	51.7	34.6	27.8	16.4	38.3	12
Maize (*lisangu*)	g	7.7	3.9	23.5	20.9	27.4	3.4	26.0	25.0	24.2	24.3	14.3	4.6	20.4	12
Eggplant (*losolo*)	f	9.3	10.5	13.0	12.5	37.1	17.8	28.0	22.6	23.4	18.6	14.4	19.4	18.9	12
Sugarcane (*bosongo*)	c	14.0	11.8	12.9	20.0	22.6	16.7	13.0	6.5	6.5	29.7	12.3	16.6	15.2	12
Pokeberry (*lisingo*)	l	9.1	10.1	18.5	5.8	23.4	17.3	31.2	4.8	1.7	7.0	18.8	6.8	12.9	12
Avocado (*limuka*)	f	10.0	25.0	12.9	3.3	3.2	0	0	4.8	3.3	16.1	5.8	1.6	8.6	10
Papaya (*lipaipai*)	f	4.0	17.1	6.2	0	0	7.5	3.6	0	0	0	3.3	0	7.0	6
Pineapple (*linanasi*)	f	5.2	10.5	12.1	5.0	8.1	2.8	8.9	3.2	3.3	1.6	3.3	10.4	6.2	12
Tomato (*ibachu*)	f	6.5	3.9	11.8	10.0	8.1	8.3	2.2	8.1	3.3	5.4	5.7	1.5	6.2	12
Yam (*esambu*)	t	4.7	6.3	10.3	10.8	4.8	0	0	0	1.7	0	1.3	0	5.7	7
Pumpkin seed (*losio*)	s	0	0	0	0	0	0	0	3.2	3.3	18.9	1.8	1.5	5.7	5
Oranges (*lilala*)	f	2.0	5.3	10.6	8.3	0	0	0	0	0	0	2.0	0	5.6	5
Banana (*ingunda & likondo*)	f	1.7	7.0	10.6	5.0	9.7	5.0	4.2	8.1	2.5	1.6	2.0	0	5.2	11
African bitter yam (*lito*)	t	6.9	4.8	11.8	8.3	7.3	1.8	2.2	1.6	6.7	2.2	4.2	1.6	5.0	12
Oil-palm mesocarp (*lomba*)	f	10.0	6.1	7.1	1.7	1.6	0	0	0	0	5.4	2.2	3.1	4.7	8
Rice (*bopunga*)	g	0	7.9	3.2	3.3	0	3.3	1.8	3.2	1.7	0	7.2	6.1	4.2	9
Yam (*ehusu*)	t	3.9	0	2.4	10.0	8.1	3.3	2.2	0	0	0	1.3	1.6	4.1	8
Sweet potato (*litembela*)	t	2.0	0	1.2	10.0	3.2	1.7	2.2	1.6	0	5.4	1.3	0	3.2	9
Oil-palm kernel (*bolika*)	f	0	5.3	3.5	0	1.6	0	0	0	0	0	2.2	0	3.2	4
Groundnut (*likalanga*)	s	0	0	0	0	0	0	0	1.6	0	0	1.1	0	1.4	2
Total of consumption frequency		743.6	892.8	1,031.7	1,019.0	971.9	948.2	868.6	820.2	841.7	946.4	888.4	668.3	888.6	
(Number of monthly food items)		(18)	(18)	(20)	(18)	(17)	(15)	(15)	(16)	(15)	(15)	(22)	(15)		

Distilled liquors and beverages made from cultivated plants are excluded from this Table (see Table 18).

(1) Local name is shown in singular form (see also Table 3 for the scientific name).

(2) Part eaten is c: cane, f: fruit, g: grain, l: leaf, s: seed, and t: tuber.

Table 12. Monthly changes in consumption frequency of gathered plants per 100 days.

Scientific name (Local name)[1]	Part[2] eaten	Month												Average frequency	Total of months
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
Scorodophloeus zenkeri, Caesalpinioidea	l	57.5	53.7	96.8	110.0	115.4	32.7	84.3	84.7	126.7	81.1	87.9	39.7	80.9	12
Sacrophrypium macrostachyum, Marantaceae	sh	22.7	32.8	29.5	8.4	7.3	3.3	15.2	46.8	55.0	7.8	16.5	9.8	21.3	12
Tetracarpidium conophorum, Euphorbiaceae	se	0	20.7	4.7	10.0	24.2	19.5	67.4	9.7	0	8.1	0	0	20.5	8
Anonidium mannii, Annonaceae	f	0	0	0	0	4.8	13.7	24.5	34.7	10.0	0	0	0	17.5	5
Dacryodes edulis, Burseraceae	f	4.0	15.8	11.8	6.7	16.1	20.3	15.2	30.7	40.0	16.7	2.9	0	16.4	11
Schotia romei, Caesalpinioidea	l	11.9	19.7	20.3	7.5	17.7	16.7	16.1	11.3	9.2	19.2	8.8	11.1	14.1	12
Fungus (*eselemete*)	m	9.3	21.1	14.4	14.2	12.1	9.3	10.9	33.9	7.5	4.6	9.3	3.2	12.5	12
Histiopteris incisa, Fern	l	2.9	12.7	14.4	13.3	12.1	21.1	21.3	2.4	6.7	4.3	15.9	3.1	10.9	12
Fungus (*bouwo*)	m	4.5	15.8	10.9	10.0	5.7	7.2	6.5	2.4	18.3	12.7	14.2	13.3	10.1	12
Fungus (*lomongo*)	m	6.9	13.2	16.5	6.7	9.7	6.7	10.9	19.4	13.3	2.7	2.2	0	9.8	11
Treculia africana, Moraceae	se	1.7	3.5	2.9	0	3.2	7.2	22.4	25.0	11.7	9.2	3.5	8.5	9.0	11
Fungus (*losolosolo*)	m	12.0	6.6	5.6	7.5	11.3	13.3	8.7	12.9	6.7	3.5	3.8	3.2	7.9	12
Panda oleosa, Pandaceae	se	8.0	4.3	11.5	0	7.3	6.7	2.9	0	5.0	12.9	13.0	4.7	7.6	10
Canarium schweinfurthii, Burseraceae	f	0	0	0	0	22.6	1.7	0	0	7.5	6.5	2.9	6.0	7.1	6
Fungus (*lotsukutsunu*)	m	0	2.6	2.7	2.5	20.2	1.7	8.9	5.7	8.3	8.4	6.0	9.8	7.0	11
Ancistrophyllum secudiflorum, Palmae	p	1.9	8.8	14.1	5.8	14.6	5.1	7.3	6.5	1.7	5.4	1.3	2.3	6.2	12
Hymenocardia ulmoides, Euphorbiaceae	l	1.9	15.8	2.4	0	3.2	9.4	8.9	0	0	5.4	2.4	1.5	5.7	9
Anthrocaryon micraster, Anacardiaceae	se	1.9	4.3	1.2	5.0	4.8	5.0	8.9	3.2	3.3	13.5	10.6	3.9	5.5	12
Chrystranthus carneus, Sapindaceae	se	0	0	0	0	0	8.3	6.5	6.5	3.3	3.0	0	0	5.5	5
Aframomum laurentii, Zingiberaceae	f	4.0	7.9	4.7	0	1.6	0	0	0	0	0	3.3	0	4.3	5
Fungus (*itotolui*)	m	0	4.3	0	0	0	0	0	0	0	0	0	0	4.3	1

Dioscorea smilacifolia, Dioscoreaceae	t	8.0	2.6	3.5	0.5	3.2	2.8	5.4	0	0	0	4.4	4.8	4.1	9
Landolphia owariensis, Apocynaceae	f	0	0	0	0	0	0	1.8	7.3	3.3	4.8	2.6	1.5	3.6	6
Pancovia laurentii, Sapindaceae	f	0	4.3	0	0	0	0	1.8	0	0	1.6	5.5	0	3.3	4
Fungus (*beesesu*)	m	0	1.3	2.4	0	0	0	0	5.7	0	2.7	0	0	3.0	4
Fungus (*yoko*)	m	0	3.9	0	0.7	3.2	3.7	0	0	0	0	0	1.6	2.8	5
Napoleona vogelii, Lecythidaceae	l	0	0	0	0	1.6	0	0	4.8	0	1.6	0	0	2.7	3
Fungus (*lolungola*)	m	0	0	0	1.7	0	0	0	0	0	3.2	0	0	2.5	2
Byrsocarpus viridis, Connaraceae	f	0	0	0	0	0	1.9	0	3.2	0	0	1.1	0	2.1	3
Treculia sp., Moraceae	se	0	0	0	0	0	1.9	0	0	0	0	0	0	1.9	1
Auricularia sp., Auriculariaceae[3]	m	0	0	1.2	0	0	1.9	0	0	0	0	1.1	0	1.4	3
Guyonia intermedica, Melastomataceae	l	0	1.3	0	0	0	0	0	0	0	0	0	0	1.3	1
Fungus (*botola*)	m	0	0	1.2	0	0	1.7	0	0	0	0	1.1	0	1.3	3
Total of consumption frequency		159.1	277.0	272.7	213.5	321.9	222.8	355.8	356.8	337.5	238.9	220.3	128.0	260.8	
(Number of monthly food items)		(16)	(23)	(21)	(16)	(22)	(25)	(21)	(20)	(18)	(23)	(23)	(17)		

(1) See Table 4 for the local name except mushrooms.

(2) Part eaten is f: fruit, l: leaf, m: mushroom, p: pith, se: seed, sh: shoot, and t: tuber.

(3) It is the fungus of a Jew's-ear plant called *lisele*.

of two tubers, three vegetables, four fruits and one grain. Of these foods, *lito,* a cultivated yam (*Dioscorea dumetorum*) which is called African bitter yam, tomato and pineapple had an intake frequency of less than ten. The food items eaten over the least number of months were beans (two months). Examining changes in the intake frequency of food items of cultivated plants on a month-to-month basis, 22 items of plants were consumed in the month of November as opposed to only 15 items in the months of June–July, September–October and December. Intake frequency totals by month showed March to be the highest (20 food items, 1,031.7 times) and December to be the lowest (15 items, 668.3 times). December had the lowest number of both food items eaten and intake frequency.

For all 33 gathered plant foods, only one part of each plant was eaten (Table 12). *Bofili* leaves (*Scorodophloeus zenkeri*), which were usually eaten with fish and meat, showed the highest intake frequency at an exceptional 80.9. They were eaten throughout the 12 months of the year. By contrast, *londende-aloshe* leaves (*Guyonia intermedia*, Melastomataceae) and the mushroom *botola* showed the lowest intake frequencies—1.3 times over three months. The 24 food items with an intake frequency of from one to ten accounted for 72% of all gathered plants.

Some 16 items of wild plants were eaten through half the year and accounted for about 50% of all plant consumption. Nine items were eaten throughout the year (27%). Examining the nine food items that were consumed 12 months of the year, we found three vegetables, a kind of seed, pith and shoot, and three types of mushrooms. Items consumed more than ten times were three kinds of *bokongo* seed (*Antrocaryon micraster,* Anacardiaceae), *bokau* pith (*Ancistrophyllum secundiflorum*, Palmae) and *losolosolo* mushroom. The number of months in which these items were consumed was small; those items consumed relatively frequently included *bolingo* fruit (*Anonidium mannii*, Annonaceae) (17.5 over five months) and *bokaso* seed (*Tetracarpidium conophorum*, Euphorbiaceae) (20.5 over eight months), each of which showed seasonal variation in its consumption. Sixteen items—almost half the wild plants eaten—were consumed less than ten times and for periods of nine months or less.

As for monthly variations in numbers of types of wild plants eaten, June showed the largest variety with 25 (one type of tuber, six varieties of plants of which either the pith or the leaves were eaten, four fruits, six kinds of seeds, and eight types of mushrooms), while January and April showed the smallest variety with 16. Average monthly intake frequency was 260.8. August showed the highest consumption at 356.8 (20 items) and December the lowest at 128.0 (17 items).

(2) Animal foods

Tables 13–17 show month-to-month changes in the frequency of consumption of animal foods. Concerning mammals, three species of genet (*Genetta* spp.) have been counted as one item. Except for the unknown species, a total of 35 mammals were eaten.

Peter's duiker (*Cephalophus calliphgus*) was consumed most frequently—on average, 60.7 times per 100 days. It was eaten throughout the 12 months of the year.

These animal foods were eaten as an accompaniment to cassava a little less than once a day. Dwarf galago (*Galago demidovi*) was consumed with a frequency of 1.2 times and for only one month of the year. Twenty-nine items of animal food were eaten with a frequency of from one to less than ten times—81% of the total. A total of four species of animals were eaten 12 months of the year: Peter's duiker, and blue duiker (*Cephalophus monticola*)—two species of antelope—elephant and porcupine. All four had a correspondingly high consumption frequency. Nineteen animals—51% of the total—were eaten from January to May.

The average of total monthly consumption frequency was 259.3. February showed the highest consumption frequency at 319.8 (16 species) while March showed the lowest at 211.3 (18 species). In terms of numbers of species eaten, the species eaten in November (23) were almost twice the 12 species eaten in October.

Ten species of wild birds were eaten, or 11 food items if the Guinea-fowl eggs were included as well. Domestic chickens and their eggs were eaten, too, making a total of 13 items (Table 14). Only the terrestrial Guinea-fowl was eaten 12 months of the year—6.9 times, in fact. If each month was considered as having 30 days, then such birds were eaten twice a month. Chicken eggs were eaten 4.0 times over 11 months of the year. The overwhelming majority of birds, ten, were consumed during six months of the year or less. Such foods were eaten on the monthly average 25.0 of consumption frequency per 100 days. April showed the heaviest consumption—four food items eaten 34.2 times—and November the lightest—four food items eaten 13.7 times. The largest number of food items eaten appeared in February and August (7). The smallest was in April–June and November (4).

Twelve species of reptiles were eaten (Table 15). The *eulu* land tortoise (*Kinixys erosa*) alone was eaten 12 months of the year—10.5 times, or more than once every ten days. By contrast, the *lokonga* cobra (*Dendroaspis jamesoni*) was eaten only 1.7 times, and during only one month of the year. Six kinds of snakes were eaten only during one month of the year and accounted for half of all reptile foods. Reptiles were eaten on average 21.2 times per 100 days. April showed the greatest consumption with 46.7 times and three species, while February showed the smallest, 8.5 times and one species. October showed the largest number of different species consumed (7) and January, February and May showed the smallest (1).

Thirty-four known and one unknown species of fish were consumed (Table 16). The fish consumed most frequently was *likoke* (*Tilapia tholloni*). It was eaten 35.9 times through 12 months of the year. *Ndondo* (*Gymnarchus niloticus*) was consumed least frequently at 1.1 times over just one month. Twenty-five different species of fish were consumed with a frequency of one to less than ten times, accounting for 37% of the total. Fish were eaten on the monthly average 205.3 of consumption frequency times per 100 days. March showed the heaviest consumption with 29 species eaten 341.2 times, and August showed the lightest consumption with 12 items eaten 90.3 times. Over twice as many kinds of fish were eaten in February and March (29) as in August and September (12).

Seventeen kinds of insects were eaten (Table 17). *Boona* (*Pseudantherea dis-*

Table 13. Monthly changes in consumption frequency of mammals per 100 days.

Common name[1]	Month												Average	Total of
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	frequency	months
Peter's duiker	55.3	60.4	41.8	59.2	45.2	51.4	39.4	52.5	66.7	73.5	59.7	123.3	60.7	12
Blue duiker	39.0	88.3	67.1	55.9	46.0	47.3	30.1	17.8	37.5	59.0	46.9	41.8	48.1	12
African elephant	58.4	72.4	10.6	17.5	58.9	44.5	77.9	22.6	25.0	31.8	43.7	15.3	39.9	12
Brush-tailed porcupine	12.2	18.2	10.0	16.7	17.8	27.2	8.5	50.9	25.0	16.2	13.8	6.3	18.6	12
Bush-pig	3.4	0	20.6	14.2	0	27.1	0	14.6	21.7	22.1	18.2	10.3	16.9	9
Water chevrotain	10.1	28.5	10.6	0	0	4.3	3.6	8.1	7.5	18.9	10.1	0	11.3	9
Bay duiker	2.0	0	10.6	12.5	1.6	0	10.7	0	18.3	14.0	8.2	9.0	9.7	9
Sitatunga	0	0	0	0	0	0	0	0	0	0	3.3	13.4	8.4	2
Genet[2]	0	0	0	0	0	0	0	12.9	0	0	2.7	9.5	8.4	3
Red-tailed monkey	15.0	2.6	5.3	3.3	0	2.8	4.3	17.8	4.2	13.2	13.5	7.5	8.1	11
Mona monkey	8.6	0	0	13.3	19.4	2.6	0	0	1.7	0	4.9	5.4	8.0	7
Four-toed elephant-shrew	14.0	3.9	4.2	16.7	4.8	1.7	10.9	0	0	0	5.3	7.9	7.7	9
Marsh mongoose	0	11.6	6.8	0	3.2	6.7	5.4	3.2	9.2	4.3	1.1	17.5	6.9	10
Black mangabey	4.6	0	1.2	0	0	6.7	0	3.2	16.7	0	0	0	6.5	5
Dark mongoose	0	5.3	5.9	5.8	0	6.7	10.9	9.7	0	0	5.7	2.3	6.5	8
Black-and-white colobus	6.3	0	0	1.7	0	0	15.2	3.2	8.3	7.6	2.0	0	6.3	7
Tree pangolin	1.9	6.3	1.2	0	6.5	7.5	19.6	5.7	3.3	0	7.7	1.6	6.1	10
Giant rat	0	2.6	8.2	6.7	1.6	1.9	5.6	19.4	3.3	10.3	1.1	3.1	5.8	11
Golden cat	0	5.3	2.4	0	0	0	0	0	8.3	0	0	0	5.3	3
Yellow-backed duiker	2.0	0	0	8.4	0	0	0	0	0	0	0	4.8	5.1	3
Black-fronted duiker	0	1.3	0	0	0	0	3.6	9.7	5.9	0	0	0	5.1	4
Otter shrew	0	0	0	0	0	0	0	0	0	0	0	4.8	4.8	1
Green squirrel	8.0	7.9	0	1.7	6.5	1.7	0	0	1.7	0	2.0	7.9	4.7	8
Two spotted palm civet	0	0	0	1.7	0	0	10.9	1.6	0	0	0	0	4.7	3
African fruit bat	2.0	0	0	0	0	0	0	0	6.7	0	0	0	4.4	2
Red colobus	0	0	0	0	3.2	7.5	1.8	0	0	0	0	0	4.2	3
Civet	4.0	0	0	3.3	0	1.9	0	0	0	1.6	3.3	4.8	3.4	5
Bosman's potto	0	0	0	0	0	0	0	0	0	0	4.3	1.6	3.0	2
African civet	0	0	0	0	0	0	0	0	0	0	2.2	4.8	3.0	3
Giant forest squirrel	0	2.6	0	0	3.2	1.9	0	0	1.7	0	0	0	2.4	4
Four-striped squirrel	0	0	2.4	0	0	0	0	0	0	0	0	0	2.4	1

Giant pangolin	2.0	2.6	0	0	0	0	0	0	0	0	0	0	2.3	2
Slender mongoose	0	0	0	0	0	0	0	0	0	0	2.2	0	2.2	1
Red-fronted squirrel	1.7	0	1.2	0	0	0	0	0	0	0	1.1	0	1.3	3
Dwarf galago	0	0	1.2	0	0	0	0	0	0	0	0	0	1.2	1
?	0	7.8	0	0	0	0	0	0	0	0	1.4	1.5	3.6	3
Total of consumption frequency	250.5	319.8	211.3	238.6	217.9	251.4	258.4	252.9	272.7	272.5	263.0	302.9	259.3	
(Number of monthly food items)[3]	(19)	(16)	(18)	(16)	(13)	(18)	(16)	(16)	(19)	(12)	(23)	(21)		

See also Table 18 for the processed foods which are excluded from this Table.

(1) See Table 5 for the scientific and the local names.

(2) It includes three species of genets (see the footnote (5) of Table 5).

(3) Genets are counted here as one species, and unknown species of animals are not added to the number of monthly food items in February, November and December, respectively.

Table 14. Monthly changes in consumption frequency of birds per 100 days.

Common name[1]	Month												Average	Total of
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	frequency	months
Crested Guinea-fowl	5.7	5.5	11.8	8.3	8.1	9.3	3.6	7.3	4.2	8.1	6.4	4.7	6.9	12
Congo peafowl	4.9	3.9	0	15.0	0	0	0	0	0	0	2.2	0	6.5	4
Chicken#	13.8	0	4.7	0	0	4.6	0	6.5	3.3	4.8	3.7	9.0	6.3	8
African hawk-eagle	0	0	0	0	0	0	0	0	5.0	5.4	0	0	5.2	2
Hartlaub's duck	0	2.6	7.1	0	0	0	2.2	0	0	0	0	7.9	5.0	4
Honey buzzard	0	2.6	0	0	0	0	0	0	6.7	0	0	0	4.7	2
Brown-cheeked hornbill	0	0	0	0	0	3.8	3.8	4.8	0	0	0	0	4.1	3
Chicken (egg)#	2.7	1.3	3.5	9.2	7.3	0	3.6	1.6	6.7	2.7	1.4	3.8	4.0	11
African fish eagle	0	0	0	0	0	0	0	3.2	0	0	0	0	3.2	1
Nkulengu rail	1.7	1.3	1.2	1.7	8.1	0	0	0	0	0	0	4.5	3.1	6
Crested Guinea-fowl (egg)	0	0	0	0	4.8	0	0	1.6	0	2.7	0	1.5	2.7	4
White-crested hornbill	0	1.3	0	0	0	2.6	2.0	1.6	3.3	0	0	0	2.2	5
Quail	1.7	0	0	0	0	0	0	0	0	0	0	0	1.7	1
Total of consumption frequency	30.5	18.5	28.3	34.2	28.3	20.3	15.2	26.6	29.2	23.7	13.7	31.4	25.0	
(Number of monthly food items)[2]	(6)	(7)	(5)	(4)	(4)	(4)	(5)	(7)	(6)	(5)	(4)	(6)		

#: Except for this chicken (and their eggs), other birds (and their eggs) consumed are wild.

(1) See Table 7 for the scientific and the local names.

(2) The consumption of eggs is counted here as one food item.

Table 15. Monthly changes in consumption frequency of reptiles per 100 days.

Common name (Local name)*	Month												Average	Total of
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	frequency	months
Hinge-backed tortoise	12.5	8.5	14.7	15.0	8.9	7.0	7.4	12.9	10.0	7.8	11.7	9.3	10.5	12
Dwarf crocodile	0	0	0	21.7	0	0	1.8	0	5.0	6.5	2.4	0	7.5	5
Rhinoceros viper	0	0	14.7	10.0	0	9.4	0	3.2	3.3	3.2	1.1	1.5	5.8	8
Black-necked cobra	0	0	0	0	0	0	0	0	6.5	0	0	4.3	5.4	2
Nile monitor	0	0	0	0	0	0	0	0	0	2.7	6.6	0	4.7	2
Common African python	0	0	0	0	0	3.8	0	0	0	0	0	0	3.8	1
Gaboon viper	0	0	0	0	0	0	0	0	0	3.2	0	0	3.2	1
Tortoise (*eyale*, hardshell; aquatic)	0	0	0	0	0	0	0	0	0	1.6	5.5	1.5	2.9	3
Brown water snake	0	0	2.9	0	0	0	0	0	0	0	0	0	2.9	1
De Costers' garter snake	0	0	2.4	0	0	0	0	0	0	0	0	0	2.4	1
Black cobra	0	0	0	0	0	0	0	0	0	2.2	0	0	2.2	1
Green Congo mamba	0	0	0	0	0	0	0	0	1.7	0	0	0	1.7	1
Total of consumption frequency	12.5	8.5	34.7	46.7	8.9	20.2	9.2	16.1	26.5	27.2	27.6	16.6	21.2	
(Number of monthly food items)	(1)	(1)	(4)	(3)	(1)	(3)	(2)	(3)	(4)	(7)	(6)	(3)		

*See Table 8 for the scientific and the local names.

Table 16. Monthly changes in consumption frequency of fish per 100 days.*

Scientific name (Local name) [1]	Month												Average	Total of
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	frequency	months
Tilapia tholloni, Cichlidae	28.0	38.2	48.2	48.3	41.9	33.3	45.7	12.9	73.3	27.0	17.6	15.9	35.9	12
Clarias buthupogon, Clariidae	50.0	30.3	41.2	30.0	17.1	18.3	32.6	22.6	13.3	16.2	39.6	60.3	31.0	12
Clariallabes melas, Clariidae	26.0	13.2	14.1	20.0	24.2	10.0	13.0	12.9	6.7	8.1	11.0	12.7	14.3	12
Macrobrachium sp., Palaemonidae[2]	10.0	14.5	27.1	26.7	14.5	10.0	8.7	3.2	23.3	8.1	15.4	7.9	14.1	12
Barbus miolepis, Cyprinidae	14.0	17.1	18.8	18.3	9.7	5.0	10.9	6.5	23.3	21.6	9.9	9.5	13.7	12
Pterocephalus sp., Mormyridae	30.0	14.5	23.5	28.3	12.9	3.3	13.0	6.5	0	2.7	2.2	0	13.7	10
Brachypetersius huloti, Characidae	8.0	2.6	14.1	10.0	11.3	10.0	10.9	0	36.7	13.5	7.7	7.9	12.1	11
Chrysichthys sp., Bagridae	6.0	7.9	17.6	20.0	6.5	11.7	15.2	3.2	20.0	0	11.0	3.2	11.1	11
Clariallabes sp., Clariidae	10.0	5.3	9.4	21.7	8.1	8.3	10.9	9.7	10.0	5.4	20.9	9.5	10.8	12
Eutropius grenfelli, Schilbeidae	2.0	10.5	18.8	16.7	9.7	11.7	6.5	3.2	16.7	2.7	4.4	0	9.4	11
Ctenopoma nanum, Anabantidae	16.0	6.6	21.2	10.0	3.2	1.7	4.3	0	0	8.1	13.2	4.8	8.9	10
Amphilius maesi, Amphiliidae	6.0	10.5	12.9	13.3	14.5	3.3	8.7	3.2	10.0	2.7	5.5	1.6	7.7	12

Barbus christyi, Cyprinidae	0	10.5	1.2	0	0	0	0	0	0	0	0	0	5.9	2
Ctenopoma nigropannosum, Anabantidae	0	7.9	3.5	0	0	0	0	0	0	0	0	0	5.7	2
Stomatorhinus sp., Mormyridae	0	5.3	7.1	10.0	8.1	1.7	2.2	3.2	0	2.7	13.2	1.6	5.5	10
Gnathonemus schiltuisi, Mormyridae	4.0	6.6	5.9	5.0	3.2	0	2.2	0	0	0	12.1	1.6	5.1	8
Auchenoglanis sp., Bagridae	4.0	1.3	4.7	8.3	8.1	1.7	8.7	0	6.7	0	5.5	1.6	5.1	10
Epiplatys sexfasciatus, Cyprinodontidae	0	3.9	9.4	0	1.6	0	0	0	0	2.7	4.4	0	4.4	5
Xenomystus nigri, Notopteridae	0	0	4.7	0	0	0	0	0	0	2.7	0	0	3.7	2
Hydrocyon sp., Characidae	0	1.3	2.4	0	8.1	0	2.2	0	0	0	0	0	3.5	4
Mastacembelus brevicauda, Mastacembelidae	0	2.6	3.5	0	0	0	0	0	3.3	0	0	0	3.1	3
Polypterus palmas, Polypteridae	0	1.3	4.7	0	0	0	0	0	0	0	0	0	3.0	2
Clariallbes brevibarbis, Clariidae	0	1.3	2.4	0	1.6	0	0	3.2	0	0	5.5	0	2.8	5
Clariidae (*bopoto*)	0	0	2.4	0	0	0	0	0	0	0	0	0	2.4	1
Barbus hulstaerti, Cyprinidae	0	0	2.4	0	0	0	0	0	0	0	0	0	2.4	1
Malapterurus electricus, Malapteruridae	0	1.3	0	0	1.6	0	0	0	0	0	0	0	1.5	2
Protopterus dolloi, Protopteridae	0	1.3	0	0	0	0	0	0	0	0	0	0	1.3	1
Ophiocephalus obscurus, Ophiocephalidae	0	1.3	0	0	0	0	0	0	0	0	0	0	1.3	1
Gymnarchus niloticus, Gymnarchidae	0	0	0	0	0	0	0	0	0	0	1.1	0	1.1	1
(*boseke*)	2.0	14.5	2.4	0	0	0	0	0	0	0	1.1	0	5.0	4
(*butulu*)	4.0	5.3	5.9	0	1.6	0	0	0	0	0	7.7	1.6	4.4	6
(*eninga*)	0	0	0	0	0	0	0	0	0	0	4.4	0	4.4	1
Ranidae (*litoke*)[3]	4.0	1.3	8.2	1.7	1.6	0	4.3	0	0	5.4	7.7	3.2	4.2	9
(*bolanga*)	0	1.3	1.2	1.7	0	3.3	0	0	0	0	1.1	0	1.7	5
?	0	2.4	0	0	0	0	0	0	0	0	0	0	2.4	1
Total of consumption frequency	224.0	239.5	341.2	290.0	209.7	133.3	200.0	90.3	243.3	129.7	222.0	142.9	205.3	
(Number of monthly food items)[4]	(17)	(29)	(29)	(17)	(21)	(15)	(17)	(12)	(12)	(15)	(23)	(15)		

*Small-sized aquatic animals like shrimps and tadpoles, which do not taxonomically belong to the category of fish, are also shown in this Table, for they are usually caught by the fishing method of bailing (*puhanse*) together with other fish. The processed foods like canned sardines are excluded here (see Table 18).

(1) See Table 9 for the local name.

(2) Small-sized shrimps.

(3) Tadpoles of frogs of certain species.

(4) Species unknown which was consumed in February, is not added to the monthly food item.

Table 17. Monthly changes in consumption frequency of insects per 100 days.

Scientific name (Local name)[1]	Stages[2] eaten	Month												Average frequency	Total of months
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
Noctuidae (*isusu*)	l	4.0	0	0	0	0	21.7	14.9	72.6	35.9	31.9	20.1	5.5	25.8	8
Macrotermes sp. Apidae	i	6.2	13.4	15.6	22.5	31.5	31.1	20.9	8.1	6.7	18.3	23.3	8.3	17.2	12
Pseudantherea discrepans, Saturniidae	l	0	0	0	0	0	0	2.2	2.4	16.7	14.6	8.8	0	8.9	5
Anaphe sp. Notodontidae	l	0	0	0	0	0	0	0	0	13.3	2.7	3.1	0	6.4	3
Notodontidae (*lokoo*)	l	0	9.2	4.7	0	0	0	0	3.2	0	0	0	0	5.7	3
Saturnia sp., Saturniidae	l	0	2.8	4.4	0	0	0	0	3.2	0	0	7.9	0	4.5	4
Lobobunaea goodi , Saturniidae	l	0	0	0	0	0	0	0	4.8	0	4.8	1.1	0	3.6	3
Saturniidae (*botoa*)	l	0	5.3	0	0	0	1.7	0	0	0	0	0	0	3.5	2
Pseudantherea discrepans, Saturniidae	p	0	0	0	0	0	0	0	0	0	0	3.3	0	3.3	1
Vespidae (*losongo*)	l	0	2.6	0	0	3.2	0	0	0	0	0	0	0	2.9	2
Vespidae (*iku*)	l	0	0	0	0	0	0	0	0	3.3	1.6	3.3	0	2.7	3
Nudaurelia dione, Saturniidae	l	0	1.3	0	0	4.8	1.7	2.9	0	1.7	0	0	0	2.5	5
Anaphe infracta, Notodontidae	l	0	0	0	0	0	0	0	0	0	0	2.2	0	2.2	1
Satruniidae (*ikeninga*)	l	0	0	0	0	0	0	1.8	0	0	0	0	0	1.8	1
Nymphalidae (*bosake*)	l	0	0	0	0	0	0	0	0	0	0	1.4	0	1.4	1
Lepidoptera (*bolenga-luuma*)	l	0	1.3	0	0	0	0	0	0	0	0	0	0	1.3	1
Rhynchophorus phoenicis, Rhynchophoridae	l	0	1.3	0	0	0	0	0	0	0	0	0	0	1.3	1
Scarabaeidae (*nsungu*)	i	0	0	0	0	0	0	0	0	0	0	1.1	0	1.1	1
Total of consumption frequency		10.2	37.2	24.7	22.5	39.5	56.2	42.7	94.3	77.6	73.9	75.6	13.8	47.4	
(Number of monthly food items)[3]		(2)	(8)	(3)	(1)	(3)	(4)	(5)	(6)	(6)	(6)	(11)	(2)		

Honey produced by four Apidae spp. are excluded from this Table, though the larvae are sometimes consumed with the honey in small amounts (see Table 18).

(1) See Table 10 for the local name.

(2) Stages eaten are i: imago, l: larva, and p: pupa.

(3) The consumption of pupae is counted here as one food item.

crepans) were eaten in both their larva and pupa stages, making 18 kinds of food in all. Lepidopteran larvae *isusu* (Noctuidae) were consumed 25.8 times over eight months and termite (*Macrotermes* sp.) 17.2 times over 12 months. Except for these two species, all the rest were eaten less than ten times. Beetles were consumed least frequently—just 1.1 times in only 100 days. Termites alone were eaten throughout the year, but this was because the termite soldiers that could be gathered throughout the year. Insect appearance was somewhat seasonal, but the eaten insects could be dried and stored, so *isusu* larvae, too, were consumed over eight months. Some 13 food items were eaten over periods of from one to three months. These accounted for 76% of the total. These insects were consumed an average of 47.4 times per month, with the widest variety (six species) consumed 94.3 times in August and the least consumed variety (two species) being consumed 10.2 times in January. There was wide monthly variation in the number of species consumed, ranging from 11 food items of insects in November to one food item in April.

(3) Other foods

Foods other than plants and animals included eight items (four derived from cultivated plants plus wild honey) as well as processed foods (Table 18). Coffee was drunk 7.3 times over six months. Distilled liquor made from corn or bananas was drunk 5.7 times over six months. Palm wine was drunk 6.5 times over just three months, and sugar-cane wine drunk 1.9 times over just two months. Consumption of beverages like these peaked in February, but none was drunk at all in May, June and August.

Of the four types of wild honey, *mpaako* honey produced by *lounje* bees (*Apis adansonii*) was consumed most frequently (5.2 times) and through eight months. *Yooki* honey from the *elungu* (*Trigona* sp.) was consumed 3.2 times over six months. The other two honeys of stingless bees, *ngee* and *beloo*, were consumed infrequently and during just one month. The consumption of wild honey was at its height in July, when the flowers bloom and the nectar was most abundant. Honey was not consumed at all during December and January.

Of the processed foods, *pooku*, a type of canned luncheon meat, was consumed most frequently (9.7 times). It was consumed during only one month. Except for a kind of soup, which was consumed over four months, both the other processed foods were consumed in only one month.

2. Monthly Changes in Number of Species and Proportion of Consumption Frequency

(1) Plant foods (by parts consumed)

Table 19 shows month-to-month changes in the number of plant species eaten depending on the parts of the cultivated plants and gathered wild plants consumed: tubers, grains, seeds, vegetables (includes not only the leaves but also the pith and shoot and, in the case of the oil palm, the mesocarp as well), fruits, and mushrooms. More than one part of the oil-palm fruit (kernel, mesocarp) and cassava (leaf, tuber) are eaten, so these items have been divided and placed in two categories according-

Table 18. Monthly changes in consumption frequency of other foods per 100 days.

Food item	Local name	Month												Average frequency	Total of months
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC		
Luncheon meat	*pooku#*	0	0	0	0	0	0	0	9.7	0	0	0	0	9.7	1
Coffee	*kawa*	3.7	14.5	7.1	3.3	0	0	0	0	0	0	7.7	7.5	7.3	6
Palm wine	*nkele*	0	11.8	5.9	0	0	0	0	0	1.7	0	0	0	6.5	3
Distilled liquor	*baana-koin*	4.9	13.0	4.4	0	0	0	2.2	0	0	0	3.1	6.8	5.7	6
Honey	*mpaako*	0	0	3.5	1.7	4.8	6.3	13.8	6.5	3.3	1.6	0	0	5.2	8
Honey	*yooki*	0	1.3	2.9	0	0	1.9	5.4	0	0	3.2	4.4	0	3.2	6
Canned sardine	*saadin#*	0	2.6	0	0	0	0	0	0	0	0	1.4	0	2.6	1
Soup	*suupu#*	3.4	0	1.2	0	0	0	0	0	0	0	2.9	3.0	2.6	4
Honey	*ngee*	0	0	0	0	0	0	0	0	0	0	2.2	0	2.2	1
Sugarcane wine	*baana-songo*	0	0	0	0	0	0	0	0	0	2.7	1.1	0	1.9	2
Honey	*beloo*	0	0	0	0	1.6	0	0	0	0	0	0	0	1.6	1
Condensed milk	*mabele#*	0	0	0	0	0	0	0	0	0	0	1.1	0	1.1	1

#: Processed foods, which were purchased or received as gifts.

ly.

November was the month in which the highest total of 22 food items of cultivated plants was eaten. June–October and December were the months when the lowest number of 15 was eaten. With wild plants, consumption of the largest number of food items occurred in June (25) and the smallest in January and April (16). Except for January and April, the number of species of gathered plants consumed exceeded the number of species of cultivated plants consumed. Three to five items of cultivated tubers were available throughout the year, but only one item of wild tuber was eaten and none of this at all during the months of August–October. All grains consumed were cultivated grains. One or two kinds were available throughout the year. Two to six types of nuts and seeds were gathered throughout the year. There were four months of the year when cultivated nuts and seeds were not eaten. Except for April, the number of species of gathered plants eaten either equaled or exceeded the number of cultivated plants eaten. The number of items of cultivated fruits eaten always exceeded the number of items of gathered fruits eaten. No wild fruits were eaten in April. Eight kinds of mushrooms were eaten in the month of March but only four in January.

Table 20-1 shows the proportional changes in consumption frequency of all plant foods according to the part of the plant consumed. The consumption of cultivated tubers was heavy throughout the year—always over 50%—and ranged from a low of 52.1% in July to a high of 67.7% in December. Next in consumption rate came cultivated or gathered vegetables with rates in the range of 10%. All other food consumption was less than 10%: gathered tubers 0–0.9%, grains 0.9-4.0%, cultivated nuts and seeds 0–1.6%, gathered nuts and seeds 1.2–8.8%, cultivated fruits 1.0-

Table 19. Monthly changes in number of species of plants consumed.

Part eaten		Month											
		J	F	M	A	M	J	J	A	S	O	N	D
Tubers	(cultivated)	5	3	5	5	5	4	4	3	3	3	5	3
	(gathered)	1	1	1	1	1	1	1	0	0	0	1	1
Grains	(cultivated)	1	2	2	2	1	2	2	2	2	1	2	2
Seeds	(cultivated)	0	1	1	0	1	0	0	2	1	1	3	1
	(gathered)	3	4	4	2	4	6	5	4	4	5	3	3
Vegetables	(cultivated)	7	7	7	7	7	5	5	6	6	7	7	7
	(gathered)	7	8	7	6	9	8	7	7	7	9	8	7
Fruits	(cultivated)	5	5	5	4	6	4	4	3	3	3	5	2
	(gathered)	1	2	1	0	2	2	3	3	2	2	4	1
Mushrooms	(gathered)	4	8	8	7	6	8	5	6	5	7	7	5
(1) Cultivated spp.*		18	18	20	18	17	15	15	16	15	15	22	15
(2) Gathered spp.		16	23	21	16	22	25	21	20	18	23	23	17
(3) (1)+(2)		34	41	41	34	39	40	36	36	33	38	45	32
(4) (2)/(3)×100 (%)		47.1	56.1	51.2	47.1	56.4	62.5	58.3	55.6	54.5	60.5	51.1	53.1

*Cassavas whose tubers and leaves were eaten, are each added as one species to the category of tubers or vegetables in the month of their consumption, respectively. In addition, for the oil palms with two usages, fruits (mesocarp) (*lomba*) and seeds (kernel) (*bolika*), the seeds were consumed in February, March, May and November (see also Tables 3 and 11).

Table 20-1. Proportional monthly changes in consumption of plants.

Consumption frequency		Month											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Consumption of all plants per 100 days		902.7	1,169.8	1,304.4	1,232.5	1,293.8	1,171.0	1,224.4	1,177.0	1,179.2	1,185.3	1,108.7	796.3
Proportion of each item (%)													
Tubers	(cultivated)	64.0	57.8	58.1	60.8	56.2	59.7	52.1	54.5	56.9	59.7	61.8	67.7
	(gathered)	0.9	0.2	0.3	0.2	0.2	0.2	0.4	0	0	0	0.4	0.6
Grains	(cultivated)	0.9	1.0	2.0	2.0	2.1	4.0	2.3	2.4	2.2	2.1	1.9	1.3
Seeds	(cultivated)	0	0.5	0.3	0	0.1	0	0	0.4	0.3	1.6	0.5	0.2
	(gathered)	1.3	2.8	1.6	1.2	3.1	4.2	8.8	3.8	2.0	3.9	2.4	2.1
Vegetables	(cultivated)	14.6	12.7	14.7	16.8	13.5	14.5	14.2	10.9	11.0	13.8	13.9	11.3
	(gathered)	11.4	13.7	14.5	12.3	16.3	9.4	13.7	15.9	20.9	12.5	12.5	9.2
Fruits	(cultivated)	3.0	4.4	4.0	3.1	3.1	2.7	2.4	1.5	1.0	2.8	2.1	3.4
	(gathered)	4.0	1.0	0.4	0	0.5	1.3	2.3	3.8	1.1	0.5	1.1	0.2
Mushrooms	(gathered)	3.6	5.9	4.2	3.6	4.8	3.9	3.7	6.8	4.6	3.2	3.4	3.9
Sub-total of cultivated plants		82.5	76.4	79.1	82.7	75.0	80.9	71.0	69.7	71.4	80.0	80.2	83.9
Sub-total of gathered plants		17.6	23.6	21.0	17.3	24.9	19.0	28.9	30.3	28.6	20.1	19.8	16.0
Total		100.1	100.0	100.1	100.0	99.9	99.9	99.9	100.0	100.0	100.1	100.0	99.9

Table 20-2. Proportional monthly changes in consumption of plants except cassava.

Consumption frequency		Month											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Consumption of all plants per 100 days		342.7	505.3	572.3	522.5	589.7	478.2	593.6	539.1	516.7	485.6	432.0	260.5
Proportion of each item (%)													
Tubers	(cultivated)	5.1	2.2	4.5	7.5	4.0	1.4	1.1	0.6	1.6	1.6	1.9	1.2
	(gathered)	2.3	0.5	0.6	0.5	0.5	0.6	0.9	0	0	0	1.0	1.8
Grains	(cultivated)	2.2	2.3	4.7	4.6	4.6	9.8	4.7	5.2	5.0	5.0	5.0	4.1
Seeds	(cultivated)	0	1.0	0.6	0	0.3	0	0	0.9	0.6	3.9	1.2	0.6
	(gathered)	3.4	6.5	3.5	2.9	6.7	10.2	18.2	8.2	4.5	9.6	6.3	6.6
Vegetables	(cultivated)	38.4	29.4	33.4	39.7	29.7	35.5	29.3	23.8	25.0	33.6	35.7	34.6
	(gathered)	30.0	31.8	33.1	29.0	35.7	23.1	28.4	34.7	47.8	30.5	32.1	28.2
Fruits	(cultivated)	7.8	10.2	9.2	7.3	6.9	6.7	5.0	3.3	2.4	6.8	5.3	10.4
	(gathered)	1.2	2.4	0.8	0	1.1	3.3	4.7	8.4	2.6	1.3	2.9	0.6
Mushrooms	(gathered)	9.5	13.6	9.6	8.5	10.5	9.5	7.7	14.8	10.5	7.8	8.7	11.9
Sub-total of cultivated plants		53.5	45.1	52.4	59.1	45.5	53.4	40.1	33.8	34.6	50.9	49.1	50.9
Sub-total of gathered plants		46.4	54.8	47.6	40.9	54.5	46.7	59.9	66.1	65.4	49.2	51.0	49.1
Total		99.9	99.9	100.0	100.0	100.0	100.1	100.0	99.9	100.0	100.1	100.1	100.0

4.4%, gathered fruits 0–3.8%, mushrooms 3.2–6.8%. The total proportion of gathered varieties was highest in August (30.3%) and lowest in December (16.0%).

The relative proportion of consumption of the staple, cassava, is shown when it is removed from the category of tuberous foods as seen in Table 20-2. The proportion of cultivated plant consumption to total consumption (excluding cassava) was 59.1% in April. The proportion of wild plant consumption to total consumption reached the 60% level during July–September. Aside from these periods, cultivated and gathered plants were consumed in virtually equal proportions.

(2) Animal foods (by animal group)

Table 21 shows month-to-month variations in the frequency of consumption of species of wild animals (Guinea-fowl eggs are also counteded as a single separate food item), two kinds of canned foods, and domestic fowl (chickens and their eggs). The monthly average was a little over 47 wild animal species, while it ranged from 64 species in November to 40 species in April-May. Only one to three species other than wild animals were consumed throughout the year. Wild animals accounted for an overwhelming proportion of the number of animal species eaten, and ranged from a high of 97.8% of all animals eaten in July to a low of 93.3% in August.

Table 22 shows the monthly relative proportion of total consumption frequency of animal foods broken down by animal group. Wild mammals accounted for only 33.0% of the total in March (their lowest proportion) but 60.0% in December (their highest)—almost double the March figure. Wild birds showed the lowest proportion in November (1.4%) and the highest in May—4.2%. Consumption of reptiles varied from 1.3% in February to 7.4% in April. Consumption of fish varied widely, from 18.2% in August to 52.9% in March. Consumption of insects varied by as much as a factor of ten, from 1.9% in January to 19.0% in August. Relative proportion of insects to total diet was high in the period June–November, although the *luuma* season (the most abundant period of edible larvae) are considered from June though September. This may be due to the seasonal fluctuation of the *luuma* outbreak as well as the delay of the human consumption of the dried insects.

The relative proportion of the frequency with which wild animals were consumed was 99.4% of the total in July and 96.4% in August. In March and April, the frequency with which birds were consumed exceeded the frequency with which animals were consumed.

(3) Proportional changes in consumption frequency per 100 days in the diet

Table 23 shows the monthly relative proportion of consumption frequency of different foods by form of consumption, i.e., whether as the staple or main dish, as a side dish or accompaniment to cassava, or whether as neither of these but by itself. The category of side dishes or accompaniment included 22 food items: Seven cultivated vegetables and cultivated fruits such as cassava leaf (*Manihot esculenta*), poke-berry leaf (*Phytolacca dodecandra*) and *londende-lapuusa* leaf (*Hibiscus acetosella*) of the former and tomato, eggplant, avocado and oil-palm mesocarp (*Elaeis guineensis*) of the latter, gathered vegetables such as *beenje* leaf (*Hymenocardia ulmoides*) *bofili* leaf (*Scorodophloeus zenkeri*), *boohe* leaf (*Histiop-*

Table 21. Monthly changes in number of species of animals consumed.

Food item		Month											
		J	F	M	A	M	J	J	A	S	O	N	D
Mammals	(wild)	19	16	18	16	13	18	16	16	19	12	23	21
	(domesticated)	0	0	0	0	0	0	0	1	0	0	0	0
Birds	(wild)	4	6	3	3	3	3	4	5	4	3	2	4
	(domesticated)	2	1	2	1	1	1	1	2	2	2	2	2
Reptiles	(wild)	1	1	4	3	1	3	2	3	4	7	6	3
Fish	(wild)*	17	29	29	17	21	15	17	12	12	15	23	15
	(processed)	0	1	0	0	0	0	0	0	0	0	0	0
Insects	(wild)	2	8	3	1	3	4	5	6	6	6	10	2
(1) Wild spp.		43	60	57	40	41	43	44	42	45	43	64	45
(2) Domesticated & processed spp.		2	2	2	1	1	1	1	3	2	2	2	2
(3) (1)+(2)		45	62	59	41	42	44	45	45	47	45	66	47
(4) (1)/(3)×100 (%)		95.6	96.8	96.6	97.6	97.6	97.7	97.8	93.3	95.7	95.6	97.0	95.7

*Based on the consumption frequency of only one informant.

teris incisa), *bokau* pith (*Ancistrophyllum secundiflorum*), *booye* shoot (*Sacrophrynium macrostachyum*), *imange* leaf (*Napoleona vogelii*), *kookumbo* leaf (*Schotia romei*) and *londende-aloshe* leaf (*Guyonia intermedica*), the wild fruits such as *bele* fruit (*Canarium schweinfurthii*) and *bosou* fruit (*Dacryodes edulis*), *bokongo* seed (*Antrocaryon micraster*) and 11 kinds of mushrooms. Animal side dishes included 111 food items: 35 species of mammals, 13 species of birds (including chicken and Guinea-fowl eggs), 12 species of reptiles, 34 species of fish, 17 species of insects plus two items of processed foods.

Side dishes when eaten by themselves included 14 varieties of cultivated plants: Four kinds of tuber such as *ehusu* yam (*Dioscorea minutiflora*), *esambu* yam (*D. baya*), African bitter yam (*D. dumetorum*) and sweet potato (*Ipomoea batatas*), two kinds of grains (rice and maize), three kinds of seeds and nuts such as oil-palm kernel, groundnut and pumpkin seed, sugarcane, and four kinds of fruits (bananas, oranges, pineapples and papayas). This category also included 11 food items of gathered foods: One kind of *bohekiheki* yam (*Dioscorea praehensilis*), five kinds of seeds and nuts such as *botete* (*Treculia* sp.), *bokana* seed (*Panda oleosa*), *bokaso* seed (*Tetracarpidium conophorum*), *bosemu* seed (*Chystranthus carneus*) and *mbimbo* seed (*Treculia africana*) and five kinds of fruits such as *bolingo* fruit (*Anonidium mannii*), *imama* fruit (*Byrsocarpus viridis*), *botofe* fruit (*Landolphia owariensis*), *londake* fruit (*Aframomum laurentii*) and *botende* fruit (*Pancovia laurentii*).

Main dish cassava was least heavily consumed in July (36.0%) and most heavily consumed in June (41.9%). The proportion of cultivated foods that were used as side dishes varied only slightly, from 6.9% in December to 11.1% in April. The proportion of consumption frequency of gathered plants used as side dishes varied from 8.4% in December to 16.8% in September. Except for April and June, the relative proportion of gathered plants consumed as side dishes exceeded that of cultivated plants consumed in the same manner. Animal foods varied from 28.0% in May to 38.8% in December. The frequency with which animal foods were consumed in the form of side dishes exceeded the proportion of both gathered and cultivated plants

Table 22. Proportional monthly changes in consumption of animals.

Consumption frequency		Month											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Consumption of all animals per 100 days		527.7	633.9	640.3	632.0	504.3	481.4	525.5	496.4	642.8	527.0	607.1	504.8
Proportion of each item (%)													
Mammals	(wild)	47.5	50.4	33.0	37.8	43.2	52.2	49.2	50.9	42.4	51.7	43.3	60.0
	(processed)	0	0	0	0	0	0	0	2.0	0	0	0	0
	(unknown)	0	1.2	0	0	0	0	0	0	0	0	0	0
Birds	(wild)	2.7	2.7	3.1	4.0	4.2	3.3	2.2	3.7	3.0	3.1	1.4	3.7
	(domesticated)	3.1	0.2	1.3	1.5	1.4	1.0	0.7	1.6	1.6	1.4	0.8	2.5
Reptiles	(wild)	2.4	1.3	5.4	7.4	1.8	4.2	1.8	4.6	3.1	5.2	5.2	2.4
Fish	(wild)*	42.4	37.8	52.9	45.9	41.6	27.7	38.1	18.2	37.9	24.6	36.6	28.3
	(processed)	0	0.4	0	0	0	0	0	0	0	0	0	0
	(unknown)	0	0	0.4	0	0	0	0	0	0	0	0	0
Insects	(wild)	1.9	5.9	3.9	3.6	7.8	11.7	8.1	19.0	12.1	14.0	12.4	2.7
Sub–total of wild animals		96.9	98.1	98.3	98.7	98.6	99.1	99.4	96.4	98.5	98.6	98.9	97.1
Total		100.0	99.9	100.0	100.2	100.0	100.1	100.1	100.0	100.1	100.0	99.9	99.9

*Based on the consumption frequency of only one informant.

Table 23. Proportional monthly changes in consumption frequency of all foods.

Consumption frequency		Month											
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Consumption of all foods per 100 days		1,429.9	1,803.7	1,944.7	1,864.5	1,798.1	1,652.4	1,749.9	1,673.4	1,822.0	1,712.3	1,715.8	1,301.1
Proportion of each item (%)													
Staple	(cultivated)	39.2	36.8	37.6	38.1	39.2	41.9	36.0	38.1	36.4	40.9	39.5	41.2
Side dish	(cultivated)	9.2	8.2	9.8	11.1	9.7	10.3	9.9	7.7	7.1	9.5	9.0	6.9
	(gathered)	10.0	13.0	13.1	10.5	15.6	9.8	12.4	16.0	16.8	11.6	11.0	8.4
	(animals)*	36.9	35.1	32.9	33.9	28.0	29.1	30.0	29.7	35.3	30.8	35.4	38.8
Snack	(cultivated)	3.6	4.4	5.6	5.4	5.2	5.2	3.7	3.2	2.7	4.9	3.4	3.3
	(gathered)	1.1	2.4	0.9	0.9	2.3	3.6	7.9	5.4	1.7	2.3	1.8	1.4
Total		100.0	99.9	99.9	99.9	100.0	99.9	99.9	100.1	100.0	100.0	100.0	100.0

*This category includes the species of wild, domesticated, processed and unknown animals, all of which nutritionally contributed to the intake of animal protein.

combined for the same purpose throughout the year.

The frequency with which cultivated plants were eaten as separate side dishes varied between 2.7% in September and 5.6% in March. On the other hand, the frequency with which gathered plants were consumed in this manner varied widely, from 0.9% in March and April to 7.9% in July. Except for July and August, the proportion of cultivated plants eaten as side dishes in this form exceeded that for gathered plants.

IV. Food Availability and Forbidden Foods

According to Itani (1977), the Tongwe, a Bantu-speaking agricultural people who live in the savanna woodlands of Tanzania, eat 27 of the 61 species of mammals they recognize (44.3%) and 52 of the 72 species of birds they recognize (77.2%). The Ngandu consider as food 62 of the 72 species of mammals they recognize (86.1%) and 46 of the 84 species of birds they recognize (54.8%, Table 2). However, during the years 1975 to 1978, the two male informants actually ate 35 mammal species (48.6%) and only ten bird species (11.9%, Table 2). The extremely low proportion of bird species actually eaten and recorded in the food diaries, as compared to the total number of bird species recognized, is in part due to the difficulty of capturing the birds as opposed to hunting terrestrial animals. Usually, adults let children catch and eat chicks and small birds. Adults rarely eat these birds. The Ngandu consider proportionally more species of mammals as food than do the Tongwe and actually eat more of these animals. On the other hand, although the Ngandu consider proportionally more species of birds as food than do the Tongwe, the proportion they actually eat is lower, thus suggesting the high degree to which the Tongwe eat birds.

The actual problem is determining what exactly the Ngandu consider food (food availability) and how often they actually eat such items over a specified period of time (consumption frequency). The Tongwe of Tanzania, for religious reasons, do not eat warthogs and bush-pigs although they kill them to use as bait for leopard traps (Takeda, 1984a). The Ngandu, however, do not hunt or trap those animals they do not eat. They neither hunt nor eat mammals such as a species of musk shrew *busungansole* (*Crodicura* sp.), the tree hyrax *eeleka* (*Dendrohyrax arboreus*, Procaviidae), the mole rat *iyondola* (*Cryptomys* sp.), two species of mice—*lingonju* (unidentified) and *longisa* (unidentified)—the bat, *litomba* (unidentified), the leopard, *nkoi* (*Panthera pardus*) and the pygmy chimpanzee, *eliya* (*Pan paniscus*). Also, the Ngandu raise domestic dogs and cats but do not eat them. In addition to these animals which are not eaten, there are some birds, reptiles, amphibia and insects that were eaten in the past but no longer. However, the Ngandu's range of utilization, i.e., eating animal foods, is over 50% for the animal categories across the board, with the exception of insects at 39.1%. They also eat 96.3% of all the fish they know (Table 2). Yet, at the time of fishing by bailing (*puhanse*), many small riverine organisms such as predacious diving beetles, river prawn, and crabs are con-

sumed by women and children but do not appear in the food diaries kept by the two male informants. Nor do these diaries show consumption of domestic livestock, of which at least one variety is eaten, although infrequently (Table 13). So when it comes to animal foods, the Ngandu depend much more heavily on wild animals than on domestic ones.

At the same time, the Ngandu consider only 17.8% of the wild plants species they know as food, and they actually eat only 8.5% of all these plants. With cultivated plants, the matter is entirely different. Excluding the plants the Ngandu cultivate for medicinal purposes or for making tools, they eat 22 of the 26 varieties of plants they cultivate (84.6%). *Etete* seeds (*Treculia* sp., Moraceae), though considered as a food and gathered, are not as tasty as the African bread tree, *mbimbo* (*Treculia africana*), and are said to be eaten usually by women. Nevertheless, it was consumed only during the month of June and only 1.9 times (Table 12).

There is a tendency for Ngandu men to consume more frequently than women the main portion of an animal, called *bitamu*, which is considered good tasting. There are more food taboos restricting meat consumption by women than men. The consumption of many foods is proscribed by sex, age or some other factor. In some cases, only parts of animals are taboo. But for animals which are traditionally not eaten or for animals which are forbidden by law to be hunted, no part of the animal may be eaten by anyone (Table 24). A taboo that applies only to men is the eating of the head of the water chevrotain *lukulukya* (*Hyemoschus aquaticus*). This taboo is not a strict food restriction (*ekila*). The reason for the taboo is said to be that the animal resembles a fish because it lives near the water. The eating of domestic livestock and fowl is not proscribed in any way except for the sorcerer-hunter (*nkangohonda*) of *bohonda*-type net-hunting, who must not eat hens (Takeda, 1987, in preparation a). Only wild animals are the object of such dietary restrictions. Some 55.0% of eaten reptiles and auphibia, 45.2% of eaten mammals, and 28.3% of eaten birds fall under some sort of consumption proscription (food taboo), while only 5.8% of eaten fish and 2.0% of eaten insects come under these same consumption restrictions (Table 2).

Beeko refers to food taboos applicable to infants, pregnant women and the parents of young children (Takeda, in preparation b). It is said that breaking these taboos by accidentally eating a proscribed animal will give the children a serious illness called *botema* (in which the ribs are said to repeatedly move up and down), from which they may even die. Nevertheless the treatment for an infraction of the *beeko* is a homeopathic one, involving use of a part of the forbidden but eaten animal.[10] I take up this matter in detail elsewhere (Takeda, in preparation b).

Taboos on insect food consumption are also called *ekila*. There is only one such taboo, which is the eating of the lepidoteran larvae *lilangachike* (*Nudaurelia dione*, Saturniidae). One must not eat them as long as one's parents are living. One is released from the taboo only upon the death of both parents. A child who has lost his father may chew the *lilangachike* larvae only on the right side of the oral cavity, and a child who has lost his mother may chew it only on the left side.

Table 24. Restricted animal consumption of the Ngandu people.

Family name	Scientific name	Common name	Local name[1]	*Beeko*[2]			*Bolenga*[3]	Women	(I)[4]	(II)[5]	(III)[6]
				[1]	[2]	[3]					
MAMMALS											
Sciuridae	*Heliosciurus rufobrachium*	Red-legged sun squirrel	*bokoma*				X				
	Funisciurus pyrrhopus	Red-footed squirrel	*epehe*				X				
	Idiurus zenkeri	Pygmy flying squirrel	*indumba*	X		X					
Cricetidae	*Cricetomys emini*	Giant rat	*botomba*								X
Hystricidae	*Atherurus africanus*	Brush-tailed porcupine	*iiko*	X	X(Pm)	X	X(Pm-y)	X(y)[7]			
Manidae	*Manis tricupsis*	Tree pangolin	*ngaa*		X		X(Pm-y)				
Viverridae	*Nandinia binotata*	Two-spotted palm civet	*mbio*				X(Pm-y)	X[7]			
	Genetta spp.	African civet	*simba*				X(Pm-y)		X		
	Herpestes sanguineus	Slender mongoose	*bongeemu*				X(Pm-y)	X			
	Atilax paludinosus	Marsh mongoose	*buunju*	X		X	X(Pm-y)	X			
	Crossarchus obscurus	Dark mongoose	*ekanda*				X(Pm-y)	X			
		Mongoose	*imongone*				X(Pm-y)	X			
Hippopotamidae	*Hippopotamus amphibius*	Hippopotamus	*nguo*	X		X					
Suidae	*Potamochoeurs porcus*	Bush-pig	*nsombo*					X(Bh-m)	X		
Bovinae	*Syncerus caffer*	Dwarf forest buffalo	*mbolo*					X(Bh)	X		
	Boocercus euryceros	Bongo	*nkenge*	X		X	X(e)	X(Bh)	X		
	Tragelaphus spekei	Sitatunga	*mbuli*	X		X	X(e)				
Cephalophinae	*Cephalophus monticola*	Blue duiker	*boloko*				X(e)				
	C. callipygus	Peter's duiker	*mbengela*				X(Bh)X(e)	X(Bh)			
	C. nigrifrons	Black-fronted duiker	*mpambi*				X(e)		X	X	
	C. dorsalis	Bay duiker	*kuluha*				X(Bh)X(e)	X(Bh)			
	C. sylvicultor	Yellow-backed duiker	*mbende*				X(e)	X(Bh)	X	X	
Tragulidae	*Hyemoschus aquaticus*	Water chevrotain	*lukulukya*				X(e)				
Galagidae	*Galago demidovi*	Dwarf galago	*lisile*	X		X		X			
Lorisidae	*Perodicticus potto*	Bosman's potto	*kachu*	X		X					
Cercopithecidae	*Cercopithecus mona*	Mona monkey	*mbeka*	X		X		X[7]	X	X	
	C. neglectus	Brazza's monkey	*mpunga*	X		X					
	Cercocebus aterrimus	Black mangabey	*ngila*						X	X	
Colobidae	*Colobus angolensis*	Black-and-white colobus	*luka*	X	X	X				X	
	C. badius	Red colobus	*yemba*	X		X					

BIRDS									
Alcedinidae	*Megaceryle maxima*	Giant fisher	*bondongidongi*	X		X			
Bucerotidae	*Tropicranus albocristatus*	White-crested hornbill	*lochumba*				X(Pm)	X(Li)	
	Ceratogymna atrata	Black-casqued hornbill	*mpwa*				X(Pm)	X(Li)	
	Bycanistes albotibialis	Brown-cheeked hornbill	*yaata*					X(Li)	
Accipitridae	*Stephanoaetus coronatus*	African hawk-eagle	*punungoli*	X		X		X(Li)	
Phasianidae	*Guttera edouardi*	Crested Guinea-fowl	*lokanga*				X(Pm)	X	
	Gallus gallus domesticus	Chicken	*nkoko*						X(f)
Picidae		Woodpecker	*lingwele*	X		X	X(Pm)		
			yolo	X		X	X(Pm)		
			iyondooko	X		X	X(Pm)		
Rallidae	*Himantornis haematopus*	Nkulengu rail	*bonjemba*				X(Pm)		
Strigidae	*Glaucidium perlatum*	Pearl-spotted owlet	*eteketeke*	X		X			
?			*bofoafoa*	X		X			
?			*ihukihuki*	X		X			
REPTILES									
Elapidae	*Naja melanoleuca*	Black cobra	*biilimi*						X
Viperidae	*Bitis gabonica*	Gaboon viper	*lichulambwa*						X
Boidae	*Python sebae*	Common African python	*nkuma*		X				
Colubridae	*Natrix anoscopus*	Brown water snake	*liyoi*		X				
Elapidae	*Naja nigricollis*	Black-necked cobra	*bongeema*						X
	Dendroaspis jamesoni	Green Congo mamba	*lokonga*						X
[Squamata]		Snake	*lilembe*						X
Testudinidae	*Kinixys erosa*	Hinge-backed tortoise	*eulu*						X[7]
[Chelonia]		Tortoise[8]	*eyale*	X		X			X[7]
Crocodylidae	*Osteolaemus tetraspis*	Dwarf crocodile	*lokokwele*	X	X	X			
	Crocodilus niloticus	Nile crocodile	*nkoli*	X		X			
FISHES									
Bagridae	*Auchenoglanis punctatus*		*mpia*	X		X			
	Auchenoglanis sp.		*likanga*	X		X			
	Chrysichthys cranchii		*ekoli*	X		X			
	Chrysichthys sp.		*nkamba*	X		X			
	Heterobranchus longifilis		*sune*	X		X			
Distiochodontidae	*Distichodus antonii*		*mboto*	X		X			

(cont.)

(**Table 24.** cont.)

Ophiocephalidae	*Ophiocephalus obscurus*	*nsinga*		X	
Malapteruridae	*Malapterurus electricus*	*nchula*		X	X
INSECTS					
Saturniidae	*Nudaurelia dione*	*lilangachike*(9)	X		

X: Animals resticted to consumption as food (not as to the portion of the body, but as to the whole body).
Bh: Restricted animals which are hunted by *bohonda*-hunting directed by a hunting magician (*nkangohonda*).
Li: Restricted animals which are hunted by traps (*lilongi*).
Pm: Restricted animals which are hunted with the use of dogs (*paho-ambwa*).
e: The embryo of the animal involved is restricted to consumption.
f: Female animals involved are resticted to consumption.
m: Male animals involved are restricted to consumption.
y: Young animals involved are restricted to consumption.
[ ]: Order name.
(1) Local name is shown in singular form.
(2) *Beeko* [1]: Consumption of animals restricted for infants.
Beeko [2]: Consumption of animals restricted for parents, when wife is pregnant.
Beeko [3]: Consumption of animals restricted for parents with babies and/or infants.
(3) Consumption of animals restricted for a bachelor or a male adult who has not fathered a child.
(4) Consumption of animals restricted for a traditional blacksmith (*nkangosanda*).
(5) Consumption of animals restricted for a bush-pig hunting magician (*nkangohonda*).
(6) Consumption of animals restricted for a bow-and-arrow hunting specialist (*nkangalusala*).
(7) Restriction of this food is not always observed strictly; it depends on each women (*botolooto*).
(8) This tortoise is aquatic and hardshell.
(9) Children, along with both parents, are forbidden to eat, but orphans can consume the larvae without any attention to this food restriction. Children with only one parent are also allowed to eat, but must chew them on one side in the mouth.

In small-scale net-hunting with the aid of dogs, called *paho-ambwa* (for detailed discussion of hunting; see Takeda, 1984b, in preparation a), the dog chases a porcupine into a hole in the trunk of a tree. The hunter exercises the greatest caution in looking into the hole and then carving it open with an axe. If he injures the animal during the capture, neither a pregnant women nor her husband may eat it, because doing so is said to cause a difficult birth.

A restriction called *bolenga* requires that a sexually active, mature male who nevertheless has no children must avoid eating a young animal, the fetus, a portion of the innards of any animal caught in the hunting with dogs (*paho-ambwa*), or one method of net-hunting (*bohonda*). He must also refrain from eating the fetus of any animal regardless of how it is caught. One of the two males who kept the food diaries was married but had no children and the other was a bachelor, so this restriction applied to both informants.

Women must avoid eating some 28 species of animals. However, for five of these animals some women avoid eating them and other women do not. Such a restriction, which is rather lax, not strictly observed is called *botolooto.* Women must refrain from eating one kind of wild young animal and 11 species of adult animals caught in such hunts as *bohonda* net-hunting and *lilongi* trapping (Takeda, 1984b, in preparation a). They must not eat the male bush-pig caught in the *bohonda* hunting. If a woman eats any of these forbidden animals, the dogs used for hunting are said to get sick with *buugano* and be useless in any more hunts thereafter. But there is a treatment for dogs afflicted with *buugano.*[11]

There are food taboos that apply to occupational specialists. The specialist avoids the animals in question in order to prevent weakening his spiritual power that allows him to carry out his duties effectively. These restrictions apply to the sorcerer-hunter of the bush-pig (*nkangohonda*), the bow-and-arrow hunt sorcerer-hunter (*nkangalusala*), and the traditional blacksmith (*nkangosanda*). The *nkangohonda* must avoid eating the greatest number of species—nine; eight species of mammals and one species of fish. The *nkangalusala* must avoid only the giant rat. The *nkangosanda* must avoid a total of seven species; five mammals and two birds.

The followings are examples of taboos that apply not to the entire animal but only to a portion of it. The sorcerer-hunter of the elephant, the *nkangongala,* must not eat the eyeballs and the brains of the elephant. In addition, he must cut off the tip of the trunk of an elephant that has been successfully caught in an elephant trap (*elongo*) and bury it nearby. It is believed this important portion of the elephant corresponds to the human hand and must be disposed of so that it cannot be eaten by anybody. The *nkangotai* (the sorcerer-hunter of the net-hunt called *botai*) must not eat the liver or the *chungu* (the buttocks) of any animal, and he must not eat the head of *nyaama-alokolo* (plural, *nyaama-lekolo*)[12] animals other than the blue duiker (*Cephalophus monticola*).

There is a sorcerer-hunter, the *nkangalilongi*, who specializes in trapping, but no special food taboos apply to him. In addition, there are several other specialists who are not subject to food taboos: the *nkangalisanga*, a type of native medical doctor

who has no involvement whatsoever with hunting; the *nkangandoho,*[13] a sorcerer; the *nkangosako*, a specialist who prays to the spirits of the forest for a successful hunt; the *nkangalokano*, the keeper and speaker of the legends, history and songs of the Ngandu (see Kano, 1987 as to the detailed tales); and the *nkangoonga*, a sort of traditional native chiropractor.

Women are forbidden to eat the following parts of the following animals: The heart, kidneys, liver and buttocks of animals taken in traps; the *lisolo-looloko* (the heart and lungs), *imbombo* (the part of the stomach nearest the trachea), and the diaphragm of any animal caught in the hunt (*paho*), the *boote* (the head) and the *lihimo* (the skin and meat of the belly) of the *nyaama-alokolo* taken in the *paho* hunt. Women are not supposed to eat birds shot with a bow and arrow, but some women eat such birds anyway. Therefore, such a taboo as to eating birds is also considered *botolooto* food restriction, a taboo not strictly observed. The *nyaama-alokolo*'s *boseko* whose portion includes the surface layer of muscles on both sides of the head were once eaten by men only; now, women also eat this part.

The young animals of *nyaama-alokolo* and *nyaama-kolomo*[14] must not be eaten by women or by childless men, but in about 1960 this restriction was abolished by govermental decree. At present, a restriction exists for the young of *nyaama-kolomo* as well as birds taken in the *paho-ambwa*. The kinds of animals subject to *ekila* keep changing, and some animals have been removed from it over time. Also, restrictions that apply to occupational specialists when they are active are lifted when these men retire from their trades, so the taboos are not for life. Nor is there any social sanction against the violation of a food taboo. Instead, in most cases, violators have the option of pursuing appropriate medical treatment for their transgression (Takeda, in preparation b).

DISCUSSION

I. The Stability of the Forest Habitation

With the exception of the oil-palm, the food repertory of the Ngandu does not include no products from West Africa. Grains such as sorghum and millet are unsuitable for cultivation in the humid tropical rain forests of the Zaire basin. The Bantu-speaking ancestors of the Ngandu began migrating out of their central Cameroon homeland sometime in the third century B.C. (Philipson, 1977). They skirted the tropical rain forest on its northern side, spread to the east and then to the south, and they followed the coast down through the rain forest to the south. The Zaire basin forms part of the home range of the Mbuti, the original inhabitants of the forest. The Bantu agriculturalists penetrated the interior regions of the tropical rain forests only after the introduction of food plants from Southeast Asia: the Asian yams, taro, and bananas. Grenfell (Johnston, 1908) also notes the poverty of plant foods in tropical Africa and, in particular, the Zaire basin, and traces the presence of

food plants (banana, taro, yam) in the Zaire basin to the end of the fifteenth century. At present, none of these items has any value as a staple in the Ngandu diet.

After the sixteenth century, with the rise of the slave trade, New World food plants from South and Central America—chiefly cassava, maize and groundnut—were introduced into Central Africa and the coastal regions of West Africa by the Portuguese and the Spanish. Cassava brought to the mouth of the Zaire River in the latter half of the sixteenth century by the Portuguese was suitable for growing in the tropical rain forests of Zaire and rapidly diffused to the river regions. The Zaire basin in particular is one region in which the cultivation of cassava has been the most spectacularly successful (Jones, 1953; Johnston, 1908). Although the Bantu intrusion into the tropical rain forest was in part motivated by a need for clearing the forest to create fields for cultivation, Sahlins (1972) points out that slash-and-burn agriculture itself requires that large areas lie fallow and that the population be dispersed.

There is no doubt that the diffusion of the necessary metal axes eased the Bantu agriculturalists' work of clearing the forest. When the Luba of the Sankuru basin, who were armed with guns, invaded the Lower Kongo tribes at the end of the fifteenth century, the invaded peoples had no metal weapons (Clark, 1962). The large-bladed *mongenda* axe manufactured in the West began to replace the traditional *liswa* axe only with the onset of Belgian colonial rule. Its diffusion probably speeded up after the end of World War II. The Belgian Colonial Government encouraged the cultivation of cassava, but it appears that it was only in this century that Bantu agriculturalists penetrated into the very heart of the tropical rain forest (Purseglobe, 1976). It is entirely possible that Bantu agriculturalists fleeing from the slave trade had fled to these interior regions earlier, bringing cassava with them.

The Azande (not a Bantu-speaking people, but instead, who belong to the Eastern Nigritic peoples of the yam belt) settled along the Zaire and Uele Rivers, and whose livelihood was based on the use of New World crops, spread to the east during the late eighteenth–early nineteenth centuries and subdued the neighboring central Sudanic tribes (Murdock, 1959). The Azande forced the Mongo peoples inhabiting both sides of the Uele River as well as the region between the Uele and Zaire Rivers deeper into the Zaire basin (Molin,1933). In this fashion, Bantu-speaking agriculturalists moved into the territory of the original forest dwellers, the Bambuti, and by subjugation and intermarriage, spread throughout and settled in the rain forest.

The Ngandu divide the year into two seasons: *Elanga*, a period of little rain, and *eula*, a period of relatively heavy rainfall. The cultivation of cassava—its planting and harvesting—has few chronological limits and is practically independent of the seasons. Thus this casual, non-time and/or labor-intensive mode of farming never developed the agricultural calendar and rigid agricultural cycles typical of the savanna agriculturalists of East and West Africa. Cassava cultivation allows time to pursue other occupations and spurs the development of a rich and diverse hunting technology (Takeda, 1984b, in preparation a), though this also depends on the availability of game.

In the savanna, one hectare may have an annual net yield of two to four tons. In the tropical rain forest, one hectare may have an annual net yield of 25–40 tons (Kawai & Sawada, 1980). The Ngandu are fortunate in this environment. The Ngandu dependence on this introduced plant, cassava, is heavy and part of the explanation for its ecological success is supported by the robustness of the plant. Cassava is an extremely ecologically adaptable plant. Its yield is two to three times richer than that of grain (Moran, 1975) and unlike grain, it is not prone to insect damage from unusual concentrations or periodic plagues of desert locust (*Schistocera gregaria*), migratory locust (*Locusta migratoria*) or oedaleous grasshoppers (*Oedaleus senegalensis*). It is not susceptible to damage from birds such as the Sudan red-billed quelea (*Quelea quelea*) (Takeda, 1984a, 1990). It is not easily subdued by weeds. It is easily cultivated in even poor soils and yields large crops with little effort. The Ngandu have relied on the animal resources available to them and took maximum advantage of the indigenous forest plant foods.

The so-called "famine foods" seen among the savanna agriculturalists such as the Bemba (Richards, 1969), who must cope with seasonal shortages of food ("the hunger months"), or among other savanna agriculturalists who often face the danger of "pre-harvest hunger" when the previous year's stock has been depleted and the new harvest is not yet in (Annegers, 1973a, 1973b), are virtually unknown among the inhabitants of the low-latitude tropics. The rain forest is richest in plant and animal resources. Furthermore the humidity of the tropical rain forest did not positively spur the development of a food storage technology, due to the stability of forest habitation. The weather varies little at the equator, so the availability of food is not seasonally affected, except for a few food insects and fruits whose appearance and use is seasonal. The cultivation of grains that are a staple crop of the savanna agriculturalists is difficult because these grains are susceptible to damage by insects, wind, drought, and thereby expose the population to famine. This factor that spurs the development of such storage technology is entirely missing. The tropical rain forest is not easily susceptible to critical situations such as famine due to irregularities in the weather, and in any case, tuber cultivation has the advantage of suffering no damage other than that caused by elephants and small animals.

However, although the Ngandu agriculturalists of the tropical rain forests of the Zaire basin make some use of wild and cultivated varieties of yam and important rhizome-like cassava, they make no use at all of the indigenous yellow Guinea yam and white Guinea yam developed as crops in the tropical rain forests and/or along the margins on the West African Guinea coast and Guinea savanna, a vegetation zone called the "middle belt" in Nigeria, transitional between the tropical rain forest and the Sudan savanna (Takeda, 1990). The West African yam belt agriculturalists, whose cultural system places great importance on yams and favor the taste (Coursey & Coursey, 1971) and even now continue to cultivate yams many centuries after it was originally semi-cultivated (Takeda, 1990). The Ngandu preference for cassava represents a strikingly different ecological background. One possible explanation is the recentness with which agriculturalists penetrated and settled the tropical rain

forest—too recent perhaps, to develop yams independently as a crop. More likely, yam cultivation is simply ecologically disadvantageous in the tropical rain forests of Zaire and the Ngandu selected cassava as the crop of choice because it could be raised without great difficulty. The cultivation of yams is labor-intensive. It requires building mounds to plant the seedlings, mulching (spreading hay or dried grass over the plants to protect them from heat and dryness) and staking (placing sticks or saplings around which string is tied [Takeda, 1990]). At the same time, as Harris (1972) points out, sharply defined wet and dry seasons are better suited to fully developing the nutritious tubers during the dry season when the plants are dormant. For Bantu agriculturalists penetrating and settling in the tropical rain forests of Zaire, cassava can be said to be the ideal crop.

It is said that when the Ngandu had to move away from their places of settlement to new homes (*bolochi*) to escape Arab slavers or intra-tribal and inter-tribal warfare (*bita*), they sometimes faced food shortages (*lochi*) and sometimes even left their children behind. The *Bokukula* people of the Kasai River to the south of the Lomela River (Fig. 1) came armed with guns to catch slaves (*bombo*, plural, *baeombo*) under the guidance of Arab traders (*boita*). The ancestors (*bakoko*) of the Ngandu, who resisted these incursions with only bows (*belele*) and shields (*ngua*), in the end fled into the interior of the forests (Takeda, 1984b, in preparation b). It is said that the slave traders occupied the whole region around the state of Equateur. The gun-toting Kasai peoples traversed the state of Equateur at will even after the Arabs departed but were driven out of Pango and Ilongo in the Zone d'Ikela by the government during the period of Belgian colonial rule (Takeda, in preparation b).

In addition, the people fled into the forest very recently as well, with the 1960 war of independence and the following civil wars in Zaire. During times of famine (*lochi*, plural, *jochi*) due to human causes, the Ngandu subsisted on *bohekiheki* bush yam (*Dioscorea smilacifolia*)[15] which produces an edible tuber (*eheki*) and *bokana* nut (*Panda oleosa*, Pandaceae). It appears that when they could find land, they could subsist on whatever that grew in the forest without having to depend on cultivated plants such as cassava. In particular, the *bokana* nut which contains albumen and is covered with a hard husk, can be stored naturally. It can be cracked open only with a rock, so there is little competition from other animals for this nut. For humans, it is an advantageous food source. The Ngandu say that there is an unlimited supply of these nuts in the forest. The *bokongo* nut (*Antrocaryon micraster*, Anacardiaceae), which resembles the *bokana* nut, is usually eaten raw, but the *bokana* nut, which is sometimes eaten raw, is usually salted and mixed with red pepper and then roasted. As mentioned previously, it is once again necessary to point out that food use is determined by the forest's rich and abundant supply of indigenous foods, the availability of which is not seasonally affected.

The Ngandu's development of a wide and varied repertory of hunting methods and their thorough use of the animal foods available to them can be taken as the epitome of a positive relation to the tropical rain forest. At the same time, it has not deepened their dependence on domestic livestock and poultry.

The frequency of consumption of food insects seasonally increases in August–November. Variations in the consumption frequency of animal food reflect the density of game, the success or failure of hunting and the intensity with which hunting is conducted. The volume of fish caught in many large and small rivers that run like a network through the tropical rain forest of the Zaire basin is regular and stable, and is an important supplemental source of animal protein. *Puhanse*, a method of fishing conducted by women and children in which a section of the river is blocked off and the water bailed out of the enclosure to reveal the fish, is the simplest, yet the surest fishing method (Takeda, 1987). When the rains let up in March and April and fishing expeditions start up, both the number and species of fish consumed increase. The decrease in the consumption of fish in August is due to the concentration of the women and children on gathering food insects. The consumption in April of two species of water snakes and of the dwarf crocodile (*Osteolaemus tetraspis*) is related to the flourishing resumption of fishing activities during the dry season called *elanganse*. The decrease in the relative proportion of mammal consumption during March and April is due to the greater emphasis placed on fishing rather than on hunting at this time.

The Ituri forest, characterized by three types of climax forests of *Cynometra alexandri*, *Gilbertiodendron dewevreii* and *Brachystegia laurentii* belonging to Caesalpinioideae, is situated on the eastern edge of the rain forest (Itani, 1974). Further east lies the wooded savanna, a transitional zone or ecotone between the savanna and the rain forest. The wooded savanna, which lies at a higher latitude than the Zaire basin, is not as humid as the Zaire basin and is characterized by a substantially fewer variety of trees. The plant foods utilized by the Mbuti (*batwa*) who live in the Ituri forest number about 60, including ten kinds of tubers, 15 kinds of nuts, 17 kinds of baccates and 18 kinds of mushrooms (Ichikawa, 1976). A wide variety of wild plants are utilized. The Mbuti are in a symbiotic relationship with neighboring agricultural peoples (the Bantu-speaking Bila and the Sudanic Lese) with whom they exchange meat for the cultivated products. The agriculturalists in this type of relationship generally utilize the secondary forest growth around their villages (Ichikawa, 1978) but have little to do with the primary forest in the interior of the secondary forest growth. The reason why the Ngandu, who are also agriculturalists, have an intimate relationship with the primary forest through their hunting, fishing and gathering is because the Mbuti population of the Zaire basin is small even when those of mixed Bantu and Mbuti blood are included. The Ngandu do not compete with a hunting people and do not depend on a symbiotic relationship with such people for animal protein, so their tie to the forest is greater. The reason why we do not see the same widespread use of plants among the Ngandu that we see among the Mbuti is partly because of the basic difference between the subsistence strategies of a hunting people as opposed to that of an agricultural people. It is also due to the species diversity that comprises the flora as well as to the shortness of the history of the Bantu agriculturalists' invasion into the forest which began approximately several hundred years ago. Most likely, however, the introduction of cassava and the

richness of animal resources precluded any desire to develop the use of wild food plants to great degree. That there are only two cultivated plants of which more than one part is eaten (cassava and oil palm), that there are absolutely no gathered food plants of which more than one part is eaten and that virtually no semi-cultivated plants[16] have been developed (Takeda, 1984a), may all be taken as a sign of this abundance of natural resources.

At the same time, the San of the Kalahari Desert, who inhabit open lands that are not as rich in species of trees as are the tropical rain forests, utilize 70 different plants as food (Tanaka, 1971). However, even though the soil is sandy as in a desert, there are bushes and undergrowth of high grass, making the desert resemble a savanna. So even the savanna is by no means poorly vegetated, there are many open areas in which one can make full use of a variety of plant resources.

The hard-shelled nut of the euphorbiaceous tree "mongongo" (*Ricinodendron rautanenii*) is the staple food of the modern !Kung San throughout the year and accounts for over two-thirds of all their food (Lee, 1965, 1968, 1969). The Central San, who subsist by seasonally gathering the leguminoseous (Caesalpinioideae) *Bauhinia* nut, eat 100 plants but a mere 18.5 animals in terms of the weight proportion. Both types of San therefore depend on plant foods to survive. They should gather their food plants daily, so it is understandable that they use many such plants.

II. The Nutritional Backgrounds of the Food

Maize yields 7 million kilocalories per hectare annually, and bananas 11 million kilocalories. Cassava, on the other hand, yields 20 million kilocalories (Fleuret & Fleuret, 1980). In addition, cassava's yield per unit area is greater than that of rice, wheat, maize, sorghum, sweet potato, yam, taro and banana (De Vries et al., 1967; Georing, 1979). Compared with other staple food crops, cassava has this major advantage but also the following disadvantage: the tuber that forms the edible part of the plant is composed mainly of starch and is only 1% protein by dry weight—the lowest proportion of all the major food crops. The agricultural peoples of tropical Africa who grow cassava are chronically afflicted with a protein deficiency called kwashiorkor, a nutritional dystrophy caused by protein-deficiency (Takeda, 1990). Although the deficiency does not affect full-grown adults, it does have a critical effect on young children and pregnant women (Owen, 1973). The disease is virtually endemic in regions where the staple food is protein-poor rhizomes and the accompaniments are also low in protein. The Ngandu do not cultivate protein-rich beans except for peanuts which is one of the introduced food plants originally cultivated in America, and even the volume of peanuts cultivated is not much. Nor do they gather wild beans although there are many leguminoseous species in the forest which have the potential of being utilized as food by humans.

Domestic livestock and poultry are neither raised nor consumed in any large numbers. Though kwashiorkor is not unknown among the Ngandu, it is not common either. The Ngandu hunt, fish and gather in the tropical rain forest, an area rich in

both plant and animal resources. They have a set of dietary taboos that regulates the consumption of animal foods by infants and by both their parents, taboos that are socially sanctioned, while adopting daily an extremely frugal cooking style. For example, meat with the bone still attached is pounded and crushed, wrapped in leaves, and then steam-cooked, thus utilizing skin, marrow and blood. The Ngandu also make plentiful use of a variety of plant foods and thus ensure themselves of an adequate supply of animal protein as well. The criticism that cassava is probably the worst food in the world in terms of nutritional value (Owen, 1973) does not mean much in a place like the Zaire basin, in which the diet can be supplemented with animal protein.

Cassava contains toxic cyanic acid. There are two varieties of cassava: sweet cassava, in which the amount of cyanic acid in every kilogram of the tuber is 50 milligrams or less, and bitter cassava, with a cyanic acid content of 100 milligrams or more (Bolhuis, 1952). Most of the cassava the Ngandu grow is the bitter variety, and they remove the toxin by soaking the cassava and then heating it as stated above. This process, however, removes some of the vitamin C, calcium, thiamin (vitamin B_1) riboflavin (vitamin B_2) and niacin (Oke, 1968). People outside Africa also eat the leaves of the cassava, and the Ngandu, too, use these leaves with great frequency on a daily basis as a kind of snack. The leaves, like the tubers, contain cyanic acid and so are not eaten raw but must be pounded and then heated. The leaves contain not only 30–40% protein by dry weight, but also much larger amounts of vitamins A and C than the tubers (Onwueme, 1978). Thus the nutritional value of cassava leaves cannot be ignored, for they also contain more vital aminoacids, except for methionine and tryptophan, than soy beans (Eggum, 1970; Rogers & Milner, 1965).

Grenfell (Johnston, 1908), who visited the Zaire basin in the late nineteenth century, labeled the Mongo peoples "the great insect-eaters" because of the variety of insects they ate. The Ngandu eat a total of 51 different species of insects, including one species that was eaten in the past but no longer. Some of these species of insects are eaten in both their larval and adult (or imago) stages, and all are eaten in one or another stage—egg, larva, pupa, imago. Of the 17 species of insects noted in the food diaries kept by the two adult male informants, one species was eaten as pupa as well as larva. Including the larvae of others (bees) which were eaten along with four different honeys, the total number of species amounts to 21. The remaining species fall within the category of "food" but are rarely consumed. In a nutritional analysis conducted on four species of insects eaten by the inhabitants of Angola by Santos Oliveia et al. (1976), findings concerning the termite *likalolo*, which is similar to *Macrotermes subhyalinus*, and the *lohose* palm weevil beetle (*Rhynchophorus phoenicis*) are instructive. Both these insects contain relatively large amounts of fat. *Macrotermes* contains large concentrations of copper and manganese. *Rynchophorus* contains large concentrations of copper and zinc, as well as vitamins B_1 and B_2. This information confirms Bodenheimer's contention (1951) that one reason people living in the tropics eat insects is to supplement a diet of plants that have few B-group vitamins. The importance of insect foods should also be stressed in terms of

mineral content and also in terms of fat and protein intake, especially methionine (Owen, 1973), as in the case of the Yukpa of the Amazon basin who eat 22 kinds of insects (Ruddle, 1973). Beckerman (1979) points out the importance of insect foods as a supplemental source of animal protein among the tribes of the Amazon basin (who also inhabit a tropical rain forest like the Ngandu) during periods in which hunting and fishing are not conducted, when vertebrate game is scarce, or during the rainy season when food is short. In the Zaire basin, however, women and children concentrate on the gathering of seasonal insects. The intensity of labor for insect-gathering is allocated to hunting or fishing activities during the *luuma* season.

As for termites, the method of gathering the winged reproductives, which swarm for a limited period of time (usually before or just at the beginning of the rainy season), is quite different from the destruction of a part of the termite mound to get at the termite soldiers. This method is not seasonal and can be done year round. Chitin-armored imagos have part of their wings removed and those with spines have them bitten off or burned off as much as possible. Termite soldiers are ground—hard heads and all—with a mortor and pestle, so chitin is consumed. However, since the human digestive tract lacks the enzyme chitinase, the chitin remains undigested and its nutritional value is nil (Gorham, 1979). Even so, the termite mounds represent a virtually inexhaustible natural reservoir of animal protein, vitamins and minerals.

The Ngandu inhabitants of Pango, who reside adjacent to the Ilongo (the two are in different administrative groupements), eat the *bembe* African snail (*Achatinidae fulica*) but the inhabitants of Ilongo do not eat them. The Ngandu do not eat the *linyenye* cricket (*Brachystryes membranaceus*), yet the people of the Bandundu region do eat it. Thus the different tribes of the same tropical rain forest eat a wide variety of insect and animal foods while at the same time being selective according to their own traditions. When informants say that "the so-and-so eat such-and-such but they themselves never touch the stuff," one gets the impression that they are expressing disdain for what others eat and simultaneously a sense of superiority about what they themselves like to eat. The people have long-developed indigenous traditions of eating insects and have their own preferences, and we must not overlook the traditionally determined attractiveness of tastes they cannot get from meat or fish even as we examine the nutritional aspects of the matter.

III. Food Repertories, Food Taboos and Natural Resources

In addition to cassava and maize, other crops which came from New World include sweet potatoes, pineapples, tomatoes, avocados, papaya and spices such as red pepper. Southeast Asian food plants include bananas, rice, eggplant and sugarcane. Besides all these introduced crops in the Ngandu food repertoire, the foods consumed by them are summarized in Table 2. Although there is a wide variety of foods consumed or recognized as foods, and various parts utilized, a complicated network of food restrictions is observed among the Ngandu. These food taboos, which are

widespread throughout the Mongo peoples (Kano, personal communication; Sato, personal communication) vary even from region to region within the Ngandu tribe, so that some women may not eat the same foods, and the taboos are in fact not strict (Table 24). Among the Mbuti, 89 of the plant and animal species they consider as food are subject to some sort of restriction (Ichikawa, 1977, 1987). Ichikawa points out that these restrictions change over the course of an individual's lifetime, from restrictions that apply to the pregnant mother and to the married couple to restrictions that are in force after the child is born, grows up and reaches old age. Restrictions that apply to pregnant mothers, couples with children, sexually active bachelors, and to women only can be seen among both the Mbuti and the Ngandu, although the Ngandu have a larger number of restrictions that apply to women. From a nutritional standpoint, such food restrictions act to artificially restict the intake of animal protein and so may be considered a negative factor in terms of human life support. These restrictions may have resulted from attempts to cope with life-threatening illnesses of unknown causes, but they may also be said to be social agreements in the form of a variety of food regulations which act as a kind of social filter on the very ordinary activity of eating. These social restrictions are applicable to child-reproducing women, infants and sexually active males, and are designed to ensure the population levels necessary to ensure the sustenance of future generations.

The application of artificial constraints on the consumption of a variety of animals can also be thought of as a dual-purpose mechanism designed also to protect and regulate the wild animal population. Among the Ngandu, however, an individual can capture and kill animals that he is forbidden to eat. He will typically bring the animal back to the village and distribute the meat to people as gift or favor. So these regulations have only a minor role in the conservation of the animal population itself. Also, animals or parts of animals subject to dietary restrictions based on sex, age, or hunting method are not a major part of the Ngandu diet anyway, so such regulations do not in any way pose a grave danger to the maintenance and support of the group. In addition, there is little doubt that the thoroughness with which the Ngandu utilize the animal resources surrounding them negates any nutritional insufficiencies engendered by the food restrictions. For example, although the Ngandu do not practice milking animals, they eat the fetuses of mammals (hairless or not). When they kill young unweaned animals (*liyele*), they favor the cheese-like lumps of hardened milk (called *lomata-la-nyaama* which means "meat cassava") found in the stomachs of these animals which they season with red pepper. They do favor the mammary glands (*liyele*) of female mammals, too.

The Ngandu say that red pepper is a spice indispensable to Ngandu cooking on a daily basis and the cheese-like substance obtained from young animals is as important as red pepper. This portion is not always used as a spice, but it is perhaps thought to be like red pepper because of its strong smell. The Ngandu also eat the animals found in the stomachs of snakes and they steal animals that have been caught by predatory birds. They also eat fertilized eggs, and the fetus (*iyemu*; plural,

baemu) whether it has hairs (*bosiya*) on the body or not and whether it is small or large. Therefore, the Ngandu would probably think the eating habits of the inland Tongwe (Takeda, 1984a) scandalously wasteful, different though these habits are, due to reasons of preference, cultural tradition and even religion. The Tongwe cultivate such high-protein crops as maize and kidney beans (*Phaseolus vulgaris* [Kakeya, 1974; 1976]) but also conduct big game-hunting expeditions for large mammals with muzzle-loading guns (Takeda, 1976). They discard the fetus of any pregnant hippopotamus killed, for example, and they leave the carcasses of elephants to rot after they have taken the tusks.

There is a great difference between the subsistence strategy of agriculturalists and that of hunter-gatherers. The Ngandu use elaborate hunting techniques which enable them to utilize a wide variety of animal foods (Takeda, 1984, in preparation a). On the other hand, hunter-gatherers like the Mbuti capture animals using a limited number of hunting methods (Harako, 1976; Ichikawa, 1983; Tanno, 1976), which serve to greater conserve the natural resources. In contrast, the elaborate hunting techniques of the Ngandu agriculturalists and their maximal utilization of resources may lead to the over-exploitation of the tropical rain forest fauna.

NOTES

(1) Although Kimura (1990) uses the name 'Bongando' to refer to this ethnic group, Ngandu is adopted here,based on Murdock (1959) and other researchers. It is believed by the Ngandu people that their legendary common ancestor Bongando is a son of Mongo. The estimated population of the Ngandu was reported to be 200,000 by Kerken (1944), and 250,000 by Murdock (1959). An accurate population census has not been done recently, but Kimura (1990) estimates 450,000–500,000, based on a rough population growth rate of 2.0% per year. See Fig. 2 for the population of Wamba, a village (*boola*) in the Zone de Djolu shown in Fig. 1.

The history of the Ngandu will be discussed in another paper (Takeda, in preparation b). The Ngandu are presumed to have come to this area 200 years ago (Kerken,1944).

(2) Called *nganda* in the Lingala language; usually inhabited for three to four months. Villagers do not stay away from the village for more than six months at a time due to the work that must be done at home, in the fields, and on the roads (this last is called *salongo* and consists of repairing the roads, cutting the grass, etc.). There are several types of *kumbo*: (a) *Isowa*, which is a *kumbo* set up by one or two men (no more than four) for individual bow-and-arrow hunting (*lotongo*) and trapping (*lilongi*). (b) *Ihombo*, a *kumbo* of at least seven or eight men for conducting *botai* (collective net hunting) and *bakimano* (collective bow-and-arrow hunting). They usually build eight to ten *lilombe* (simple huts of *bombongo* leaves [*Gilbertiodendron dewevrei*, Caesalpinioideae], without the use of earth or dirt from termite mounds). (c) *Lihano*, a *kumbo* for a single *nkangongala* (a sorcerer-hunter skilled in hunting elephants) and his two helpers (*ekoho*), who may live there three or four months while they set as many as 10-20 elephant *elongo* (elephant traps). They build two or three *lilombe*. It is permitted to bring wives and children, but sexual intercourse is taboo until an elephant is caught. A *lilombe* built along the river (usually along the Luo River) for fishing is called a *kumboase*.

(3) *Beengo* means to get cassava or the stalks used for transplanting cassava. They can be obtained through barter, but between closely related people, they may be free. This second type of relationship is called *likahi*. A relatiohship in which the cassava is purchased with cash, etc., is called *biima*. Women, who manage the fields, decide whether to sell or to barter.

(4) Yaseka is made up of seven lineages: Yolumbo, Yohaliyongo, Yabonjosai, Yasimbo, Ehondo, Ingoli and Yalokende. At the time of my second period of fieldwork in 1977, a married couple of the Yalokende lineage was building a home at Bowa, the study site.

(5) Satoh (1984) also divides foods into main dishes, side dishes (accompaniment), and snacks (foods that do not accompany an accompaniment) except for beverages such as liquor and coffee.

(6) At the study site in 1977 there was one young oil-palm tree that bore fruit, but only in small quantities. Most such fruit is brought in from Wamba in the Zone de Djolu or from Ilongo in the Zone d'Ikela, although oil-palms propagate naturally in secondary forests and fallow lands.

(7) In a village called Sema (the name of the "groupement") in the Zone de Djolu, a man born in 1935 first began making rifles. Now it is said that there are people who make guns in the Zone d'Ikela as well (Takeda, 1984b, in preparation a).

(8) Men make string from the fibers found in the cambium of the euphorbiaceous tree vine. They use this string to weave the hand-nets (*lisangi*) and bag-nets (*liheta*) used in fishing, and the *botai* nets used in hunting. They also use it to tie arrowheads to the shafts of the arrows.

(9) The inhabitants of the tropical rain forests of Ghana also utilize the bark of this tree for the same purpose (Irvine, 1961).

(10) The chief cures involve either giving the patient an enema (*lichule*) or cutting the lower portion of the belly with a traditional long and slender knife (*lokengo*) and smearing the wound with charcoal made by burning the feathers of an African hawk-eagle, the skin and bones or horns of a sitatunga (*Tragelaphus spekei*), the spines of the jaws of the *mpia* fish (*Auchenoglanis punctatus*), or the spines of the *likanga* fish (*Auchenoglanis* sp.) (Takeda, in preparation b).

(11) The cure for dogs afflicted with this illness involves boiling the bark of the *bolengalenga* (*Cissus* sp.) of Vitaceae and *liiye* tree (unidentified) and then cooling it. The dog is placed in a type of basket called *losingi* and the liquid is poured over its body starting from the head.

(12) A large animal classification of the Ngandu and the general term indicating docile antelope species. In contrast to *nyaama-alokolo*, there are *nyaama-kolomo* (see also Note 14).

(13) These are people who cure serious illnesses brought on by sorcery, though they are also thought of as evil-spirited *doki* who are called *boloki* in the Lingala language (Kano, 1987; Takeda, in preparation b).

(14) The general term for short-legged, aggressive carnivores that are difficult to subdue when captured unlike the gentler species of antelopes (*nyaama-alokolo*, see Note 12).

(15) This barbed vine is called *bohekiheki* and often used in spring traps (Takeda, 1984b, in preparation a). The subterranean stalk is small and thin, but can be eaten after being processed by heating.

(16) Some lone *bosou* tree (*Dacryodes edulis*, Burseraceae) and *bolingo* tree (*Anonidium mannii*, Annonaceae) are grown in the vicinity of the settlements, but not many. Their cultivation cannot be said to be systematic. It is one species that could be a candidate for

proto-culture (Coursey & Coursey, 1971). In addition, oil-palms (*Elaeis guineenisis*, Palmae) propagate naturally in secondary forest and fallow lands.

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